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Trend of Traditional Medicine and Ethnobotany Research: A Bibliometrics Analysis

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Abstract: The use of traditional medicine from herbs and natural ingredients has existed for a long time and goes alongside people's lives. So, this study aims to analyze the trend of scientific publications of traditional medicine research from 2015 to 2024. Bibliometric analysis was used, with the assistance of Dimensions.ai, Publish or Perish, and VOSviewer. The keywords used, both in Dimensions.ai and Publish or Perish, are "Traditional AND Medicine AND plant AND ethnobotany" with a time span of 2015-2024. The results showed that "pharmacology," "herbalist," and "medicinal plants" were some of the most frequently occurring keywords in this topic. In addition, in scientific publications, research trends also continue to evolve. More specifically, when the COVID-19 pandemic hit, there was a very significant increase in this topic.

Keywords: Bibliometrics; COVID-19; Ethnobotany; Plants; Traditional medicine.

Introduction

The tradition and knowledge of the community about the utilization of plants for medicinal purposes has existed since ancient times. This knowledge begins with trying various plants to cure various diseases. According to Raj et al. (2018) traditional medicine research is not only concerned with the pharmacological effects of plants but also involves the relationship between traditional knowledge and modern medical practices.

Traditional medicine has been widely used, and many studies have been conducted. In research discussions, experts often emphasize the importance of understanding the social and cultural context in ethnobotanical research. The discussion in this study shows that the focus on traditional medicine is increasing as global awareness of sustainability and health safety increases. Sher et al. (2016) stated that documentation of local knowledge is essential to ensure that this knowledge is not lost amidst globalization and modernization.

According to Teoh (2016), the main objectives of ethnobotanical research are often related to the preservation of traditional knowledge, exploration of new medicinal plants, and development of local resource-based pharmaceuticals. In this study, the aim of identifying trends in traditional medicine research through bibliometric analysis represents an effort to document the development of existing knowledge and respond to the need for safer natural remedies. Research objectives such as these not only help in understanding the current research landscape but also contribute in directing research towards relevant topics in the future. In addition, Sher et al. (2016) underline that research with the aim of bibliometric trend exploration also helps to identify potential knowledge gaps and areas that require further research.

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Method

This research uses bibliometric analysis with content analysis. Bibliometric analysis can effectively summarize a large amount of bibliographic data. By adding a stage to the literature review method, bibliometric analysis can reveal hidden patterns that can help the research process, identify knowledge gaps, research patterns and trends, and new ideas for investigation (Shuang et al., 2023).

Documents in this study were obtained from Google Schoolar. There are 3 applications used in this research, namely Publish or Perish, Dimensions.ai, and VOSViewer. Publish or Perish is used to retrieve data from the Google Scholar database which is then analyzed using VOSViewer. VOSViewer is used to map the most frequently used keywords (Table 4, Figure 2, Figure 3, Figure 4). While Dimension.ai is used to analyze general data, including publication trends by year (Figure 1), publication type (Table 1), the most popular journals (Table 2), and the number of citations by document (Table 3). The keywords used, both in Dimensions.ai and Publish or Perish, are "Traditional AND Medicine AND plant AND ethnobotany" with a time span of 2015-2024. More specifically, the keyword search on Dimensions.ai is only on the title and abstract. Meanwhile, in Publish or Perish, the maximum results of articles are limited to 1,0000 articles. The data was accessed on October 25, 2024.

Result and Discussion

Figure 1 illustrates the trend of research on traditional medicine from 2015 to 2024. The total number of published documents in the span of these years was 1,229 documents, with the lowest breakdown occurring in 2017 with only 78 documents, and the peak occurring in 2021 with 179 documents. From a bibliometric perspective, the increase in the number of publications each year indicates the growing interest and relevance of this topic, especially in documenting the benefits of medicinal plants as natural health solutions. According to Hart & Bussmann (2019), this upward trend reflects the growing importance of research involving traditional medicine amidst the global community's growing interest in alternative methods of treatment. More specifically, there is a very significant increase from 2019 to a peak in 2021. This could be due to the fact that the COVID-19 pandemic occurred during this period, and many people around the world are paying close attention to treatments using natural ingredients (Benkhaira et al., 2021; Fedoung et al., 2021; Tegen et al., 2021; Vroh, 2020).

