Ethiopian Medical Journal 2023, 61(2)

ISSN 0014-1755 eISSN 2415-2420

Review Article

Monkeypox: Scientometrics of 50 years of global scientific publications

Meisam Dastani[1], Reza Ahmadi[2], Jalal Mardaneh[3*]

[1]Infectious Diseases Research Center, Gonabad University of Medical Sciences, Gonabad, Iran.
[2]School of Medicine, Infectious Diseases Research Center, Gonabad University of Medical Sciences, Gonabad, Iran.
[3]Department of Microbiology, School of Medicine, Infectious Diseases Research Center, Gonabad University of Medical Sciences, Gonabad, Iran.

Corresponding authors*: Email: jalalmardaneh@yahoo.com

Abstract
Background*: Scientific publications related to epidemic diseases are crucial for controlling and treating such diseases. The present study aimed to explore and analyze international publications on monkeypox through scientometric methods.*
Methods*: This review is an applied research conducted using the scientometric method with an analytical method. All world scientific publications on monkeypox were extracted from the Web Of Science (WOS) citation database from January 1972 to May 2022 through an appropriate search strategy. Moreover, Excel and the VOS viewer Bibliometrix package of the R programming language were used for data analysis.*
Results*: In total, 1130 publications related to monkeypox were extracted from the WOS citation database. Most of the publications were original papers published in 2010. The United States, Germany, and the Congo had the most publications on monkeypox. The topic clusters of scientific publications on monkeypox have been in four topic orientations: prevention, epidemiology, treatment, and immune response.*
Conclusion*: The findings of the present investigation provided a clear picture of the publications and scientific productions of world researchers in the field of monkeypox. Accordingly, researchers and policymakers on monkeypox can better understand the scientific publications on this disease and its dimensions.*

Keywords*: Monkeypox, Scientific publications, Scientometric, Bibliometric, Topic clusters*
Citation: *Dastani M, Ahmadi R, Mardaneh J. Monkeypox: Scientometrics of 50 years of global scientific publica tions. Ethiop Med J 61 (2) 189-198*
Submission date : *26 September 2022 Accepted: 22 March 2023 Published: 31 March 2023*

Introduction

In addition to being still one of the global health challenges recently, infectious diseases are one of the leading causes of death worldwide (1). Scientists have made significant progress in recent decades in treating and preventing infectious diseases such as HIV, viral hepatitis, and tuberculosis (2). However, many other infectious diseases, such as H5N1 and H7N9 bird flu, Middle East Respiratory Syndrome, Ebola virus, Zika virus, and COVID-19, have emerged in recent years; therefore, humans are always at risk of emerging infectious diseases (3).
Monkeypox, a common disease between humans and animals, is caused by the monkeypox virus, which belongs to the Poxviridae family, the Chordopoxvirinae subfamily, and the Orthopoxvirus genus. It is closely related to the variola virus (smallpox) and leads to smallpox-like disease (4).
Monkeypox has been a rare disease native to Africa but is now spreading to western and central Africa. Confirmed cases of monkeypox have been more common since 2016 than in the last 40 years (5). the World Health Organization (WHO) reported on the monkeypox outbreak in some countries (6).

In order to control and treat the disease, diagnostic test kits, medications, vaccines, and other health measures should be developed based on a thorough understanding of the biological properties and pathogenic mechanisms of this infectious disease; therefore, extensive research is needed in this field (7). In addition, one way to respond to this disease and con-

trol its outbreak is to conduct relevant research on all its dimensions (6). Accordingly, researchers have published various studies in different scientific fields in scientific databases, especially in health, for which quantitative and qualitative evaluations are necessary (8).
Scientometrics is an effective and efficient way to assess scientific progress and identify various aspects of scientific publications (9).
These methods are used to quantify the growth of research productivity, determine the countries and institutions with high numbers of publications, develop research materials, and determine significant research gaps (10). By taking into account the statistical data of scientometric studies, it is possible to reach a general understanding of global publications in a particular field, such as the number of studies, research capacities of different countries, leading research institutes, main journals, and other research parameters, which can be used to identify the research status, dominant areas, and main gaps for strategic planning and scientific research (9).

In this respect, scientometric methods were extensively applied to evaluate the knowledge growth in research related to health science and diseases, including influenza (11), coronaviruses and COVID-19 (12, 13), brucellosis (14, 15), tuberculosis (16), and other infectious diseases (17, 18).
Mayta-Tovalino et al. (2022) (19) analyzed the trend of scientific production on monkeypox between 2018 and 2022 using bibliometric indicators. The results of this study indicated the most important journals, institutions, and authors in this field . Zeeshan et al. (2022) (20) have also used bibliometric techniques to analyze the research trend of monkeypox between 2001 and 2021. The results of this study showed the growth of documents, distribution of sources, and collaborations at the national and international levels, as well as the relationship between authors and co-authors . In another study, Lin et al. (2022) (21) demonstrated that the number of scientific publications on human-related monkeypox has increased since 2003 through analysis of scientific publications on monkeypox from 1975 to 2022. Infection, vaccine, and efficacy have been the main topics of these publications .
Given the importance of the subject, the present study has also analyzed the scientific publications on monkeypox using bibliometric and scientometric techniques.

