

RESEARCH ARTICLE



Overview of current research on traditional Chinese medicine in skin disease treatment: a bibliometric analysis from 2014 to 2024

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ABSTRACT

Context: Recent research has revealed significant advancements in the field of traditional Chinese medicine (TCM) for skin diseases. However, there is a lack of visualization analysis within this research domain.

Objective: To analyze the research directions and advancements in TCM research in skin diseases.

Materials and methods: Publications related to TCM in skin diseases from 2014 to 2024 were searched on the Web of Science Core Collection (WoSCC), VOSviewer, CiteSpace, and the R package “bibliometrix” were employed to visualize and analyze the retrieved data.

Results: The study included 527 articles published in 25 countries. The number of publications consistently increased from 2014 to 2024. The Guangzhou University of Chinese Medicine was the most noteworthy institution in this field. Among the journals in this domain, the *Journal of Ethnopharmacology* was the most popular, and most frequently co-cited journal. Chuanjian Lu published the most papers and Yin-Ku Lin was the most frequently co-cited author. Among keywords, “psoriasis” appeared the most frequently. Additionally, several emerging research hotspots were identified, indicating the transition from traditional Chinese therapies to investigations of the molecular interactions and network pharmacology of Chinese herbs in treatment of skin diseases over the past decade.

Discussion and conclusion: This visualization analysis summarizes the research directions and advancements in TCM research on skin diseases. It presents a comprehensive examination of the latest research frontiers and trends and serves as a valuable reference for scholars engaged in the study of TCM research.

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Introduction

Skin diseases are prevalent ailments affecting individuals across various cultures and age groups, and have long been a significant concern for humanity. Skin diseases are the fourth leading cause of non-fatal diseases burden around the world (Hay et al. 2014). The impact of these ailments is widespread, with an estimated 30–70% of the global population affected, and even higher rates among susceptible groups (Hay et al. 2014). Unfortunately, despite their profound impact, skin diseases have received limited attention in national and global health discussions.

Traditional Chinese medicine (TCM) has been a rich clinical practice and a theoretical principle for ancient Chinese people for > 5000 years to struggle against diseases and is important in skin disease treatment. Local reaction treatment based on syndrome differentiation is the characteristic treatment method of TCM and the core and foundation of the skin disease treatment. Skin diseases manifest on skin surface; however, their root cause and the internal dysfunction of “qi,” “blood,” and “zang-fu

organs” are closely related. In clinical practice, “blood syndrome differentiation,” “meridian syndrome differentiation,” “viscera syndrome differentiation,” “eight outlines syndrome differentiation” and other methods can be used to treat the skin disease syndrome differentiation. Skin lesion syndrome differentiation is the main skin disease diagnosis and treatment in TCM and can effectively increase the accuracy of diagnosis and treatment of skin diseases. Herbal therapy is the mainstay treatment modality in TCM. Most herbal concoctions are combinations of a few herbs used to rectify imbalances in the internal milieu of the patients, and has unique characteristics efficacy advantages for skin disease treatment (Li et al. 2007). TCM external treatment has a long history, from the single pure use of plants, fire baking, and other direct contacts with the skin to relieve the symptoms. Current developments include “paste rubbing,” “fumigation,” “wet compress,” “stick compress,” “cupping, fire needle,” “plum blossom needle,” “umbilical,” “puncture blood,” and other characteristic therapies, which have been extensively applied in clinical

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contexts (Wang et al. 2019). TCM also offers an extensive repository of natural products, enriched by its long-standing history of application and significant potential for drug development. Novel drug candidates derived from TCM and its extracts are currently attracting substantial research attention (Shergis et al. 2016).

Bibliometrics is a methodology for literature analysis that evaluates the publication output and status within a specific research domain using quantitative and qualitative lenses. This process involves extraction of essential insights from a multitude of published studies (Chen and Song 2019; Bai et al. 2023) and supports establishment of networks that focus on collaboration, co-citation, and co-occurrence. Powerful visualization tools such as VOSviewer, CiteSpace, and the R package “bibliometrix” are widely utilized in medical contexts to enhance analysis capabilities. However, there is a notable absence of visual exists within the realm of TCM research on skin diseases. This study aimed to address this gap by conducting a comprehensive bibliometric analysis of TCM research publications in the field of skin diseases spanning the 2014–2024, and to identify key contributors and the current research landscape, while forecasting new trends and further development opportunities in the field (Cai et al. 2023).

Materials and methods

Search methodology

Data were collected from the Web of Science Core Collection (WoSCC) database on 15 May 2024. The following search criteria were used: TS = (“Chinese medicine” or “traditional Chinese medicine” or “Chinese herbal medicine” or “Chinese materia medica” or “TCM” or “Chinese medicine and drugs” or “Chinese herbs” or “traditional Chinese treatment” or “traditional Chinese medicine treatment” or “herbal therapy” or “acupuncture” or “needle moxibustion” or “homeopathy” or “homeotherapy” or “manipulation” or “Chinese massage” or “Chinese external application”) AND TS = (“skin disease” or “skin disorder” or “dermatopathy” or “dermatopathy” or “dermatologic diseases” or “eczema” or “psoriasis” or “acne” or “vulgaris” or “pruritus” or “alopecia areata” or “decubitus ulcer” or “urticaria” or “scabies” or “fungal skin diseases” or “impetigo” or “abscess” or “cellulitis” or “viral warts” or “molluscum contagiosum” or “non-melanoma skin cancer” or “melanoma”) and the period are from 1 January 2014 to 15 May 2024 and LA = (English). A total of 1,616 articles were included in the analysis. Literature titles, abstracts, and the full texts were manually examined by two investigators to exclude literature that was irrelevant to the study topic (including disease type and research purposes). After removing duplicates and irrelevant items, 527 articles were retained. Document types selected for inclusion were “Article” and “Review Article”. Book chapters, meeting abstracts, online articles, and letters were excluded. The exported file format for the software was “Plain Text File”. Table 1 shows the advanced search strategy in the WoSCC. Since the data used in this study were obtained from publicly available databases and did not involve any direct interaction with human or animal subjects, ethical approval was not necessary.

Data analysis

This study sought to dissect thematic evolution while establishing a worldwide dissemination network of publications centered on TCM in the context of skin diseases. The bibliometric analysis software CiteSpace (version 6.3. R1) was used to analyze TCM in the field of skin disorders over the past 10 years, including citation bursts of

Table 1. Advanced search strategy in Web of Science Core Collection (WoSCC).

Search set	Advanced search term in Web of Science Core Collection	Records
1#	TS = (“Chinese medicine” or “traditional Chinese medicine” or “Chinese herbal medicine” or “Chinese materia medica” or “TCM” or “Chinese medicine and drugs” or “Chinese herbs” or “traditional Chinese treatment” or “traditional Chinese medicine treatment” or “herbal therapy” or “acupuncture” or “needle moxibustion” or “homeopathy” or “homeotherapy” or “manipulation” or “Chinese massage” or “Chinese external application”)	147,471
2#	TS = (“skin disease” or “skin disorder” or “dermatopathy” or “dermatopathy” or “dermatologic diseases” or “eczema” or “psoriasis” or “acne” or “vulgaris” or “pruritus” or “alopecia areata” or “decubitus ulcer” or “urticaria” or “scabies” or “fungal skin diseases” or “impetigo” or “abscess” or “cellulitis” or “viral warts” or “molluscum contagiosum” or “non-melanoma skin cancer” or “melanoma”)	213,240
3#	1 # AND 2#	1616
4#	Period: 2014–2024	
	Language: English	536
	removing duplicates and irrelevant items	
5#	Article type: Articles or Reviews	527

references and keywords with timelines. A dual-map overlay was created using CiteSpace. A co-citation analysis of countries, institutions, authors, keywords, journals, and co-cited references was performed using VOSviewer (version 1.6.16). The R package “bibliometrix” (version 3.2.1) was applied for analysis, and to visualize the number of publications from 2014 to 2024, forecast the trend of topics, and build an international research platform for TCM in skin disease. Journal quartiles and impact factors (IFs) were extracted from the Journal Citation Report (JCR). Based on the value of Journal Impact Factor value, JCR splits all journals within the same discipline into four categories, with the top 25% belonging to Q1 and the top 25–50% belonging to Q2, etc.

Results

Analysis of publications

Based on our search method, articles with low correlation and non-English language articles were excluded. A comprehensive analysis revealed 536 studies conducted on TCM research on skin diseases from 2014 to 2024. Nine studies were excluded: three editorials, two letters, two proceeding papers, one correction, and one with early access. A total of 527 papers were finally included, including 420 “Articles” and 107 “Reviews” (Figure 1).

The entire decade was divided into three parts according to the growth rate of the number of annual publications: Phase I (2014–2018), Phase II (2019–2020), and Phase III (2021–2024). Figure 2 illustrates that there was a relatively modest number of publications in Phase I, with an average annual count of approximately 27. During Phase II, there was a notable increase in the number of publications related to TCM research on skin diseases, with an annual publication count of approximately 51, followed by a period of stability in Phase III (average number of annual citations was 76.72). Notably, there were 73 publications in 2020, i.e., 3.17-times more than that in 2014. Throughout Phase III, the number of publications focusing on TCM research on skin diseases fluctuated within a narrow range until December, 2023. From 1 January 2024 to 15 May 2024, the number of publications reached 36.