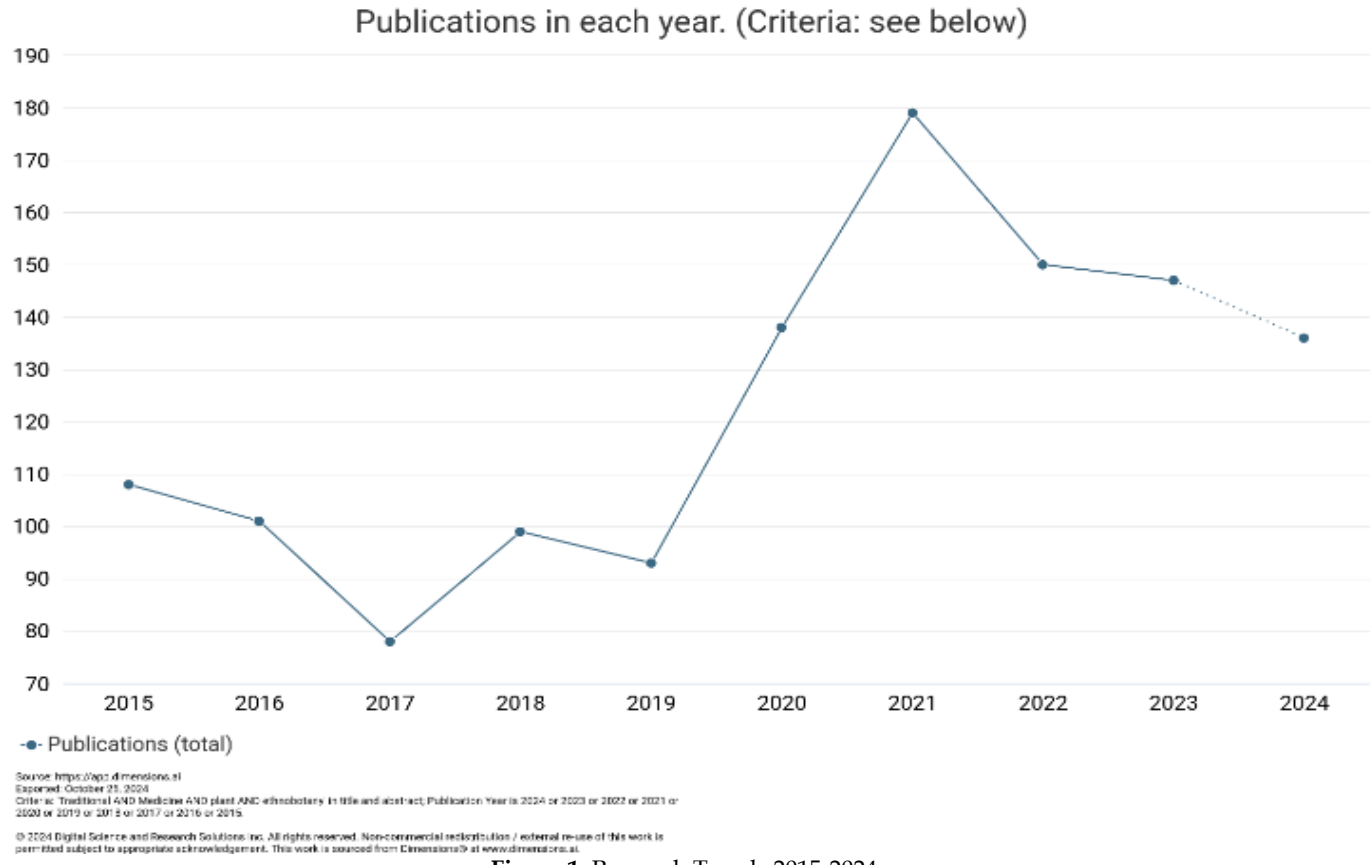


Figure 1: Research Trends 2015-2024

Table 1. Publication Type

Publication Type	Number of Publications
Article	1.052
Chapter	128
Edited Book	18
Preprint	15
Proceeding	10
Monograph	6

