

A two-decade bibliometric exploration of AI applications in obstetrics and gynecology (2005-2024)

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ABSTRACT

Aims: Artificial Intelligence (AI) technologies have significantly impacted obstetrics and gynecology (Obs&Gyn), particularly in diagnostics, treatment, and patient care. This study aims to conduct a bibliometric analysis of AI-related research in Obs&Gyn published between January 1, 2005, and December 31, 2024. The main objectives are to explore publication trends, leading contributors, research themes, collaboration patterns, and emerging technologies.

Methods: A total of 959 publications were retrieved from the Web of Science Core Collection using the keyword “artificial intelligence” and filtered by the Obs&Gyn category. VOSviewer software was used to map co-authorship, keyword co-occurrence, bibliographic coupling, and geographic collaborations.

Results: AI research in Obs&Gyn increased notably after 2017. North America and Europe led in publication output, with Asia also showing strong contributions. Prominent themes included machine learning, deep learning, IVF, diagnostic imaging, and robotic surgery. Collaboration networks revealed strong institutional and international partnerships.

Conclusion: This study underscores the transformative potential of AI in Obs&Gyn and highlights critical research areas, key contributors, and collaboration dynamics. Findings provide a foundation for future research, emphasizing the need for inclusivity, ethical AI adoption, and addressing global healthcare disparities in Obs&Gyn.

Keywords: Artificial Intelligence, obstetrics, gynecology, machine learning, Deep Learning

INTRODUCTION

The rapid evolution of artificial intelligence (AI) technologies has transformed various fields, including healthcare. In obstetrics and gynecology (Obs&Gyn), AI applications have emerged as powerful tools to enhance diagnostic precision, optimize treatment strategies, and address pressing challenges in maternal and fetal health. From predictive models for embryo viability to advancements in robotic surgery, the integration of AI has opened new avenues for improving outcomes and streamlining clinical workflows.^{1,2}

Bibliometric analyses provide a systematic method to evaluate the progression and impact of research within a field, offering insights into publication trends, influential contributors, and emerging hotspots. These analyses are particularly relevant in Obs&Gyn, where the intersection of AI with clinical practice has gained substantial momentum in recent years. For instance, the proliferation of research on robotic surgery, as highlighted by Xiao et al.¹ and Levin et al.,² underscores the transformative potential of AI in enhancing surgical precision and reducing patient recovery times. Additionally, the integration of machine learning techniques in predictive models for obstetric complications has demonstrated promising results in improving maternal and neonatal care.³

A critical aspect of AI's application in Obs&Gyn is its ability to address resource disparities and promote equitable access to healthcare. Industry 4.0 technologies, as explored by Sibanda et al.,⁴ have been pivotal in optimizing maternal health care systems in resource-limited settings. Furthermore, the use of natural language processing tools, such as ChatGPT, has sparked discussions around AI's potential to support decision-making and patient communication in clinical settings.^{5,6}

Despite these advancements, the global distribution of AI research in Obs&Gyn remains uneven, with contributions concentrated in certain regions, particularly North America and Europe.^{5,7} Emerging players such as China and other Asian countries are progressively expanding their influence in this domain, as evidenced by recent bibliometric studies.⁸ However, contributions from Africa and other underrepresented regions, while growing, remain limited, highlighting the need for a more inclusive research landscape.⁴

Existing bibliometric studies have also emphasized the interdisciplinary nature of AI research in Obs&Gyn. Keywords such as “machine learning,” “deep learning,” “IVF,” and “ultrasound” consistently appear as dominant themes, reflecting the diverse applications of AI across reproductive

health and diagnostics.^{9,10} Moreover, AI's potential to transform clinical workflows through emerging technologies, such as radiomics and digital pathology, underscores its growing relevance in Obs&Gyn.^{8,11}

The primary aim of this study is to conduct a comprehensive bibliometric analysis of research trends in AI within the domain of Obs&Gyn. This study seeks to identify the key research areas, influential contributors, emerging technologies, and collaboration networks that are shaping the integration of AI in Obs&Gyn. By examining the temporal distribution of publications, most-cited works, prominent institutions, and keyword trends, this research provides a detailed understanding of how AI is transforming clinical practices, diagnostics, and research in this critical healthcare field.