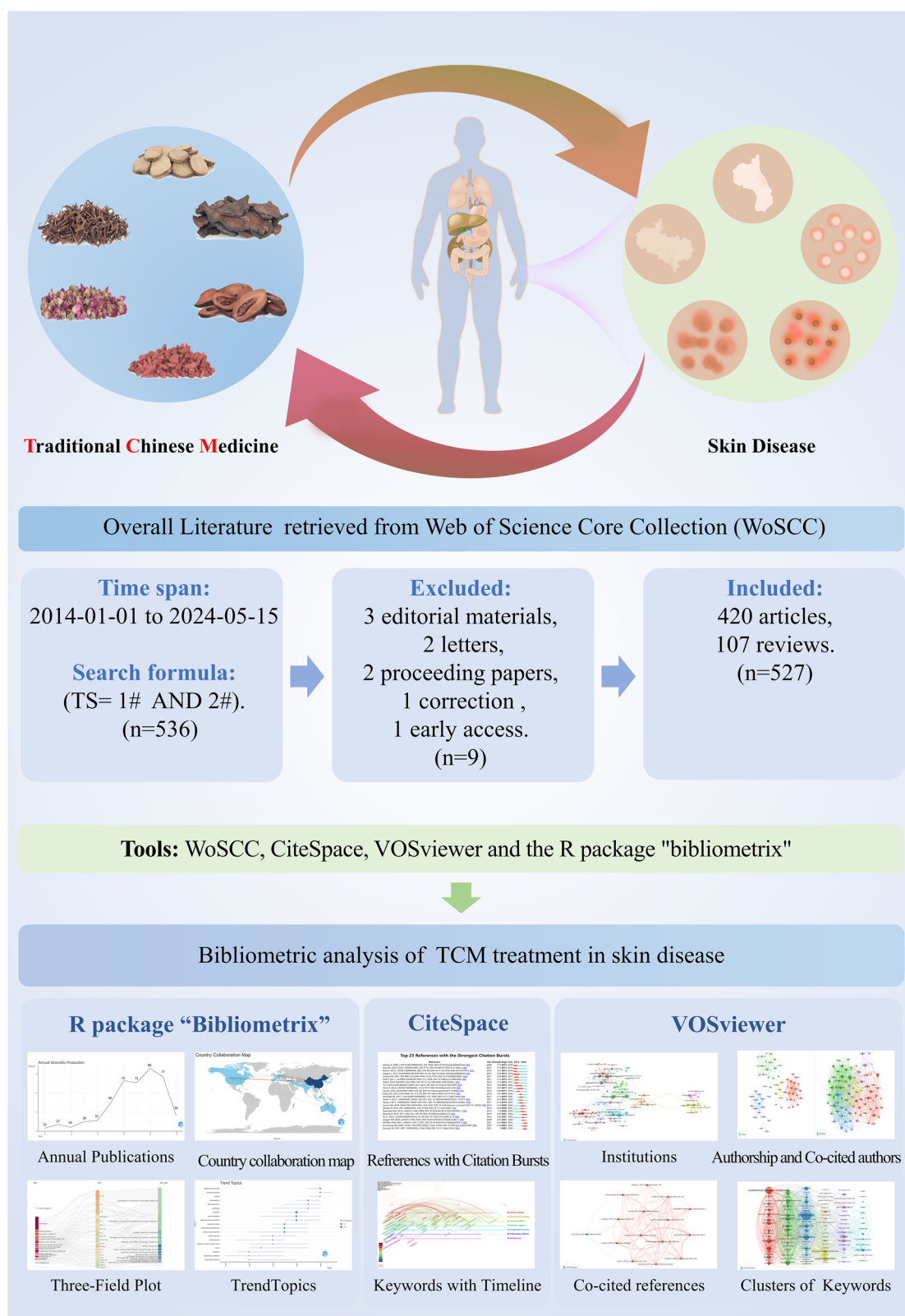


Figure 1. Flow diagram for the bibliometric analysis of publications of the TCM research in skin disease included publications, methods, and results.

Analysis of countries and institutions

A review of countries and institutions indicated that the publications covered 25 nations and 618 academic institutions. The majority of the publications ($n=496$) originated in Asia, with smaller contributions from North America, Australia and Europe

($n=35$). China published the most articles ($n=457$, 86.72%), followed by the United States (USA) ($n=32$, 6.07%), Australia ($n=22$, 4.17%), South Korea ($n=20$, 3.80%), India ($n=10$, 1.90%), and Japan ($n=9$, 1.71%). The data include articles jointly published by multiple countries as well as those published by individual countries.

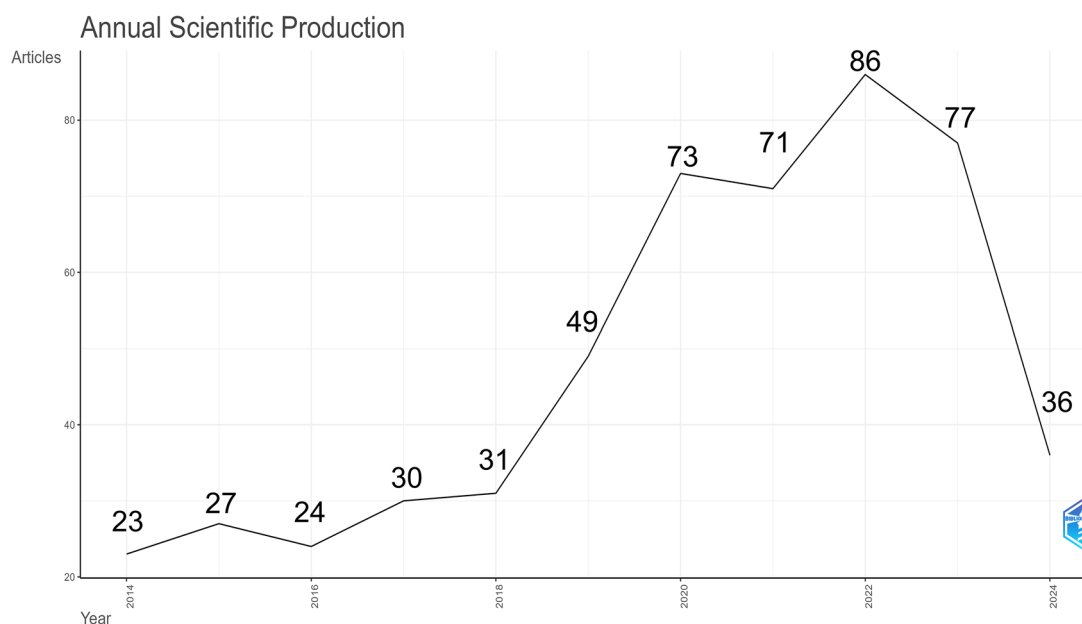


Figure 2. Annual number of published articles of TCM research in skin disease from 2014 to 2024.

To further explore collaboration, we filtered and visualized all 25 countries. The resulting collaborative network (Figure 3A, B) demonstrated active collaboration among several countries. China had cooperative relationships with many other countries; noteworthy partnerships included collaborations among China, Australia, the USA, and the United Kingdom (UK), South Korea and Japan.

The top 10 organizations ($n=618$) were located in China. The five institutions with the highest number of relevant papers were Guangzhou University of Chinese Medicine ($n=47$), Shanghai University of Traditional Chinese Medicine ($n=45$), Beijing University of Chinese Medicine ($n=37$), Capital Medical University ($n=37$), Guangdong Province Academic Chinese Medicine Science ($n=28$). The close collaboration between Capital Medical University and other schools was evident from the network visualization in Figure 3C. Notably, Shanghai University of Traditional Chinese Medicine had the highest level of cooperation with other institutions (total link strength = 62), followed closely by Guangzhou University of Traditional Chinese Medicine (total link strength = 61).

Authors and co-cited authors

A total of 2904 authors involved in TCM dermatology research were listed, with 6 clusters of different colors. Chuanjian Lu ($n=33$, H-index = 32, self-citing rate = 6.7%), Bin Li ($n=31$, H-index = 9), and Xin Li ($n=27$, H-index = 17, self-citing rate = 13.1%) had published the most publications. We analyzed the authors who published more than five papers, and constructed a network of collaborations (Figure 4A), which revealed wide cooperation among researchers. Bin Li (total link strength = 169), Xin Li (total link strength = 163), Yi Ru ($n=14$, H-index = 13, self-citing rate = 15%, total link strength = 106), and Xiaoying Sun ($n=12$, H-index = 12, self-citing rate = 7.5%, total link strength = 105) were extremely closely connected among others. Yan Wang ($n=3$, H-index = 11, self-citing rate = 1.7%, total link strength = 49) and Ping Li (total link strength = 52, H-index = 9) were closely connected with Jingxia Zhao ($n=9$, H-index = 14, self-citing rate = 1.5%, total link strength = 97), and closely connected to the Chuanjian Lu team and the Bin Li teams.