Then, the number of documents published between 2015-2024 is spread in various forms of documents. Table 1 above shows the classification of the types of publications made in ethnobotanical and traditional medicine research. Most publications are in the form of scientific articles (1,052 publications), which indicates that research results are often disseminated through academic journals so that they can be accessed by the wider community and other researchers. According to Zeng et al. (2017), scientific articles are very effective in disseminating the latest research results and reaching a wider scientific community. In addition to articles, publications in the form of book chapters are also significant, with a total of 128 publications, indicating an effort to study this topic comprehensively through an interdisciplinary approach. Other forms such as edited books, preprints, proceedings, and monographs each have smaller numbers, indicating variations in the delivery of research results depending on the intended audience and the need for deeper documentation (Norton & Schivley, 2020).

Table 2. 10 Most Popular Journals from 2015-2024

Journal Name	Number of publications	Citation	Citation (Mean)
Journal of Ethnopharmacology	298	14,048	47.14
Journal of Ethnobiology and Ethnomedicine	164	5,653	34.47
PLOS ONE	29	595	22.04
Molecules	15	421	28.07
Frontiers in Pharmacology	12	435	36.25
Reference Series in Phytochemistry	12	35	2.92
Economic Botany	11	96	8.73
South African Journal of Botany	11	281	25.55
BMC Complementary Medicine and Therapies	11	215	19.55
Ethnobotany of Mountain Regions	10	4	0.40

Table 2 lists the 10 journals with the highest number of publications in the field of ethnobotany and traditional medicine. Journal of Ethnopharmacology is the journal with the highest number of publications (298 articles) and has the highest average citations (47.14), demonstrating its role as a leading journal in ethnobotanical research (Agarwal & Varma, 2015, 2015; Baydoun et al., 2015; Cabanting & Perez, 2016; Cock & Vuuren, 2020). Followed by the Journal of Ethnobiology and Ethnomedicine with a total of 164 publications, this journal has a strong focus on the use of plants in cultural contexts and traditional medical practices (Ahmed, 2016; Araya et al., 2015; Chekole, 2017; Lin et al., 2019). According to Díaz et al. (2015), these journals play an important role in publishing research that is not only empirical but also explores the social and cultural relationships in the use of medicinal plants. Other journals such as PLOS ONE and Molecules contribute by examining the pharmacological effects and chemical components of medicinal plants, thus opening up opportunities for the development of plant-based medicines (Caruntu et al., 2020; González-Juárez et al., 2020; Maroyi, 2018; Sagbo & Otang-Mbeng, 2021; Santos et al., 2020).

Table 3. Number of Citations by Document

Number of citations	Citation/ year	Year of publication	Authors	Title
379	42.11	2016	Sher, Hassan; Bussmann, Rainer W.; Hart, Robbie; de Boer, Hugo J. (Sher et al., 2016)	Traditional use of medicinal plants among Kalasha, Ismaeli and Sunni groups in Chitral District, Khyber Pakhtunkhwa province, Pakistan
348	38.67	2016	Wang, Ting; Guo, Rixin; Zhou, Guohong; Zhou, Xidan; Kou, Zhenzhen; Sui, Feng; Li, Chun; Tang, Liying; Wang, Zhuju (Wang et al., 2016)	Traditional uses, botany, phytochemistry, pharmacology and toxicology of Panax notoginseng (Burk.) F.H. Chen: A review