Research questions
This study applied scientometric techniques with an analytical approach to answer the following questions:
What are the types of scientific publications in the field of monkeypox?
What is the trend of publishing scientific publications on the subject of monkeypox?
Which countries have the most scientific publications in the field of monkeypox?
What is the scientific cooperation of countries in the field of monkeypox?
In what topics have scientific publications related to monkeypox disease been published?

Methods

Search strategy and inclusion criteria

The statistical population is all the scientific publications on the subject area of monkeypox in the WOS database. The main keywords for designing the search strategy were identified using the Medical Subject Headings Database (MeSH) and consulting with specialists in the field of infectious diseases. Afterward, in the advanced search of the WOS database, publications on monkeypox disease were extracted using the following search strategy by filtering the English language on May 28, 2022.
It should be noted that the search strategy was reviewed and approved by subject matter experts who were also authors of the present study. The search operation was performed by one author and then reviewed and approved by the other authors, who were subject matter experts in the field.
The timeframe considered in the search strategy was from January 1972 until the date of extraction of the publications, and the search strategy in topic fields in all WOS databases was as follows: (Monkeypox OR Monkeypox OR monkeypox viridae OR monkeypox viridae)
Moreover, eligibility criteria for scientometrics analysis were all types of documents extracted based on the search strategy. The reason for using the WOS database was that it is the most authoritative, extensively used, and oldest citation database (22).
Considering that the objective of the present investigation was the scientometric analysis of scientific publications in the field of monkeypox; therefore, all the monkeypox scientific publications indexed in the WOS in the search strategy were included as inclusion criteria.

Data extraction and data analysis
After conducting a search in the WOS database, the results obtained were extracted in the form of a plaintext file. The excel and VOS viewer software were applied to perform scientometric analysis and visualization. The VOS viewer software is one of the most powerful and standard software for analyzing data from citation databases, which clusters the most relevant documents and their relationships (23). Moreover, this software allows drawing maps based on terms.
A term map is a two-dimensional map in which the number of term occurrences is defined by label size, and the distance between two terms can be interpreted as an indication of the relatedness of these terms based on the number of term co-occurrences in the studied corpus file (24).

The Biblioshiny graphical interface tool based on the Bibliometrix package in R programming language was employed to analyze the data. Bibliometrix is a tool for visualizing information in bibliometric analyses based on scientific productions and publications in nations and regions, journals, authors, articles, keywords, and research institutes (25). It should be noted that KeyWords Plus has been applied to draw conceptual maps in each of the publications.
The thematic map uses the Keywords Plus field. The Keywords Plus is associated with Thomson Reuters editorial experts supported by a semi-automated algorithm. Keywords Plus terms can capture an article's content with greater depth and variety (26).

Results

What are the types of scientific publications in the field of monkeypox?

A total of 1,130 scientific publications on monkeypox over the past 50 years were extracted from the WOS database. Table (1) indicates the types of scientific publications conducted on monkeypox. According to Table (1), original articles, reviews, editorials, and other publications accounted for 71.95%, 10.53%, 5.22%, and 5.22% of scientific publications on monkeypox, respectively.

Table 1. Most types of scientific publications conducted on monkeypox.

Article Type	Number of Publications	Percentage
Original Article	813	71.95%
Review Article	119	10.53%
Editorial Material	59	5.22%
Meeting Abstract	56	4.96%
Letter	31	2.74%
Book Chapter	26	2.30%
Proceeding Paper	24	2.12%
News Item	22	1.95%
Note	8	0.71%
Correction	7	0.62%

Which countries have the most scientific publications in the field of monkeypox?

Table 2. Number of publications of countries in the global publications on monkeypox 1972-2022

Countries/ Regions	Number of Publications	Percentage
USA	687	60.80%
Germany	97	8.58%
Dem Rep Congo	75	6.64%
England	59	5.22%
Switzerland	53	4.69%
Russia	48	4.25%
France	42	3.72%
Belgium	37	3.27%
Canada	36	3.19%
Nigeria	28	2.48%

According to Table (2), the United States has the most publications related to monkeypox, with 687 patients accounting for 60.80%, followed by Germany with 97 publications (8.58%), and the Republic of Congo with 59 publications (6.64%). Moreover, Figure (3) indicates the trend of publications in the ten countries with the most scientific productions on monkeypox.

Since 2000, the United States has had the highest growth rate in global scientific publications on monkeypox, as demonstrated in Figure (2). Moreover, there has been a consistent trend in scientific publications on monkeypox in Germany and the Congo. Since 2017, Nigeria has also published scientific publications on monkeypox.