Of the 12,958 co-cited authors, 56 received > 20 co-citations each. The most co-cited author was Yin-Ku Lin ($n=104$), followed by Claire Shuiqing Zhang ($n=58$), and Pfab F ($n=54$). To explore the co-citation relationships, we filtered authors > 56 co-citations and mapped the co-citation network. The co-citation network shown in Figure 4B, demonstrated active collaboration among various co-cited authors, including Claire Shuiqing Zhang (link strength = 390), Yin-Ku Lin (link strength = 284), Chuanjian Lu (link strength = 244), as well as WH Boehncke (link strength = 236).

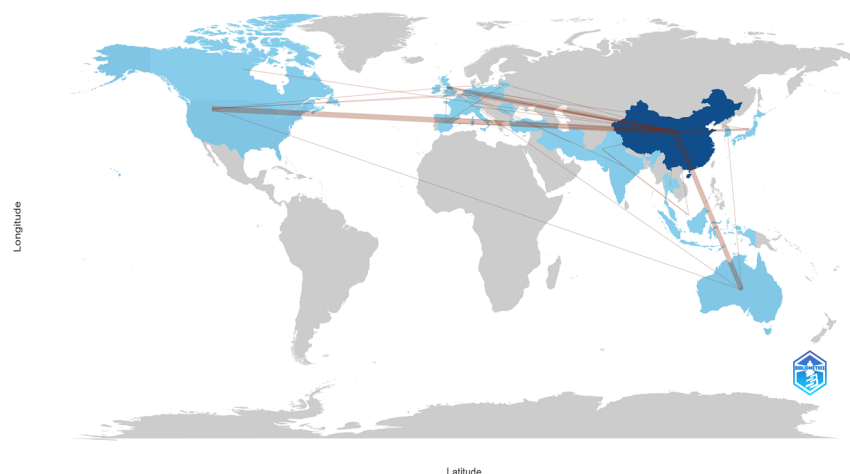
Journals and co-cited journals

Publications focusing on TCM research in skin diseases were distributed across 177 journals. The *Journal of Ethnopharmacology* published the highest number of papers ($n=50$, IF = 5.4, H-index = 170, Citescore = 8.60, Q1), followed by *Medicine* ($n=41$, IF = 1.6, H-index = 135, Citescore = 2.90, Q3), *Evidence-Based Complementary and Alternative Medicine* ($n=40$, IF = 1.813, H-index = 72, Citescore = 3.50, Q3), *Frontiers in Pharmacology* ($n=35$, IF = 4.278, H-index = 62, Citescore = 6.30, Q2), and *Trials* ($n=13$, IF = 2.5, H-index = 64, Citescore = 3.60, Q2). *Phytomedicine* had the highest IF ($n=12$, IF = 7.9, H-index = 105, Citescore = 10.40, Q1), followed by *Biomedicine & Pharmacotherapy* ($n=13$, IF = 7.5, H-index = 78, Citescore = 12.60, Q1) (Table 2; Figure 5A).

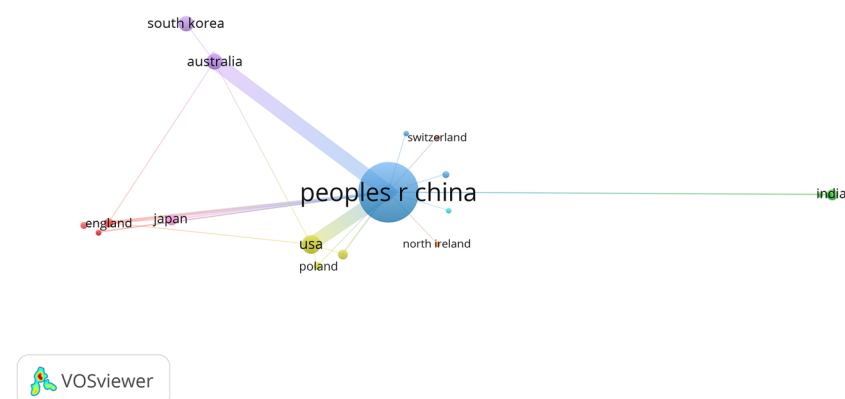
To further explore citation patterns, we screened 177 journals with > 20 relevant publications among the 4,436 co-cited journals and visualized the journal network (Table 3; Figure 5B). Five of the top 10 co-cited journals received > 300 citations. The *Journal of Ethnopharmacology* (citations = 504, IF = 5.4, H-index = 170, Citescore = 8.60, Q1) had the highest citation count, followed by *British Journal of Dermatology* (citations = 481, IF = 10.3, H-index = 161, Citescore = 15.70, Q1), *Journal of Investigative Dermatology* (citations = 463, IF = 6.5, H-index = 181, Citescore = 8.90, Q1), and *Journal of the American Academy of Dermatology* (citations = 420, IF = 13.8, H-index = 192,

Country Collaboration Map

A



B



C

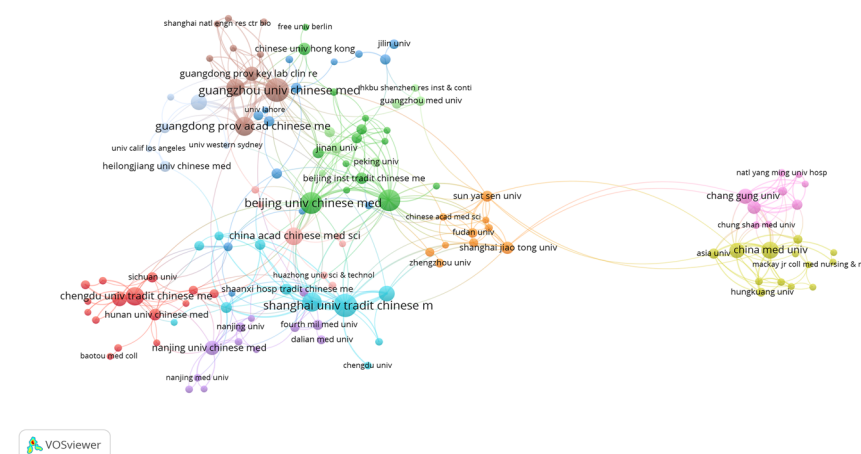


Figure 3. National and institutional analysis on TCM research in skin disease. (A) The geographical distribution of countries based on R studio. (B) Visualization of cooperation between different countries based on VOSviewer. (C) Co-authorship network between top institutions based on VOSviewer.

Citescore = 8.70, Q1). *The Journal of Allergy and Clinical Immunology* had the highest IF (citations = 243, IF = 14.2, H-index = 262, Citescore = 22.60, Q1).

The juxtaposition of dual maps depicts citation interactions among journals and co-cited sources, highlighting the groupings

of citing journals on the left and clusters of cited publications on the right. **Figure 5C** shows the primary citation path represented by the orange path, indicating that research published in *molecules/biology/immunology* journals was primarily cited in *molecules/biology/genetics* journals.