Number of citations	Citation/ year	Year of publication	Authors	Title
302	30.20	2015	Malik, Zubair A.; Bhat, Jahangeer A.; Ballabha, Radha; Bussmann, Rainer W.; Bhatt, A.B. (Malik et al., 2015)	Ethnomedicinal plants traditionally used in health care practices by inhabitants of Western Himalaya
302	50.33	2019	Süntar, Ipek (Süntar, 2019)	Importance of ethnopharmacological studies in drug discovery: role of medicinal plants
276	30.67	2016	Shakeri, Abolfazl; Sahebkar, Amirhossein; Javadi, Behjat (Shakeri et al., 2016)	Melissa officinalis L. – A review of its traditional uses, phytochemistry and pharmacology
255	28.33	2016	Wei, Wen-Long; Zeng, Rui; Gu, Cai-Mei; Qu, Yan; Huang, Lin-Fang (Wei et al., 2016)	Angelica sinensis in China-A review of botanical profile, ethnopharmacology, phytochemistry and chemical analysis
253	50.60	2020	Fakchich, Jamila; Elachouri, Mostafa (Fakchich & Elachouri, 2020)	An overview on ethnobotanico-pharmacological studies carried out in Morocco, from 1991 to 2015: Systematic review (part 1)
251	27.89	2016	Teoh, Eng Soon (Teoh, 2016)	Medicinal Orchids of Asia
231	25.67	2016	Tugume, Patience; Kakudidi, Esezah K.; Buyinza, Mukadasi; Namaalwa, Justine; Kamatenesi, Maud; Mucunguzi, Patrick; Kalema, James (Tugume et al., 2016)	Ethnobotanical survey of medicinal plant species used by communities around Mabira Central Forest Reserve, Uganda
223	31.86	2018	Raj, Antony Joseph; Biswakarma, Saroj; Pala, Nazir A.; Shukla, Gopal; Vineeta; Kumar, Munesh; Chakravarty, Sumit; Bussmann, Rainer W. (Raj et al., 2018)	Indigenous uses of ethnomedicinal plants among forest-dependent communities of Northern Bengal, India

Then, Table 3 shows the most cited articles in this study, indicating topics that have a large impact and are considered important by the scientific community. The article by Sher et al. (2016) on the utilization of medicinal plants in Pakistan was the most cited with 379 citations and an average annual citation of 42.11. Another article by Wang et al. (2016) which examined Panax notoginseng, a plant known in traditional Asian medicine, had an average annual citation of 38.67. According to Hallinger & Chatpinyakoop (2019), highly cited articles tend to be the foundation for future research, especially if they examine the benefits and risks of using certain plants in traditional medicine. The high number of citations on these articles also suggests that the topic of using medicinal plants in traditional medicine has high relevance in the scientific world.

Table 4. displays the most frequently occurring keywords in ethnobotanical and traditional medicine research. Keywords such as "pharmacology" (Abubakar & Loh, 2016; Adnan et al., 2017; Antal et al., 2021; Shakeri et al., 2016; Wang et al., 2016) "medicinal plants," (Achour et al., 2022; Alebie et al., 2017; Amiri et al., 2021; Ammor et al., 2020; Baydoun et al., 2015) and "herbalist" (Akgül et al., 2016; Alalwan et al., 2019; Anywar et al., 2020; El-Ghazouani et al., 2021) indicate the focus of research on the pharmacological effects of plants and the role of traditional medicine practitioners. According to Zawacki-Richter et al. (2019 these keywords indicate the direction of research, describing the focus in understanding the effects of medicinal plants on human health. The use of keywords such as "northern Ethiopia" (Assefa et al., 2020; Chekole, 2017; Giday et al., 2016; Tewelde et al., 2017) and "traditional medical practitioner" (Vijayakumar et al., 2016; Wubetu et al., 2017) indicate the importance of cultural context and geography in this research, underscoring that many studies focus on specific regions rich in biodiversity.

Table 4. Keyword Trend

Keyword	Occurrences	Relevance
human ailment	11	4.57
genera	10	3.15
herbalist	14	3.00
traditional medical practitioner	14	2.62
traditional medicine practitioner	22	2.32
northern ethiopia	11	2.01
pharmacology	35	1.92
nigeria	34	1.88
total	16	1.70
pharmacological activity	11	1.65