What is the scientific collaboration of countries in the field of monkeypox?

Figure (3) depicts the international collaboration network of different countries in publications on monkeypox when it comes to scientific collaboration between countries.

Characteristics of socio-demographics, vaccination,

The results of the chi-square/Fisher's exact test re-

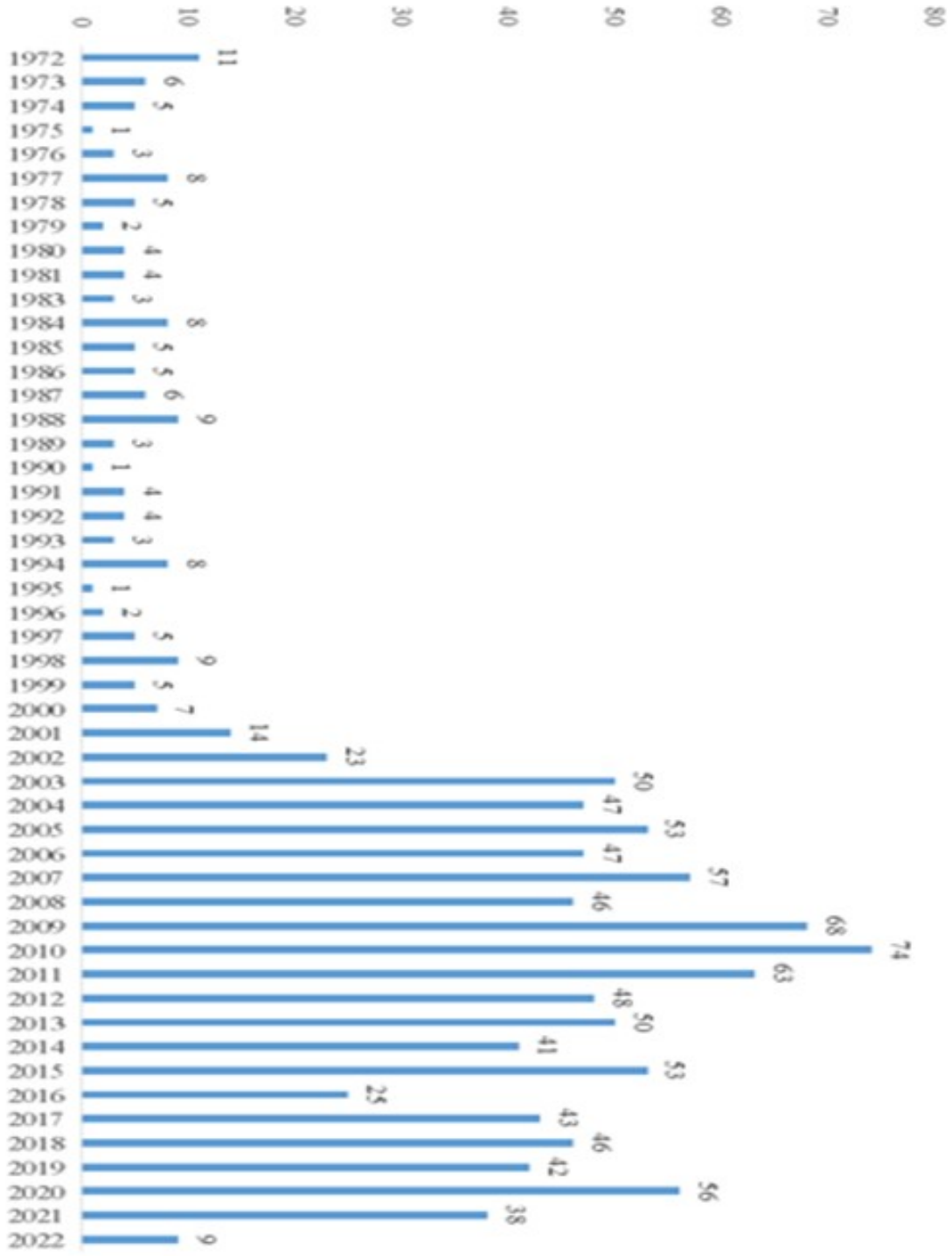

Figure 1. Trend of scientific publications on monkeypox from 1972-2022 .

Figure (1) indicates that the highest number of publications was in 2010, 2009, and 2011.