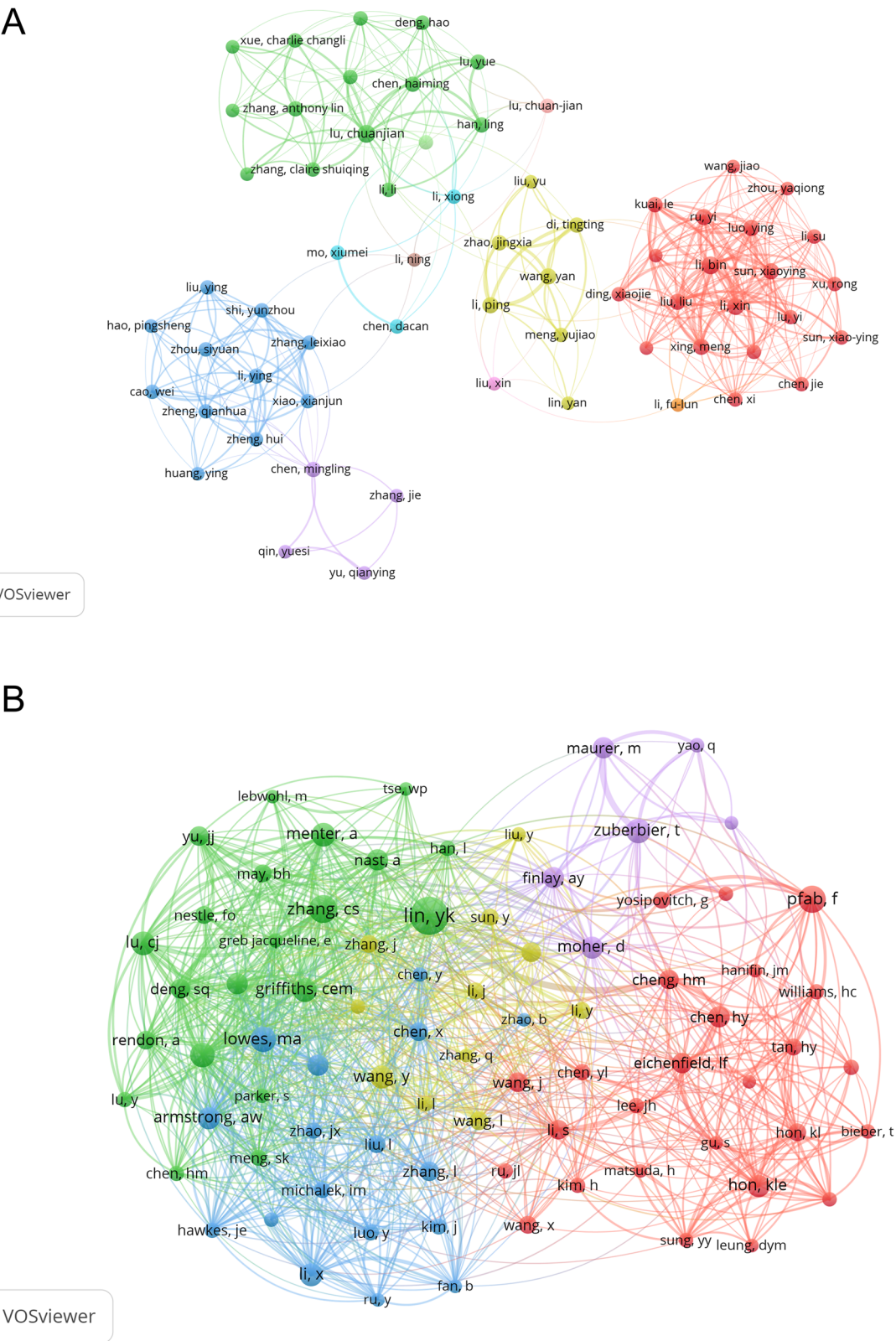


Figure 4. Authorship analyzing of TCM research in skin disease. (A) Collaboration network of authors based on VOSviewer. (B) Collaboration network of co-authors based on VOSviewer.

Co-cited references

There were 17,642 co-cited references in TCM research on skin diseases from 2014 to 2024. Among the top 15 co-cited references, each was co-cited > 20 times, with 1 reference co-cited > 30 times. The most co-cited reference was “Boehncke WH, 2015,

Lancet, v386, p983, doi 10.1016/s0140-6736(14)61909-7” ($n=36$) followed “Van der fits I, 2009, *J Immunol*, v182, p5836, doi 10.4049/jimmunol.0802999” ($n=34$), and “Zhang CS, 2014, *Int J Dermatol*, v53, p1305, doi 10.1111/ijd.12607” ($n=32$) (Table 4; Figure 6A).

Table 2. Top 10 journals of TCM research in skin disease.

Rank	Journals	Articles	IF	In-index	Citescore	Q
1	<i>Journal of Ethnopharmacology</i>	50	5.4	170	8.60	Q1
2	<i>Medicine</i>	41	1.6	135	2.90	Q3
3	<i>Evidence-Based Complementary and Alternative Medicine</i>	40	1.813	72	3.50	Q3
4	<i>Frontiers in Pharmacology</i>	35	4.278	62	6.30	Q2
5	<i>Trials</i>	13	2.5	64	3.60	Q2
6	<i>Biomedicine & Pharmacotherapy</i>	13	7.5	78	12.60	Q1
7	<i>Phytomedicine</i>	12	7.9	105	10.40	Q1
8	<i>Chinese Medicine</i>	11	4.9	34	6.90	Q2
9	<i>Molecules</i>	10	4.6	116	6.70	Q2
10	<i>Journal of Dermatological Treatment</i>	9	2.9	47	5.0	Q2

References with citation bursts

We identified 23 references with significant citation bursts using CiteSpace, indicating that these references were cited by scholars in this area over a specific period (Figure 6B). Each bar in Figure 6B represents 1 year, with red bars indicating strong citation bursts. Citation bursts for these references occurred from 2014–2024. “Griffiths CEM, 2021, *Lancet*, v397, p1301, doi 10.1016/S0140-6736(20)32549-6” exhibited the strongest citation burst (link strength = 5.34) from 2014–2024. The second reference (Rendon and Schäkel 2019) had a strong citation burst (link strength = 4.49) from 2021 to 2024. The citation burst strengths of these 23 references ranged from 2.58 to 5.34, with endurance continuing from 1–4 years.

Analysis of keywords

Keywords clusters

Analyzing keywords enables efficient identification of research trends and hot topics in a specific field. We extracted 2136 keywords from the literature. Furthermore, 80 keywords with > 10 occurrences were analyzed, and cluster analysis was performed using VOSviewer. As shown in Figure 7A, we obtained six clusters, representing six research directions. Keywords in red clusters included “traditional Chinese medicine,” “melanoma,” “network pharmacology,” “expression,” “mechanisms,” “cells,” “apoptosis,” etc. Keywords in green clusters included “management,” “meta analysis,” “randomized controlled trials,” “eczema,” “acupuncture,” etc. Keywords in blue clusters included “psoriasis,” “inflammation,” “pathogenesis,” “skin,” “vulgaris,” “nice,” etc. Keywords in yellow clusters included “Chinese herbal medicine,” “atopic dermatitis,” “extract,” “nf-kappa-b,” etc. Keywords in purple clusters included “double-blind,” “efficacy,” “psoriasis vulgaris,” “safety,” etc. Keywords in sky blue clusters included “atopic dermatitis,” “itch,” “quality,” “pruritus,” “i hypersensitivity itch,” etc. Among these keywords, “traditional Chinese medicine” and “expression” > 40 times, which represented the main research direction of TCM research in skin disease. Extracting co-occurrence keywords from the selected literature reflected the development trends and research hotspots in a certain field (Figure 7A).

Timeline of keywords

The timeline of keywords and co-occurring keywords was analyzed among the keywords of the 527 papers. Seven clusters marked with “#” were analyzed from the included literature cluster analysis, and connecting lines between two words indicate that two keywords appear together in the same article. Figure 7B shows the top seven high-frequency co-occurrence keywords and

the co-occurrence frequency which were “#0 chronic urticaria,” “#1 network pharmacology,” “#2 Chinese medicine,” “#3 psoriasis vulgaris,” “#4 luc-g5 melanoma mice,” “#5 inflammatory cytokines” and “#6 treating acne”. The burst time of “quality of life” in “#0 chronic urticaria” persisted for the longest time. The keyword “molecule docking” in “#1 network pharmacology” was the most recent keyword.

Three-field plot of keywords, authors and institutions

Relationship between keywords, authors, and institutions based on the three-field plot for TCM treatment of skin diseases are shown in Figure 8A. The keyword “psoriasis” was most closely related to the authors (Chuanjian Lu, Xin Li, Bin Li, etc.), followed by “traditional Chinese medicine,” and then “systematic review.” Guangzhou Medical University contained or was connected with the most authors (Chuanjian Lu, Al Zhang, etc), followed by Shanghai University of Traditional Chinese Medicine. Chuanjian Lu had conducted the most research in the fields of psoriasis research and TCM for dermatology, and had the closest connections with other institutions.

Trend topics

Trend analysis of keywords (Figure 8B) revealed that from 2015 to 2017, research primarily focused on TCM characteristics of psoriasis: “blood-stasis syndrome” and “blood-heat syndrome.” In 2018, researchers began actively exploring the therapeutic potential of TCM for skin diseases using keywords such as “atopic eczema” and “Chinese herbal medicine.” From 2018 to 2019, the keywords became “review,” “systematic review,” and “randomized controlled trial.” From 2020 to 2022, keywords such as “atopic dermatitis,” “psoriasis,” and “anti-inflammation” were dominant. Since 2023, continuous emergence of the keywords “network pharmacology,” “molecular docking,” “and eczema” indicated their significant importance as current research hotspots in TCM dermatology.

Discussion

Analysis of annual publication

Annual publication counts from 2014 to 2018 indicated limited attention to TCM research on skin diseases, suggesting that the foundation for studying the relationship between TCM and skin diseases remains in its early stages (Yang et al. 2023). From 2019 to 2020, the number of relevant studies increased rapidly, and research on TCM in skin diseases entered an explosive stage, attracting increasing attention from scholars (Cai et al. 2023). Since 2021, the number of publications has remained high, indicating that skin disease research in the field of TCM has remained highly attractive to researchers. This suggested that TCM treatment of skin diseases may remain active and robust in future years.