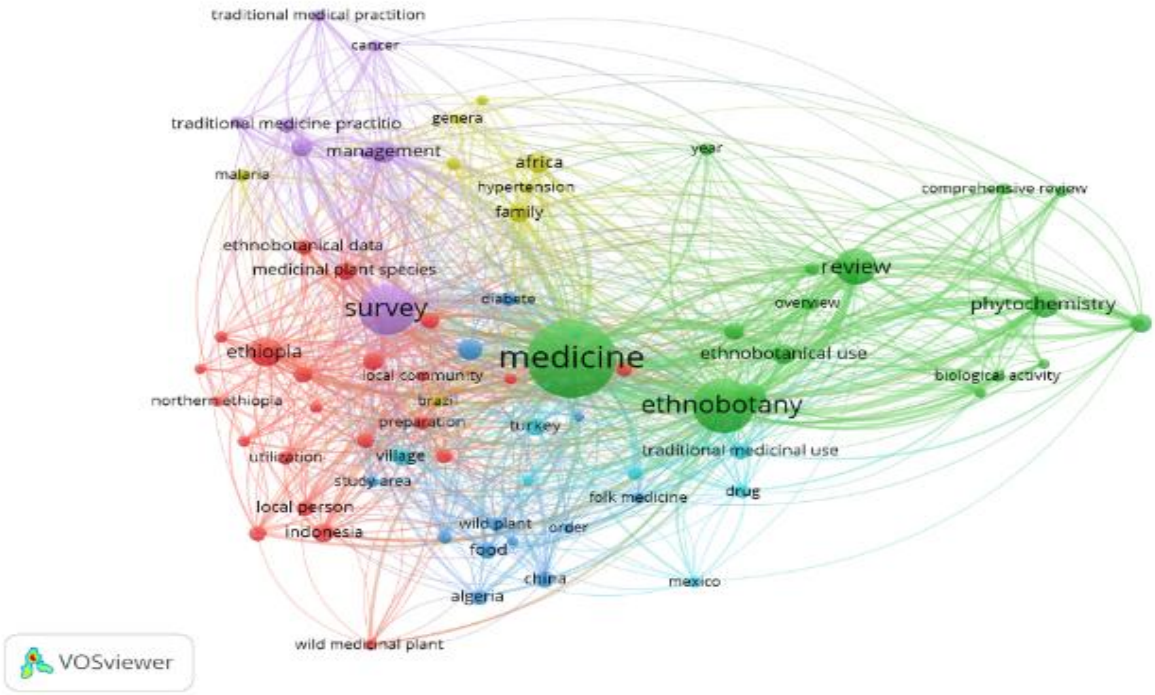
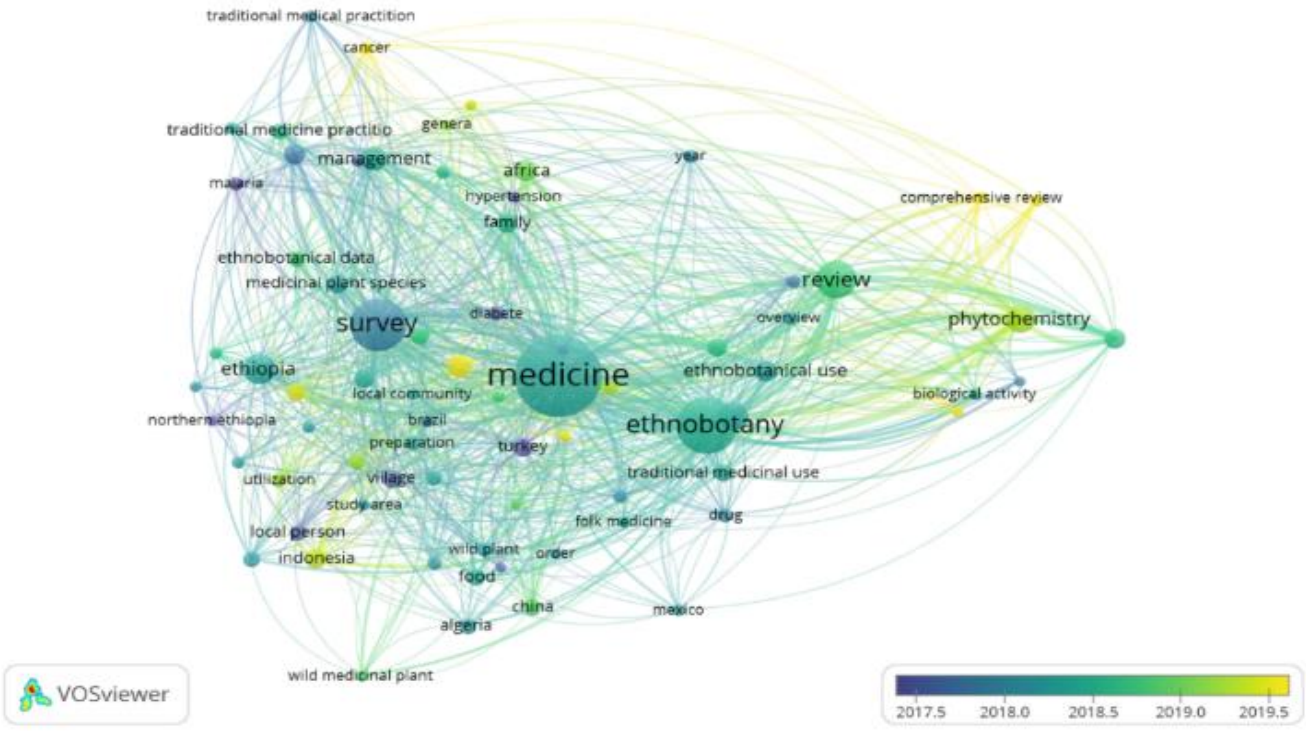