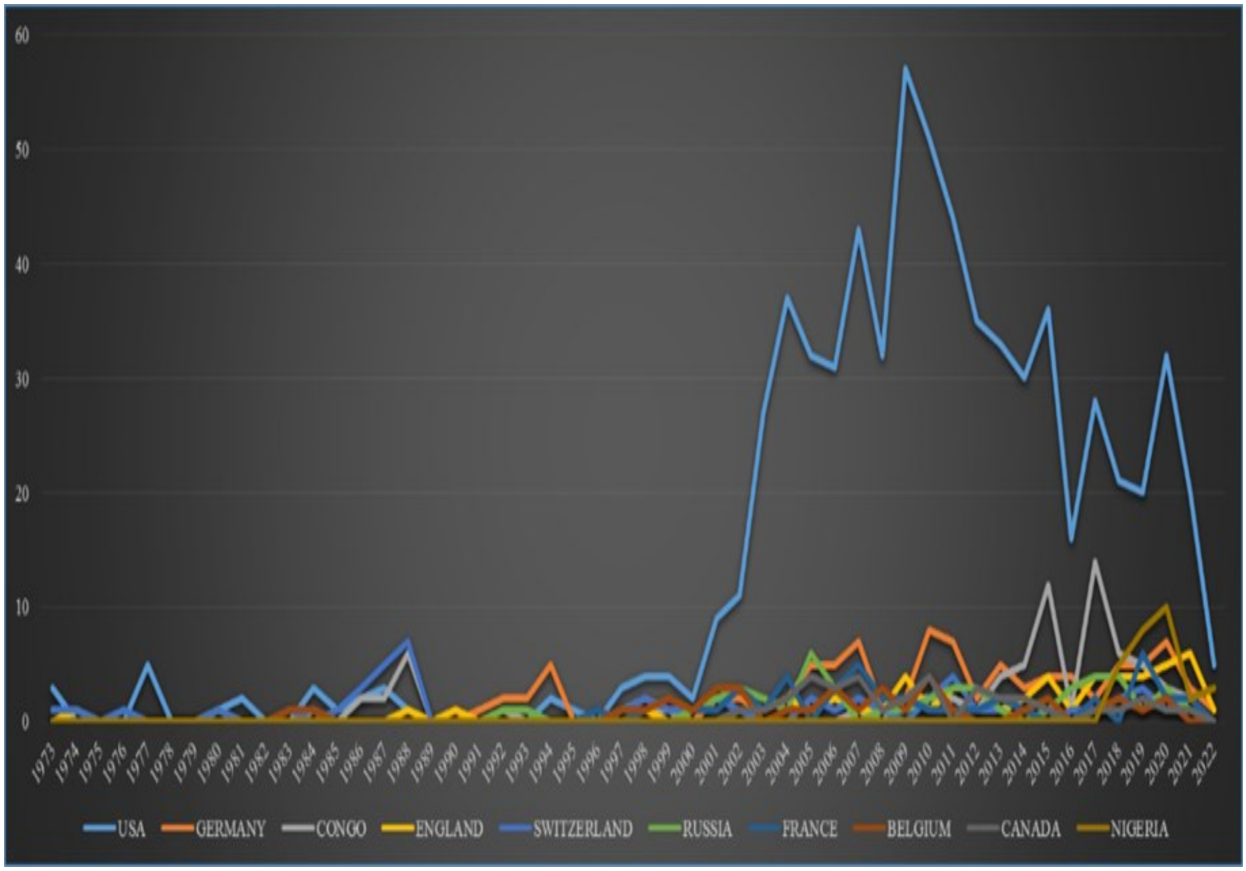

Figure 2. Trend of publications in ten countries with the most scientific productions on monkeypox from 1972-2022.

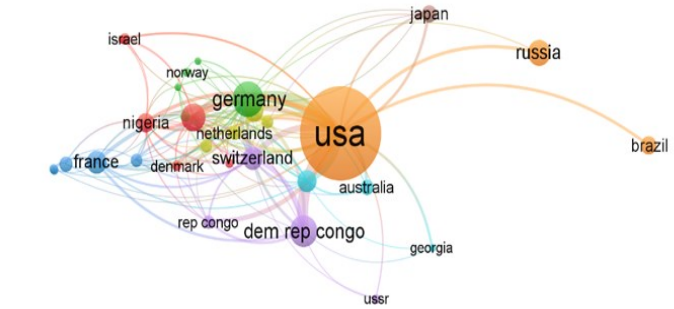

Figure 3. Collaboration of countries in the global publications on monkeypox

In what topics have scientific publications related to monkeypox disease been published?
Figure (4) shows the topic clusters of monkeypox publications based on the keyword co-occurrence.

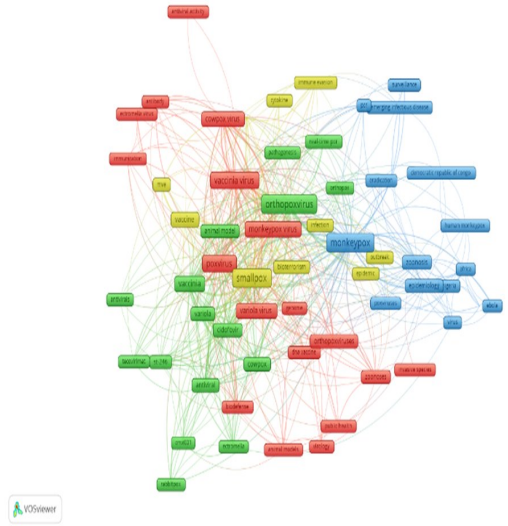

Figure 4. Network visualization based on the co-occurrence of monkeypox publications.