Analysis of countries and institutions

China was the leading country in research on TCM for skin diseases, followed by the USA. Notably, close cooperation existed between China, Australia, the USA, and Japan. Over the past decade, interest in TCM had expanded to other countries owing to the growing popularity of complementary and alternative medicine (CAM). However, most countries

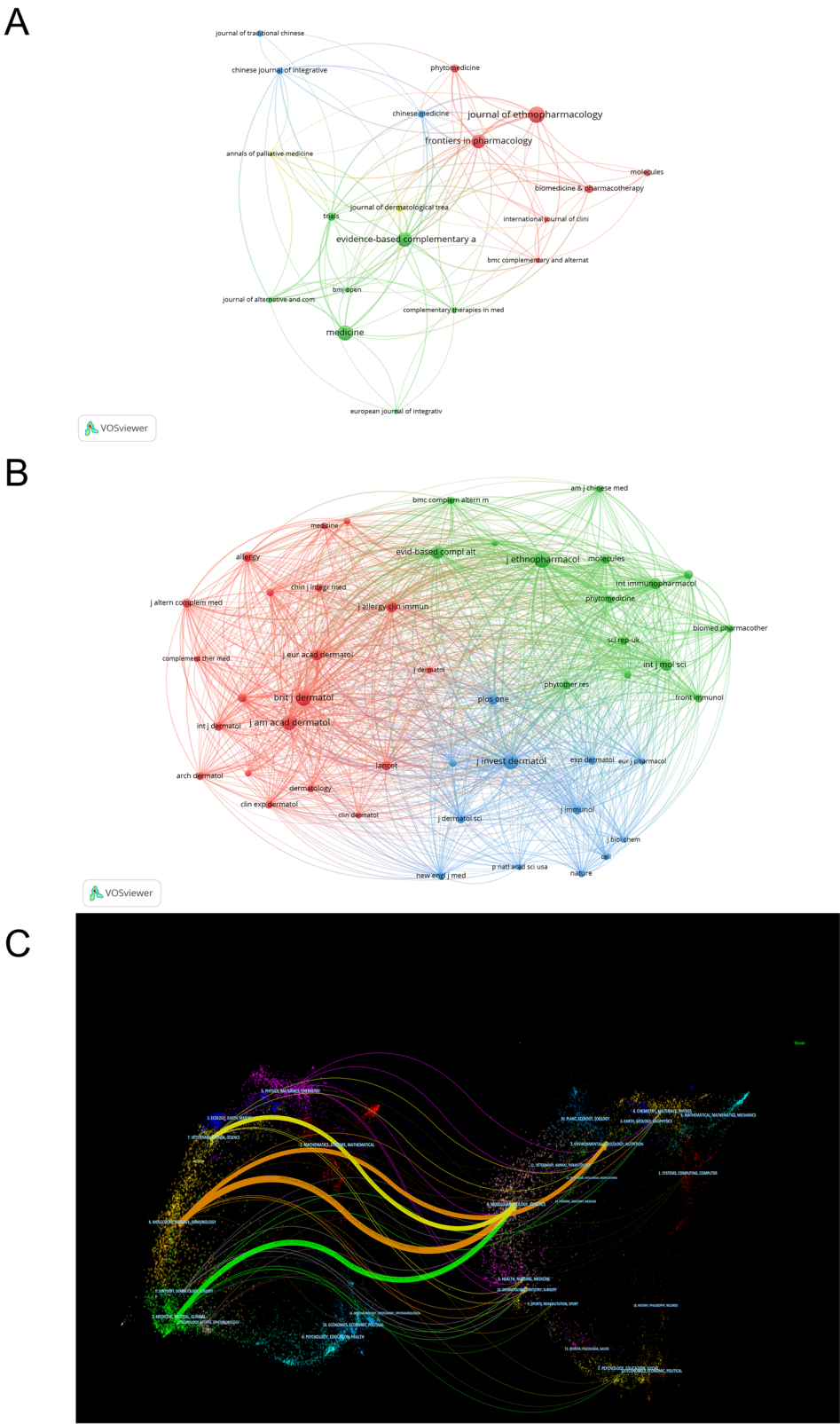


Figure 5. Journals related to TCM research in skin disease are published worldwide. (A) The visualization of journals based on VOSviewer. (B) Visual analysis of co-cited journals based on VOSviewer. (C) The journal dual-map overlay showcases the interconnections among various journals based on CiteSpace.

engaged in TCM research on skin diseases were in Asia, which poses limitations that could hinder long-term academic development.

The top 10 organizational structures were all located in the most developed cities in China: Beijing, Shanghai, Guangzhou,

and Chengdu. According to the analysis of the institutional network map, cooperation between universities of TCM and their affiliated hospitals and the connection among institutions in the same location were relatively high; in contrast, cooperation between multiple universities and cross-regional research

Table 3. Top 10 co-cited journals on TCM research in skin disease.

Rank	Co-cited journals	Article	IF	In-index	Citescore	Q
1	<i>Journal of Ethnopharmacology</i>	504	5.4	170	8.60	Q1
2	<i>British Journal of Dermatology</i>	481	10.3	161	15.70	Q1
3	<i>Journal of Investigative Dermatology</i>	463	6.5	181	8.90	Q1
4	<i>Journal of the American Academy of Dermatology</i>	420	13.8	192	8.70	Q1
5	<i>Evidence-Based Complementary and Alternative Medicine</i>	339	1.813	72	3.50	Q3
6	<i>International Journal of Molecular Sciences</i>	291	5.6	114	7.80	Q1
7	<i>Journal of the European Academy of Dermatology and Venereology</i>	254	9.2	90	9.70	Q1
8	<i>Journal of Allergy and Clinical Immunology</i>	243	14.2	262	22.60	Q1
9	<i>International Immunopharmacology</i>	241	5.6	98	8.70	Q1
10	Plos One	223	3.7	268	6.00	Q1

Table 4. Top 15 co-cited references on TCM research in skin disease.

Rank	Co-cited references	Citations	Link strength
1	Boehncke WH, 2015, LANCET, V386, P983, DOI 10.1016/S0140-6736(14)61909-7	36	76
2	Van der fits I, 2009, j immunol, v182, p5836, doi 10.4049/jimmunol.0802999	34	43
3	Zhang cs, 2014, int j dermatol, v53, p1305, doi 10.1111/ijd.12607	32	75
4	Parisi r, 2013, j invest dermatol, v133, p377, doi 10.1038/jid.2012.339	28	41
5	Rendon a, 2019, int j mol sci, v20, doi 10.3390/ijms20061475	27	50
6	Finlay ay, 1994, clin exp dermatol, v19, p210, doi 10.1111/j.1365-2230.1994.tb01167.x	26	19
7	Moher d, 2009, plos med, v6, doi [10.1136/bmj.i4086 10.1371/journal.pmed.1000097 10.1136/bmj.b2535 10.1136/bmj.b2700 10.1016/j.ijisu.2010.02.007 10.1186/2046-4053-4-1 10.1016/j.ijisu.2010.07.299]	26	19
8	Lowes ma, 2014, annu rev immunol, v32, p227, doi 10.1146/annurev-immunol-032713-120225	24	45
9	Menter a, 2008, j am acad dermatol, v58, p826, doi 10.1016/j.jaad.2008.02.039	24	42
10	Yu jj, 2013, evid-based compl alt, v2013, doi 10.1155/2013/673078	21	46
11	Michalek im, 2017, j eur acad dermatol, v31, p205, doi 10.1111/jdv.13854	21	31
12	Nestle fo, 2009, new engl j med, v361, p496, doi 10.1056/nejmra0804595	20	40
13	Meng sk, 2018, chin med-uk, v13, doi 10.1186/s13020-018-0174-0	20	35
14	Armstrong aw, 2020, jama-j am med assoc, v323, p1945, doi 10.1001/jama.2020.4006	20	30
15	Ru jl, 2014, j cheminformatics, v6, doi 10.1186/1758-2946-6-13	20	10

institutions was relatively weak. Although various national institutions exhibited strong cooperative relationships, the intensity of cooperation with agencies was not optimal, which may impede long-term progress in the field. International team collaboration enhances research competitiveness, indicating the importance of seeking extensive cooperation between institutions and countries, particularly when the economy or resources are limited. Therefore, we strongly recommend that research institutions

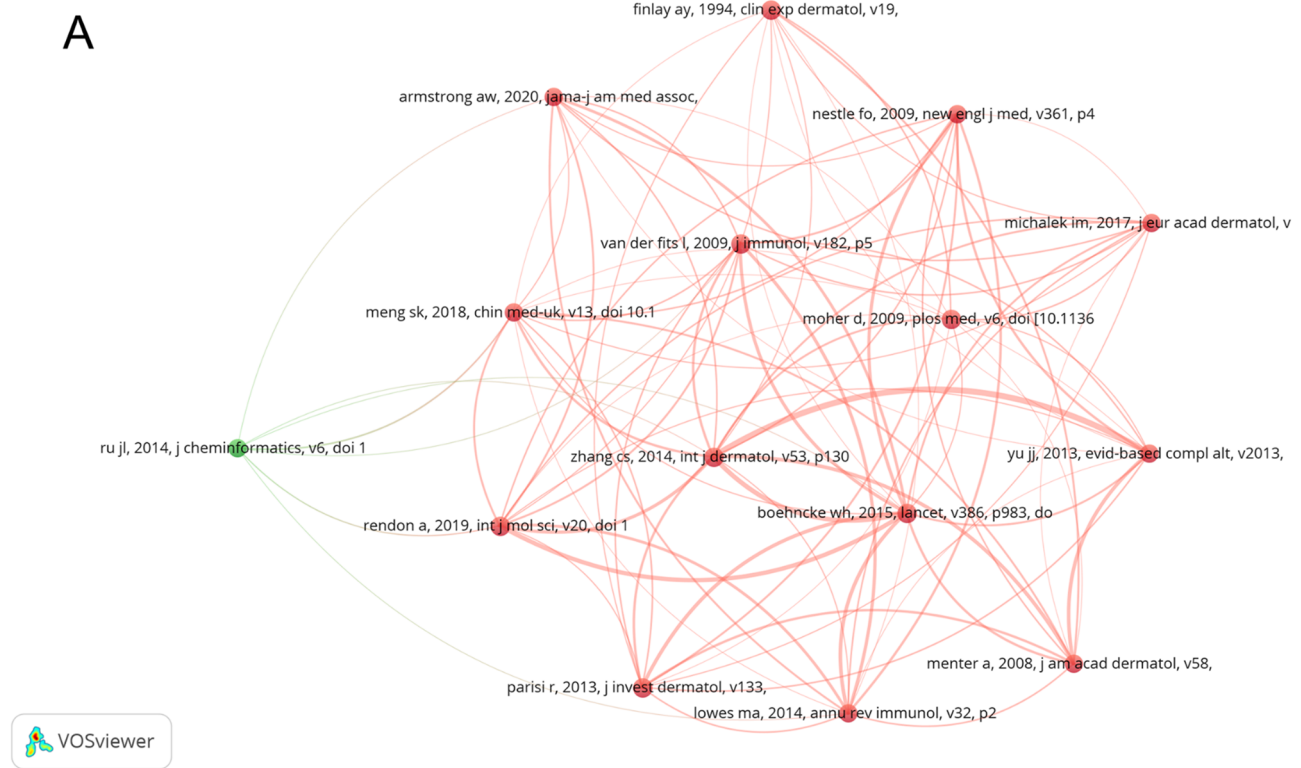
worldwide collaborate to promote progress of TCM research in dermatology.