Figure 2. Network Visualization

Figure 2. shows a network visualization of the keywords frequently used in this research. The clusters in this visualization show the interconnectedness of key topics in traditional medicine and ethnobotany research. The red clusters show keywords related to the pharmacological effects of plants, while the green clusters focus on traditional medicine practitioners and local wisdom. This network visualization provides deep insights into how certain topics in ethnobotany are interconnected and opens up opportunities for cross-disciplinary collaboration. The network shows that while there is a focus on the pharmacological aspects of plants, there is also great interest in understanding how plants are utilized by local communities.



Gambar 3. Overly Visualization

The overlay visualization in Figure 3 shows the temporal changes in the use of keywords in ethnobotanical research. The purple to yellow colors show a shift in trend from older to newer keywords, indicating an evolution in research focus. For example, keywords such as "ethnobotany" (Abbas et al., 2019; Abbas et al., 2016; Amir et al., 2019; Bibi et al., 2015) and "traditional healer" (Belhouala & Benarba, 2021; Benarba, 2016; Chinsembu, 2016; Semenya & Maroyi, 2019; Tuasha et al., 2018a) were more frequently used at the beginning of the research period, while keywords such as "phytochemistry" (Birhan, 2022; Manikandaselvi et al., 2016; Mohammadhosseini et al., 2019; Mohtashami et al., 2021) dan "medicinal plant diversity" (Silalahi et al., 2015; Uzun & Koca, 2020; Xiong et al., 2020; Yaseen et al., 2019) started to appear in recent years. According to Liao et al. (2018), his overlay visualization provides an overview of how the research topic has evolved over time and shows an increased interest in understanding the chemical components of medicinal plants relevant for pharmaceutical development.