The frame sizes in Figure (4) represent the frequency of each keyword. Larger frames are related to higher frequencies. The frames and connections between them are depicted in four different colors in this figure. Each color represents a keyword cluster that frequently appears in monkeypox publications.

As a result, the red color denotes the subject of prevention, blue indicates the epidemiology, green implies the treatment, and yellow represents the immune response.
The density of authors' keywords in scientific publications on monkeypox is also displayed in Figure 5.

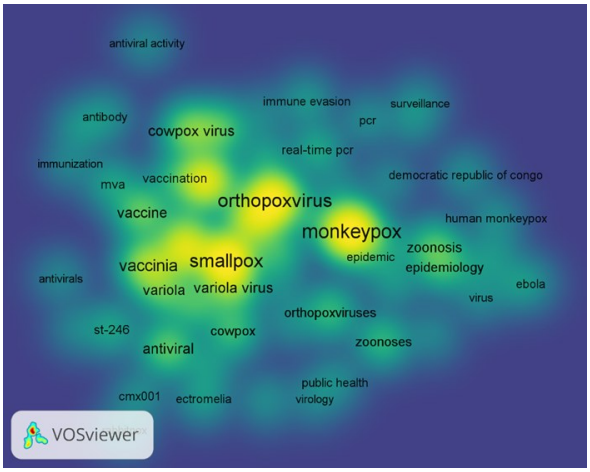

Figure 5. Density visualization based on occurrences of monkeypox publications

The density of the keyword network is depicted by the yellow-to-blue color spectrum in Figure (6). The weight density is represented by yellow, green, and blue from top to bottom. The most commonly used keywords are shown in the yellow sections. The higher the density, the more yellow the map would be. The scientific publications on smallpox had the highest co-occurrence of closely related keywords. As a result, the terms Monkeypox, Smallpox, and Orthopoxvirus were most frequently used and repeated in scientific publications regarding monkeypox.
Moreover, Figure (6) indicates the frequency of words and their co-occurrence over time. In this figure, lighter-colored frames indicate the most commonly used keywords in recent scientific publications on monkeypox, while darker-colored frames depict older keywords in monkeypox-related articles.

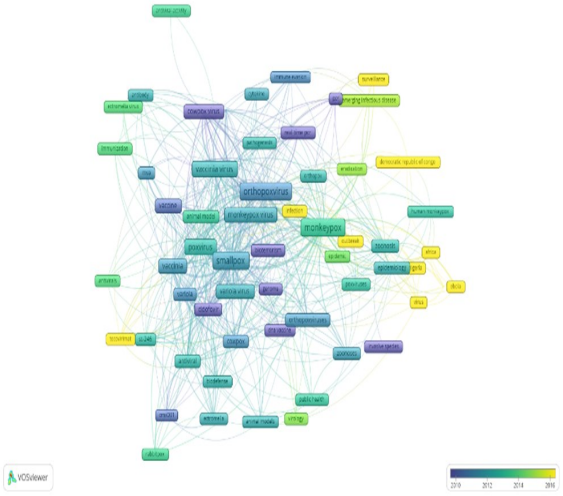

Figure 6. Overlay visualization based on the occurrences of monkeypox publications.

Therefore, "Outbreak," "Infection," "Nigeria," "Africa," and "Congo" have been the keywords in scientific publications on monkeypox in recent years and after 2016.
Moreover, Figure (8) demonstrates the thematic evolution trends in the monkeypox publications over time in four time periods, 1953-2000, 2001-2010, 2011-2020, and 2021-2022.

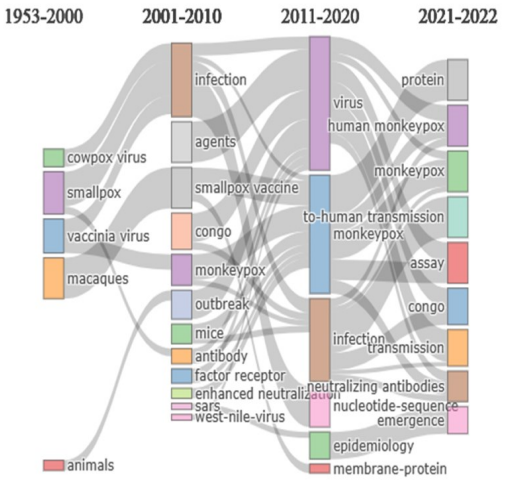

Figure 7. Thematic evolution trends in research of the monkypox publications.

Figure (7) indicates that the protein, human monkeypox, monkeypox, human transmission, assay, congo, transmission, neutralizing antibodies, and emergence were important topics in 2021-2022. Moreover, the congo has also been an important topic recently repeated in 2001-2010 and 2021-2022.