Many open-access publishers offer authors more rights over their work than traditional publishers. This includes the ability to freely distribute, share, and reuse research. Open access promotes transparency in research by making data, methods, and findings freely available, which supports the reproducibility and verification of scientific results. Open access reduces the disparity in access to scientific knowledge between wealthy and less-affluent institutions and countries. The democratization of information fosters global equity in scientific research and education. The authors involved in the present study are all researchers at institutions (university and affiliated hospitals), supported by the research funds provided by the institutions and the government to assist with the literature search and publication.

Journal analyses

Most research on TCM in skin diseases was published in the *Journal of Ethnopharmacology*, indicating that herbal medicines and formulas play an important role in this field of study. The journal with the second-highest volume of research was *Medicine*, which covers medical internal medicine and other fields, aiming to accurately and comprehensively report on experience, scientific research achievements, technological innovation and academic trends obtained by domestic and foreign medical physicians in their scientific research in this field in a timely manner. This indicated that researchers place great importance on clinical research and animal experiments on TCM for treatment of skin diseases. The journal with the third-highest volume of research was *Evidence-Based Complementary and Alternative Medicine*, the approach of which has been applied to the study of CAM models, particularly in traditional Asian therapeutic systems. This indicated that TCM has had a diverse trend in treating skin diseases and is widespread in Western countries. Analysis of the “H-index,” “IF,” and “Citescore” of the journals, which represent a high level of international platforms, showed that these journals afford the exploration of TCM research in skin disease (Dunański et al. 2019). Furthermore, current research in this field was predominantly published in journals that focus on Chinese medicine, pharmacology, and its molecular aspects. This shift highlighted the transition from the experience of Chinese traditional therapies to its molecular mechanism. The co-cited journals mainly consisted of high-impact Q1 journals, emphasizing their quality and contribution to the study of TCM in skin diseases. However, the contribution of magazines with a lower H-index, IF, and Citescore cannot be ignored (Dunański et al. 2019).

Open-access articles are freely available to anyone with an internet connection, which significantly increases their potential audience size and can lead to higher readership and citation rates compared to those of subscription-based publications. Papers published with open access are more accessible to other scholars and cited more often than those published with not open access. Studies have shown that open-access articles often receive more citations than their non-open-access counterparts, which increases visibility enhances research impact and dissemination. Open access supports dissemination of knowledge to a broader audience, including policymakers, practitioners, educators, and the general public, which can drive innovation, inform policy decisions, and contribute to public education and awareness.



B

Top 23 References with the Strongest Citation Bursts

References	Year	Strength	Begin	End	2014 - 2024
Menter A, 2008, J AM ACAD DERMATOL, V58, P826, DOI 10.1016/j.jaad.2008.02.039, DOI	2008	3.75	2014	2016	<div></div>
May BH, 2012, CHIN J INTEGR MED, V18, P172, DOI 10.1007/s11655-012-1008-z, DOI	2012	3.75	2014	2016	<div></div>
Nast A, 2012, J DTSCH DERMATOL GES, V10, P0, DOI 10.1111/j.1610-0387.2012.07919.x, DOI	2012	3.21	2014	2016	<div></div>
Higgins J, 2012, COCHRANE DB SYST REV, V0, P0, DOI 10.1002/14651858.ED000049, DOI	2012	2.58	2014	2018	<div></div>
Cheng HM, 2011, INT ARCH ALLERGY IMM, V155, P141, DOI 10.1159/000318861, DOI	2011	3.65	2015	2017	<div></div>
Pfab F, 2011, J ALTERN COMPLEM MED, V17, P309, DOI 10.1089/acm.2009.0684, DOI	2011	3.12	2015	2017	<div></div>
Pfab F, 2010, ALLERGY, V65, P903, DOI 10.1111/j.1398-9995.2009.02284.x, DOI	2010	3.12	2015	2017	<div></div>
Yu JJ, 2013, EVID-BASED COMPL ALT, V2013, P0, DOI 10.1155/2013/673078, DOI	2013	3.28	2016	2020	<div></div>
Parisi R, 2013, J INVEST DERMATOL, V133, P377, DOI 10.1038/jid.2012.339, DOI	2013	3.97	2017	2021	<div></div>
Lee KC, 2012, ACUPUNCT MED, V30, P8, DOI 10.1136/acupmed-2011-010088, DOI	2012	2.98	2017	2018	<div></div>
Meng SK, 2018, CHIN MED-UK, V13, P0, DOI 10.1186/s13020-018-0174-0, DOI	2018	3.91	2019	2020	<div></div>
Michalek IM, 2017, J EUR ACAD DERMATOL, V31, P205, DOI 10.1111/jdv.13854, DOI	2017	3.13	2019	2021	<div></div>
Parker S, 2017, J DERMATOL TREAT, V28, P21, DOI 10.1080/09546634.2016.1178377, DOI	2017	2.91	2019	2020	<div></div>
Xiang Y, 2017, J DERMATOL TREAT, V28, P221, DOI 10.1080/09546634.2016.1224801, DOI	2017	2.79	2019	2021	<div></div>
Lowes MA, 2014, ANNU REV IMMUNOL, V32, P227, DOI 10.1146/annurev-immunol-032713-120225, DOI	2014	3.18	2020	2022	<div></div>
Zhang CS, 2014, INT J DERMATOL, V53, P1305, DOI 10.1111/ijd.12607, DOI	2014	2.69	2020	2021	<div></div>
Boehncke WH, 2015, LANCET, V386, P983, DOI 10.1016/S0140-6736(14)61909-7, DOI	2015	2.6	2020	2022	<div></div>
Rendon A, 2019, INT J MOL SCI, V20, P0, DOI 10.3390/ijms20061475, DOI	2019	4.49	2021	2024	<div></div>
Ru JL, 2014, J CHEMINFORMATICS, V6, P0, DOI 10.1186/1758-2946-6-13, DOI	2014	3.28	2021	2022	<div></div>
Langan SM, 2020, LANCET, V396, P345, DOI 10.1016/S0140-6736(20)31286-1, DOI	2020	2.91	2021	2022	<div></div>
Griffiths CEM, 2021, LANCET, V397, P1301, DOI 10.1016/S0140-6736(20)32549-6, DOI	2021	5.34	2022	2024	<div></div>
Armstrong AW, 2020, JAMA-J AM MED ASSOC, V323, P1945, DOI 10.1001/jama.2020.4006, DOI	2020	4.32	2022	2024	<div></div>
Gonçalo M, 2021, BRIT J DERMATOL, V184, P226, DOI 10.1111/bjd.19561, DOI	2021	3	2022	2024	<div></div>

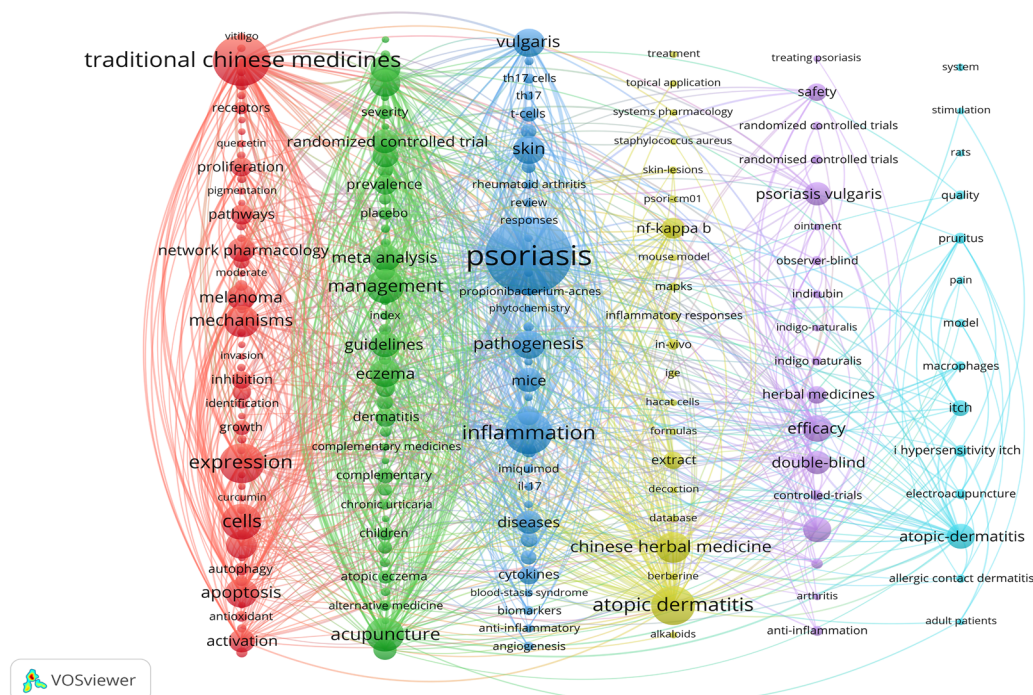
Figure 6. Analysis of references of TCM research in skin disease. (A) Co-citation network of references from literature based on VOSviewer. (B) Top 23 references with strong citation bursts based on CiteSpace.