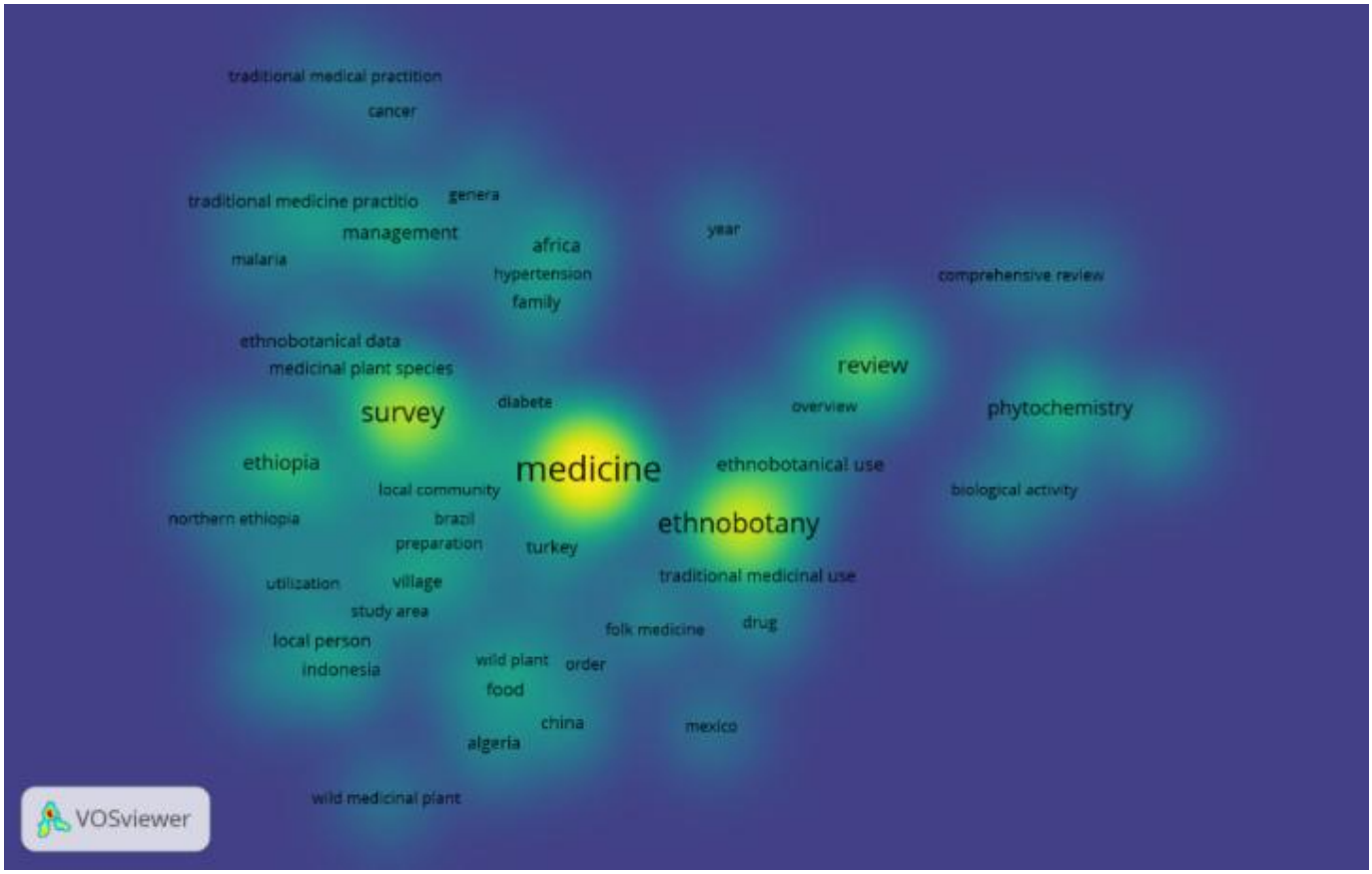


Figure 4. Density Visualization

Finally, Figure 4. density visualization shows the density of research topics, where keywords with high frequency are marked with light color. Keywords such as "pharmacology" (Al-Fatimi, 2019; Benarba, 2016; Fakchich & Elachouri, 2020) and "traditional medical practices" (Bhat et al., 2021; Muluye & Ayicheh, 2020; Tuasha et al., 2018b) are most prominent, indicating that these areas are often a major research topic. Meanwhile, keywords with fainter colors, such as "local wisdom" (Zukmadini et al., 2020) and "herbal usage," ndicate less researched topics with potential for further development. This visualization shows, as suggested by Kaur et al. (2022), that density analysis assists researchers in identifying knowledge gaps and potential future research, especially in local contexts and specific uses of medicinal plants.

Conclusion

Bibliometric analysis provides valuable insights into how a field of research evolves over time. The increasing publication trend in traditional medicine research indicates a global interest in more natural, plant-based health solutions. In the results of this study, it was found that the journals Journal of Ethnopharmacology and Journal of Ethnobiology and Ethnomedicine had the highest number of publications and significant average citations. This is in accordance

with the views expressed by Malik et al. (2015), which shows that these journals are often the main publication venues for research related to medicinal plant pharmacology and ethnobotany.

In addition, the results showed that there were major keywords that were frequently used, such as "pharmacology," "herbalist," and "medicinal plants." These keywords reflect the research focus on understanding the pharmacological effects and benefits of medicinal plants in the healthcare system. The network visualization generated through VOSviewer also shows clusters of interconnected topics, which are helpful in identifying research areas that are often explored together and complement each other.

Author Contributions

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Conflicts of Interest

The author declares no conflict of interest

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