Figure (8) indicates the strategic diagram of the thematic map to demonstrate the significance and development of research topics. Moreover, it shows the thematic map based on density (y-axis) and centrality (x-axis). The centrality measures the importance of the selected theme, and density measures the development of the chosen theme.

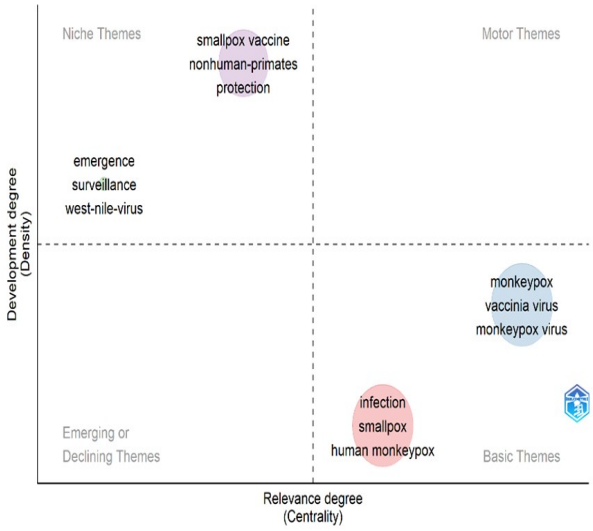

Figure 8. Thematic map based on density (y-axis) and centrality (x-axis).

In Figure (8), the upper-right quadrant indicates the motor themes. They are characterized by both high centrality and density. Moreover, there is not any topic in this quadrant. In the upper left quadrant, the niche themes are observed, which are peripheral and specific topics for the research field. "Smallpox vaccine," "nonhuman- primates," and "protection" are in this quadrant. In addition, "emergence," surveillance," and "west-nile-viruse" are in this quadrant.

The basic themes are demonstrated in the lower right quadrant. These are basic, general, and transversal themes in the research field. "monkeypox," "vaccinia virus," and "monkeypox virus" keywords are basic themes, also "infection," "smallpox," and "human monkeypox" are in this quadrant. Finally, there are emerging or declining themes in the lower left quadrant. There is not any topics in this quadrant.

Discussion

Scientometric methods are helpful in determining increased scientific activity and organizing the intellectual and scientific structure that makes up a topic area (27). This study revealed the structure of scientific publications on monkeypox using scientometric methods over the last 50 years.

According to the findings, scientific publications on monkeypox have increased significantly since 2000, with most publications occurring in 2010, 2009, and 2011. Furthermore, the majority of scientific publications were original articles. Lin et al. also showed that the increase in publications on monkeypox has been since 2003 (21).

The increase in infections in endemic areas of the disease and humans' close contact with monkeys could explain the upward trend in scientific publications on monkeypox infectious disease, a common disease between humans and animals (zoonotic disease) (28) since 2000. Consequently, studies have indicated that the monkeypox virus was first discovered in monkeys in a Danish laboratory in 1958 (29). In 1970, a 9-month-old baby boy in the Democratic Republic of the Congo was diagnosed with the disease for the first time (30). Recent studies have also indicated that the highest incidence of this disease has been in African countries, although it has been reported in other parts of the world in recent years (2, 31).

From 2009 to 2012, for three years in a row, published articles about monkeypox were higher than in past years. One of the reasons for this could be the disease's periodic outbreak and spread in endemic areas. Since 2000, the overall trend of studies has been upward. Although the outbreak of the disease has fluctuated slightly over the years, the number of studies on this virus has remained high. This problem highlights the importance of paying attention to the monkeypox disease, as a lack of attention has resulted in a steady increase in disease cases over the years. The increase in the number of publications indicates the progress of the scientific community on the subject. Moreover, the increase in the number of monkeypox publications shows the importance of the issue (20).

On the one hand, modern transportation and increased communication between different parts of the world, as well as the rapid movement of humans between countries and even continents, have resulted in the rapid and easy transmission of viruses, while on the other hand, a lack of attention to monkeypox disease in recent years and a reduced focus on the disease has resulted in the outbreak this zoonotic disease. On the contrary, since the global outbreak of the coronavirus pandemic, all of the world's attention and medical resources have been focused on this disease. Other diseases, on the other hand, have had more time to spread, and monkeypox cases have now been reported all over the world.

The United States, Germany, Congo, the United Kingdom, and Switzerland have the most publications in this field, according to the results of the present study. Furthermore, in terms of scientific publications on this disease, these countries have the highest level of scientific communication and collaboration. According to Phoobane et al. (17) on infectious diseases in Africa, the United States, the United Kingdom, South Africa, Switzerland, and Kenya have the most publications in this area. Moreover, in this field, these countries have the most international scientific collaboration. Due to the significant investment in various disease research in the United States, the study of their various aspects is at the forefront. The United States, for example, has the most global publications on tuberculosis (15, 32) and COVID-19 (33). In this regard, studies have found that a higher level of the outbreak of diseases increases researchers' interest in research and publication in those countries (34). Furthermore, country income is another reason for increased scientific publications. Accordingly, high-income countries have more scientific publications, and low-income countries have fewer scientific production (35, 36).