Author analyses

Regarding authors, Chuanjian Lu from Guangzhou University of Chinese Medicine published the most articles, followed by Bin Li and Xin Li. Chuanjian Lu is committed to studying the roles of

Chinese herbal medicines in psoriasis, chronic urticaria, and atopic dermatitis. Chuanjian Lu explored and improved the action mechanisms of formulas PSORI-CM01, PSORI-CM02, YXBCM01, and Fuzhenghefuzhiyang Formula (FZHFZY) in symptoms, molecular mechanisms, network pharmacology, and

A



B

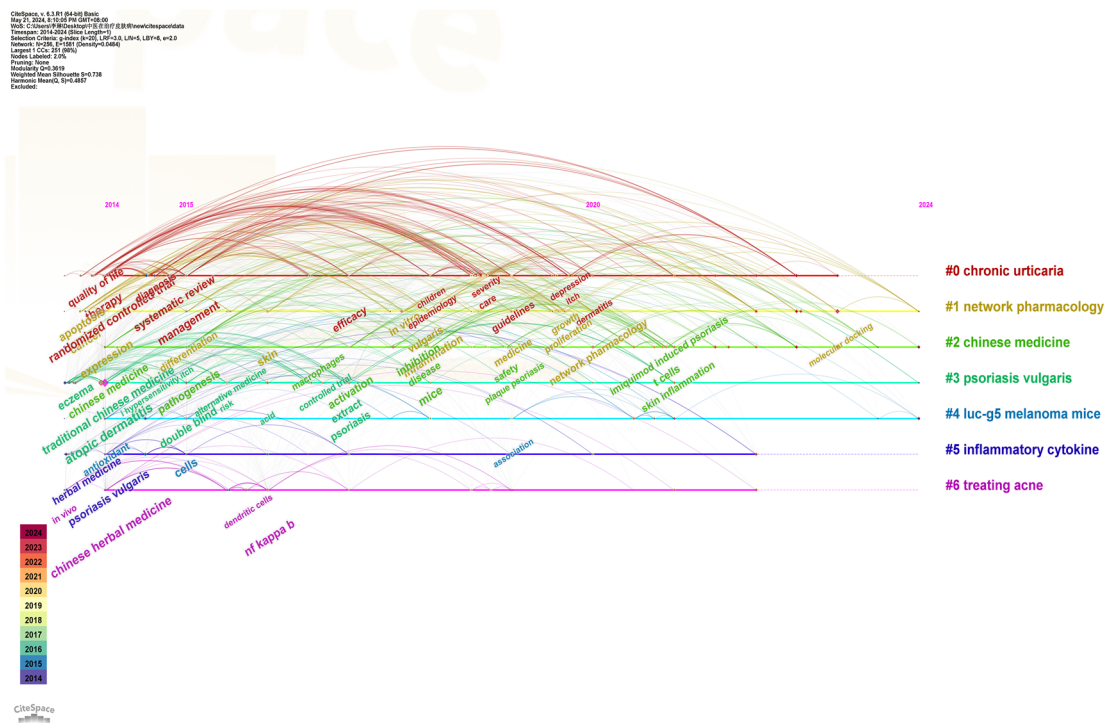


Figure 7. The keywords analysis. (A) Cluster analysis of keyword co-occurrence networks based on VOSviewer. (B) Cluster diagram of keyword co-occurrence analysis with timeline method of CiteSpace.

chromatographic analysis. Chuanjian Lu team also performed a study on psoriasis metabolomics and used the network pharmacology combined with the intestinal microbiota to reveal the role of Shenling Baizhu powder in psoriasis treatment (Gu et al. 2014; Yao et al. 2016; Lv et al. 2018; Lu et al. 2021; Tang et al.

2024). The Xin Li and Bin Li team from Shanghai University of Traditional Chinese Medicine verified the roles of Chinese herbal medicine, juyin granules, pottery granules, tinea chinensis, and curcumin in psoriasis and eczema treatment and discussed the efficacy of acupuncture, fire needle therapy, cupping, and other

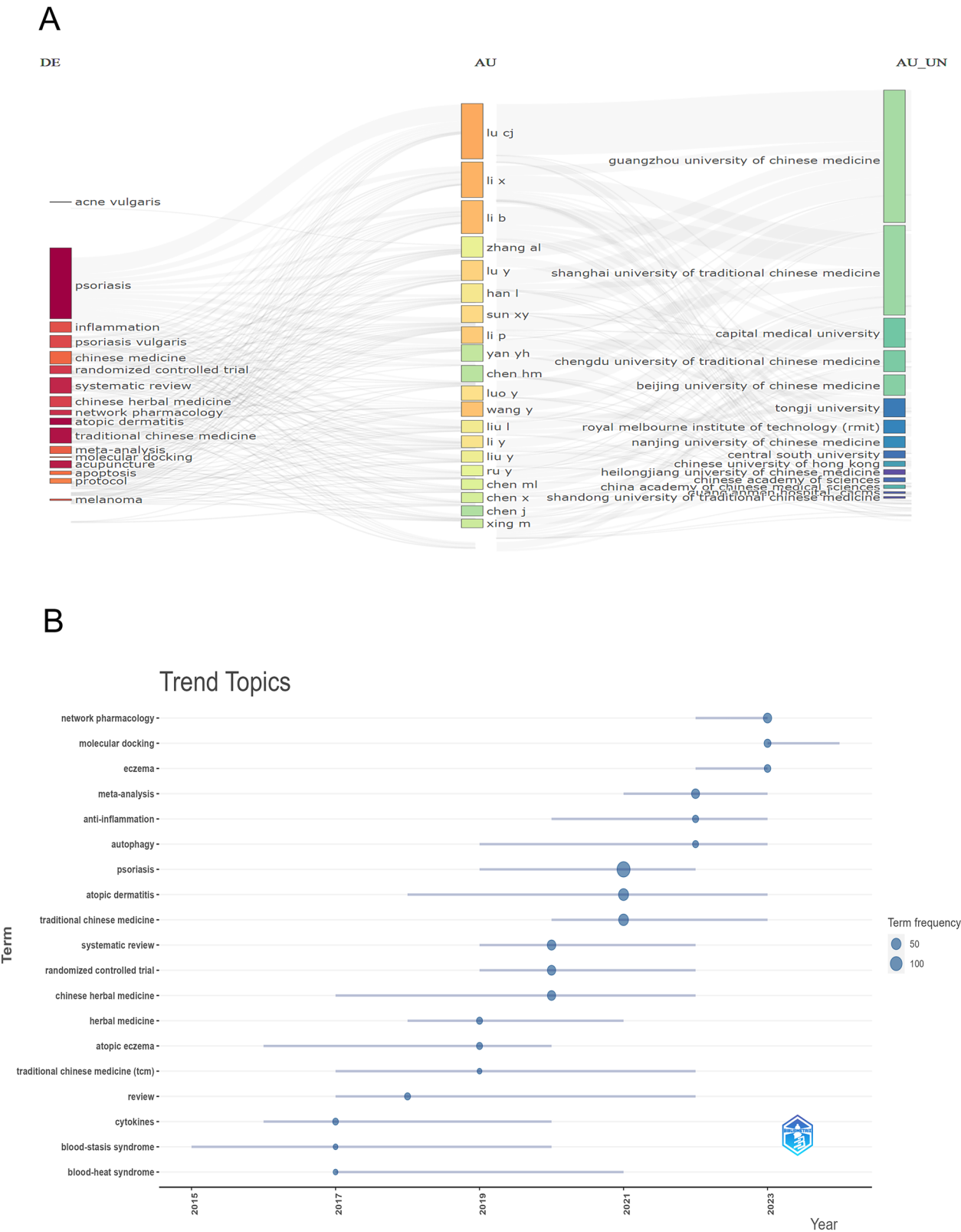


Figure 8. Trend topics analyzing. (A) The relationship of the countries, institutions, and journals produced articles based on the three-field plot method of CiteSpace. (B) Annual trend chart of key words changes based on R studio.