Furthermore, the presence of the protein, human monkeypox virus, and monkeypox itself, along with the potential for human transmission, have been major focus of the research community in 2021-2022. This indicates that researchers have been working to develop improved assays for detecting the virus and neutralizing antibodies, as well as studying the emergence of monkeypox in areas such as the Congo.

The keywords "monkeypox," "vaccinia virus," and "monkeypox virus" are significant in the research field of monkeypox. Monkeypox is a rare but potentially fatal viral disease that is similar to smallpox, caused by the monkeypox virus. One of the treatments for monkeypox is the smallpox vaccine, which is based on the vaccinia virus (37,38). Smallpox vaccination using the vaccinia virus has been shown through historical data to be approximately 85% effective against monkeypox (39).

These keywords are also transversal themes, which means that they are relevant and applicable across different research fields, such as virology, epidemiology, and infectious diseases.

Conclusion

The present investigation provides a comprehensive and clear picture of monkeypox scientific publications over the last 50 years. According to the findings, scientific publications on monkeypox have increased. Furthermore, since 2000, the growth in scientific publications in this field has been at its highest rate. Monkeypox has been the subject of scientific publications in four areas of epidemiology, prevention, treatment, and immune response. Furthermore, American, African, and European countries have the highest participation in scientific publications on this disease.

Furthermore, according to the results, researchers and policymakers gain a better understanding of scientific publications on monkeypox by having access to some information such as the most important countries, authors, keywords, and topics of scientific publications.

Furthermore, by analyzing the results obtained from studies that use these keywords, researchers can gain valuable insights into the epidemiology, pathogenesis, diagnosis, treatment, and prevention of monkeypox, which can ultimately contribute to the development of effective strategies for controlling this disease.

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: The authors express their gratitude to the Infectious Diseases Research Center of Gonabad University of Medical Sciences for their financial support in the research project with ID 992, which led to the publication of this article.

References

1. Brennan RJ, Nandy R. Complex humanitarian emergencies: a major global health challenge. Emerg. Med. 2001;13(2):147-56.
2. Morens DM, Fauci AS. Emerging infectious diseases in 2012: 20 years after the institute of medicine report. MBio. 2012 ;3(6):e00494-12.
3. Morens DM, Folkers GK, Fauci AS. The challenge of emerging and re-emerging infectious diseases. Nature. 2004;430(6996):242-9.
4. Bunge EM, Hoet B, Chen L, Lienert F, Weidenthaler H, Baer LR, et al. The changing epidemiology of human monkeypox—A potential threat? A systematic review. PLOS Negl. Trop. Dis.. 2022;16 (2):e0010141.
5. Durski KN, McCollum AM, Nakazawa Y, Petersen BW, Reynolds MG, Briand S, et al. Emergence of monkeypox—west and central Africa, 1970–2017. MMWR. 2018;67(10):306.
6. WHO. Multi-country monkeypox outbreak in non-endemic countries 2022 [Available from: https:// www.who.int/emergencies/disease-outbreak-news/item/2022-DON385.
7. Dastani M, Mardaneh J, Pouresmaeil O. Detecting latent topics and trends in global publications on brucellosis disease using text mining. Interdiscip Perspect Infect Dis. 2022;2022.
8. Belli S, Mugnaini R, Baltà J, Abadal E. Coronavirus mapping in scientific publications: When science advances rapidly and collectively, is access to this knowledge open to society?. Scientometrics. 2020;124:2661-85.
9. Tian D. Bibliometric analysis of pathogenic organisms. Biosafety and Health. 2020;2(02):95-103.
10. Tran BX, Ha GH, Nguyen LH, Vu GT, Hoang MT, Le HT, et al. Studies of Novel Coronavirus Disease 19 (COVID-19) Pandemic: A Global Analysis of Literature. Int. J. Environ. Res. Public Health. 2020;17 (11):4095.
11. Fricke R, Uibel S, Klingelhoefer D, Groneberg DA. Influenza: a scientometric and density-equalizing analysis. BMC Infect. Dis. 2013;13(1):454.
12. Danesh F, Ghavidel S. Coronavirus: Scientometrics of 50 Years of global scientific productions. Iran J Microbiol. 2020;14(1):1-16.
13. Malik AA, Butt NS, Bashir MA, Gilani SA. A scientometric analysis on coronaviruses research (1900–2020): Time for a continuous, cooperative, and global approach. J. Infect. Public Health.. 2021;14(3):311 -9.
14. Dastani M, Mardaneh J, Mosher J. Mapping the Scientific Structure of Iranian Brucellosis Researches Using the Co-authorship and Co-occurrence Network Analysis. Iranian J. Med. Microbiol. 2022;16(4):8-
15. Bakri FG, AlQadiri HM, Adwan MH. The highest cited papers in brucellosis: identification using two databases and review of the papers' major findings. Biomed Res. Int. 2018;2018.
16. Chang L, Su Y, Zhu R, Duan Z. Mapping international collaboration in tuberculosis research from 1998 to 2017: A scientometric study. Medicine. 2019;98(37).
17. Phoobane P, Masinde M, Mabhaudhi T. Predicting Infectious Diseases: A Bibliometric Review on Africa. Int. J. Environ. Res. 2022;19(3):1893.
18. Ramos JM, Masía M, Padilla S, Gutiérrez F. A bibliometric overview of infectious diseases research in European countries (2002–2007). Eur. J. Clin. Microbiol. Infect. Dis. 2009;28(6):713-6.
19. Mayta-Tovalino F, Valverde-Espinoza N, Barja-Ore J, Mauricio-Vilchez C, Munive-Degregori A, Guerrero ME. Advances, Visibility, and Impact of Collaborative Global Scientific Production on Monkeypox: a 5-Year Scientometric Study. Available at SSRN 4240517.
20. Zeeshan HM, Rubab A, Dhlakama H, Ogunsakin RE, Okpeku M. Global Research Trends on Monkeypox Virus: A Bibliometric and Visualized Study. Trop. Med. Infect. Dis.2022 Nov 28;7(12):402.
21. Lin J, Li G, Zhong P, Zeng Q, Liu L, Chen L. Bibliometric analysis of human monkeypox research from 1975 to 2022 and novel prevention and control strategies. Front Public Health. 2022:3469.
22. Birkle C, Pendlebury DA, Schnell J, Adams J. Web of Science as a data source for research on scientific and scholarly activity. Quant. sci. stud. 2020;1(1):363-76.
23. van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. scientometrics. 2010;84(2):523-38.
24. Cardona G, Sanz JP. Publication analysis of the contact lens field: What are the current topics of interest?. J. Optom. 2015;8(1):33-9.
25. Mühl DD, de Oliveira L. A bibliometric and thematic approach to agriculture 4.0. Heliyon. 2022;8 (5):e09369.
26. Della Corte V, Del Gaudio G, Sepe F, Sciarelli F. Sustainable tourism in the open innovation realm: A bibliometric analysis. Sustainability. 2019;11(21):6114.
27. Danesh F, GhaviDel S. Visualizing the Clusters and Dynamics of HPV Research Area. Iran J Microbiol. 2019;13(4):266-78.
28. Georges A-J, Matton T, Courbot-Georges M-C. Le monkey-pox, un paradigme de maladie émergente puis réémergente. Med Mal Infect. 2004;34(1):12-9.

29. Magnus Pv, Andersen EK, Petersen KB, Birch-Andersen A. A pox-like disease in cynomolgus monkeys. APMIS. 1959;46(2):156-76.
30. Breman JG, Kalisa-Ruti M, Zanotto E, Gromyko A, Arita I. Human monkeypox, 1970-79. Bull. World Health Organ. 1980;58(2):165.
31. Yong SEF, Ng OT, Ho ZJM, Mak TM, Marimuthu K, Vasco S, et al. Imported Monkeypox, Singapore. Emerg Infect Dis. 2020;26(8):1826.
32. Ramos J, Padilla S, Masia M, Gutierrez F. A bibliometric analysis of tuberculosis research indexed in PubMed, 1997–2006. Int J Tuberc Lung Dis. 2008;12(12):1461-8.
33. Sahoo S, Pandey S. Evaluating research performance of Coronavirus and Covid-19 pandemic using scientometric indicators. Online Inf. Rev. 2020.
34. Hassan MD, Castanha RCG, Wolfram D. Scientometric analysis of global trypanosomiasis research: 1988–2017. J. Infect. Public Health. 2020;13(4):514-20.
35. Narotsky D, Green PHR, Lebwohl B. Temporal, and geographic trends in celiac disease publications: a bibliometric analysis. Eur J Gastroenterol Hepatol. 2012;24(9):1071-7.
36. Demir E, Comba A. The evolution of celiac disease publications: a holistic approach with bibliometric analysis. Ir. J. Med. Sci. 2019;189:267-76.
37. Petersen E, Kantele A, Koopmans M, Asogun D, Yinka-Ogunleye A, Ihekweazu C, et al. Human monkeypox: epidemiologic and clinical characteristics, diagnosis, and prevention. Infectious Disease Clinics. 2019;33(4):1027-43.
38. Chakraborty S, Mohapatra RK, Chandran D, Alagawany M, Sv P, Islam MA, Chakraborty C, Dhama K. Monkeypox vaccines and vaccination strategies: Current knowledge and advances. An update-Correspondence. Int J Surg. 2022 1;105:106869.
39. Fine PEM, Jezek Z, Grab B, Dixon H. The transmission potential of monkeypox virus in human populations. Int J Epidemiol. 1988.