TCM therapy for common skin diseases (psoriasis, flat warts, acne) (Luo et al. 2019; Xing et al. 2020). The most co-cited author was Dr. Yin-Ku Lin, a research team member at Chang Gung Memorial Hospital in Taipei. This team improved the Qingdai ointment to treat patients with psoriasis who had not

responded to Western medicine for 5 years. Finally, they ensured that lindioil 200 µg/g indirubin in ointment is the most effective concentration for treatment of topical psoriasis (Lin et al. 2018). Yan Wang from Capital Medical University revealed that indirubin and Yangxue Jiedu Soup reduces the inflammatory response

of the skin by regulating signaling pathways and produces a therapeutic effect on psoriasis. In a recent study, combining network pharmacology, RNA-seq and metabolomics strategies was proposed to reveal the mechanism of action of Chinese herbal medicine for treating psoriasis, and to investigate TCM mechanisms and components (Wang et al. 2019).

References analyses

We identified the top 10 co-cited references to establish a research foundation for TCM in skin disease treatment. In 2018, Professor Meng SK contributed articles exploring the pathogenesis and clinical therapeutic principles of psoriasis using a combination of modern medicine and Chinese medicine. Novel small-molecule drugs based on TCM are a promising strategy for reducing treatment costs and improving safety in patients with psoriasis (Boehncke and Schön 2015; Michalek et al. 2017; Meng et al. 2018). Moreover, in 2019, Professor Rendon emphasized notable advancements in understanding the pathogenesis of psoriasis. These breakthroughs have paved the way for precise and remarkably efficient treatments, offering an essential understanding of the mechanisms underlying chronic inflammatory conditions characterized by a prominent IL-23/Th17 axis (Paek et al. 2015; Liu et al. 2017; Rendon and Schäkel 2019; Tang et al. 2021; Zhang et al. 2021). Of the top 15 co-cited references, 8 primarily revolved around the use of Western and Chinese therapies for the psoriasis treatment. This indicated that experts were overwhelmingly interested in psoriasis research in this field. TCM treatment of psoriasis has considerable research prospects.

Hotspots and frontiers

Among the keywords, “psoriasis” appeared 150 times, indicating its significance as a primary research focus in this area. Compared with modern medicine, TCM has unique advantages in the treatment of psoriasis, including the uniqueness of syndrome classification, abundance and flexibility of treatment ideas, and efficiency and safety of treatment methods. According to the analysis of keywords in each cluster, six clusters were summarized: “Cell expression and pathway of traditional Chinese medicine,” “Experimental study and meta-analysis,” “Traditional Chinese medicine syndrome of common skin diseases and biomarkers,” “Interaction of Chinese herbal medicine and skin disease,” “New drug development and experiment on animal model,” “Chinese medicine therapies in skin diseases.” Research hotspots on TCM in skin disease treatment have transformed from clinical research to basic research. The keyword timeline of keywords shows that doctors pay considerable attention to “quality of life” in chronic urticaria patients. TCM improves the quality of life of patients with chronic urticaria by reducing itching symptoms (Lu et al. 2022), and can be used as an auxiliary aid in skin disease treatment. The most recent keyword “molecule docking” represents the latest area of research interest. As an efficient auxiliary screening method, molecular docking has wide application prospects in basic research of effective Chinese medicines. TCM theory and modern scientific and technological means are helpful in further explaining the material basis and mechanism of action of TCM (Wu et al. 2022).

References with citation bursts and the topic trends assisted in swiftly identifying the dispersion and progression of focal areas in TCM research for skin diseases. References that exhibited citation outbreaks indicated emerging themes in a particular research

area, as they have gained considerable attention from researchers in recent years. Strong citation bursts were used to analyze the content of these references. As shows in Figure 6B, we revealed that TCM plays a crucial role in many aspects of skin disease treatment. Initially, scientists were interested in the different therapeutic method in TCM for skin disease treatment. Scientists have been studying psoriasis for several years. In recent years, the mechanism of psoriasis has become a popular topic in skin disease research. Researchers have gradually focused on the application of compound TCM preparations and combination therapies with biological agents in common skin diseases. By analyzing the primary research content of these highly cited references, we observed that investigations of TCM components and therapies for psoriasis and atopic dermatitis constituted a prominent area of focus (Xiang et al. 2017). Most researchers have focused on TCM treatment of psoriasis, eczema, and chronic urticaria, and have neglected other common skin diseases such as infectious skin diseases and melanoma, which requires further investigation (Zhong et al. 2022).

Through trend topic analysis, the research was mainly divided into three phases. In Phase I (2014–2017), researchers summarized TCM theory and immune and metabolic characteristics of common skin diseases (Huang et al. 2015; Cai et al. 2017). In Phase II (2018–2019), through a large number of clinical experiments and systematic reviews, researchers summarized the status of Chinese herbal medicines in skin diseases. Development and improvement of new herbal medicines within TCM had also been a hot topic (Lin et al. 2018; Mansu et al. 2018; Wang et al. 2019). From 2020 to 2022, psoriasis and atopic dermatitis were research hotspots, and numerous articles were published at this stage, illustrating that researchers showed considerable interest in overcoming these two major refractory diseases. Researchers have attempted to explain the mechanism of TCM treatment of skin diseases from a molecular perspective (Lu et al. 2021). Since 2023, the research trend has shifted towards the exploration of new and important targets through network pharmacology and molecular docking, which are more accurate and efficient (Liu et al. 2024). In 2024, researchers revealed the effect and mechanisms of Xiao-Chai-Hu Decoction (XCHD) on psoriasis by integrating network pharmacology, molecular docking, and in-vivo experiments. Network pharmacology provides a systematic approach for studying the complex interactions between TCM and the human body. Nevertheless, it is imperative to acknowledge that network pharmacology is solely a prognostic tool for identifying targets, and that the pharmacological efficacy of drugs necessitates rigorous experimental substantiation (Bai et al. 2023). Molecular docking is the main means of network pharmacology in determination of TCM in skin diseases, with particular advantages in the material basis and elucidation of the mechanism of action. Continuous improvement of the computational theory method and software will enable molecular docking technology surgery to play a greater role in aspects of TCM in skin disease (Liu et al. 2024). With rapid development of artificial intelligence (AI), TCM in the era of AI and multi-omics technology has exhibited new research trends, including: (i) integration of network and AI technology; (ii) deep network relationship mining; (iii) quantitative positioning and navigation of network targets, and; (iv) development of deeply interpretable network pharmacology models (Zhang et al. 2023). Drug delivery systems in TCM has previously always been a gap in TCM research. Delivery of TCM by nanoparticle systems, smart nanoparticles for delivery of Chinese medicine, omics profile of nano/micro-Chinese medicines, acupuncture needles transporting Chinese medicine

Table 5. Summary of study limitations.

Order number	Limitations
1	Including only English-language literature introduces a language bias.
2	Only articles from the WoSCC database were included, which means some valuable studies indexed by other databases may be missed, leading to potential bias. However, since WoSCC has a high coverage rate, this oversight is unlikely to influence the general trends significantly. (Matthew E, Falagas et al. 2008).
3	This analysis is limited to the publications on open-access websites, it is responsible for the lack of literature.
4	Lacking an analysis of the self-citation rate among articles, authors, and journals may also lead to bias, it needs to be corrected in future work.
5	Additionally, newly published high-quality studies might have few citations due to their recent publication, potentially resulting in discrepancies between the research findings and the actual state of the field.

nanoparticles, and in-depth pharmacodynamic mechanisms of nano/micro-Chinese medicines may be relatively new trends in this field (Huang et al. 2023). The combination of metabolomics and network pharmacology, as well as the integration of gut microbiota, is also a hot topic and trend in TCM research methods for dermatology in China. Unresolved issues of unclear active ingredients and pharmacological effects in TCM have limited the development of directions such as “network pharmacology,” “molecular docking,” and “application of drug delivery systems,” which have attracted attention of researchers.

Limitations

This study had several limitations. We detail several limitations in Table 5 regarding this bibliometric analysis. Despite these limitations, this study will help researchers understand developing trends, hotspots, and frontiers.

Conclusions

The increasing number of related publications highlighted the global importance of TCM research on skin diseases. Visual analysis of the literature on TCM in skin disease published worldwide from 2014 to 2024 showed that the research hotspots were increasing. Limited cooperation among countries and regions can hinder long-term academic progress. In recent years, the focus has been on the pharmacology of TCM ingredients and herbal treatments for skin diseases. Our study provides a comprehensive analysis of the trends and research focal points of TCM treatment for skin diseases and a valuable reference for future studies.

Authors’ Contributions

Lin Li, Lanfang Zhang: Conducted literature analysis, normalized figures, drafted the original manuscript, and secured funding. Yuan Li: Screened the literature and edited the manuscript. Yunlei Bao, Chuyan Wu: Contributed to data analysis, bibliometric interpretation and methodological support. Feng Jiang: Contributed to study design, data mining, bibliometric analysis, figure preparation, and manuscript revision. Ni Zeng, Nana Sun: Led study design, provided critical review and editing, managed the project, supervised the research, and offered administrative support. Yuan Cai, Xue Wen, Chenjie Zheng: Contributed to data processing and manuscript revision. All authors have read and approved the final version of the manuscript.

Disclosure statement

The authors declare that they have no competing interests.

Availability of data and materials

All data generated during this research are included in this published article. The analysis during the study can be obtained from the corresponding author Feng Jiang on reasonable request.

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