The significance of this study is underscored by the increasing reliance on AI technologies in healthcare. As maternal and fetal health are central to population well-being, the application of AI in Obs&Gyn has the potential to revolutionize patient care through predictive analytics, personalized treatment plans, and enhanced diagnostic accuracy. Furthermore, as global challenges such as resource limitations and unequal access to healthcare persist, understanding the role of AI in addressing these disparities is vital. This study also highlights the interdisciplinary and collaborative nature of AI research, offering insights into how advancements in computer science, medicine, and engineering converge to solve complex healthcare challenges.

By providing a granular view of the state of AI research in Obs&Gyn, this study contributes to the literature by identifying opportunities for future research, fostering collaboration among stakeholders, and supporting evidence-based decision-making in healthcare policy and practice.

METHODS

Ethics

Our study is a bibliometric analysis based solely on previously published data obtained from public databases. It does not involve human participants, personal data, or any clinical interventions. Therefore, ethical approval is not required for this type of research. All procedures were carried out in accordance with the ethical rules and the principles.

Study Design and Data Collection

This study conducted a bibliometric analysis of the literature on “artificial intelligence” (AI) published between January 1, 2005, and December 31, 2024. A total of 959 publications were evaluated, with data retrieved from the Web of Science (WoS) Core Collection database. The keyword “artificial intelligence” was used as the primary search term, applying the “topic” filter to include titles, abstracts, author keywords, and Keywords Plus®. Publications categorized under “obstetrics gynecology” in the Web of Science Categories were selected to ensure relevance to the intersection of AI and this specific medical domain.

The decision to use “artificial intelligence” as the sole keyword and focus on the “obstetrics gynecology” category was based

on the need for specificity and precision in capturing relevant literature. This approach ensured a focused dataset while eliminating irrelevant results, maximizing both the relevance and comprehensiveness of the study.

Data export: Data from the selected papers were exported and saved in Microsoft Excel 2019 for quantitative analysis and EndNote Desktop for citation management. The exported dataset included various parameters such as authors, organizations, countries/regions, keywords, titles, abstracts, publication years, source journals along with their impact factors (as per the Journal Citation Report, 2022), and citation counts. This structured dataset enabled qualitative and quantitative analyses to uncover trends, patterns, and key contributions in AI research within obstetrics and gynecology.

Data analysis: The bibliometric data were systematically analyzed to identify trends in publication volume over time, citation patterns, and the impact of specific journals, authors, and institutions. Authorship and collaboration patterns were also examined, focusing on the affiliations and contributions of leading researchers as well as international collaboration networks. Keyword analysis was performed to investigate co-occurrence patterns, revealing dominant themes and emerging trends. Additionally, the geographical distribution of research was mapped to understand contributions from different countries and regions. Bibliographic coupling and co-citation networks were analyzed to uncover relationships between publications, authors, and references.

Visualization: To visualize relationships and trends within the dataset, VOSviewer software (version 1.6.11, Leiden University, The Hague, Netherlands) was utilized. Co-authorship networks were generated to map collaborative relationships among authors, countries, and organizations, where node size indicated the frequency of co-authorship, and the thickness of connecting lines reflected the strength of collaboration. Keyword co-occurrence networks were created to highlight research hotspots, with larger nodes representing higher keyword frequency and clusters depicted in distinct colors to illustrate thematic groupings. Bibliographic coupling maps revealed connections based on shared references, while co-citation networks identified foundational works cited together.

Visualization maps were further refined using three distinct types: network visualization maps, density visualization maps, and overlay visualization maps. The network visualization maps illustrated clusters of keywords and their interrelationships, with larger nodes indicating higher frequency and thicker lines representing stronger connections. Density visualization maps used a gradient color scheme to depict the frequency of keyword occurrences, with red denoting the highest frequency. Overlay visualization maps captured the temporal evolution of keywords, using colors to indicate average publication years (APY), enabling an assessment of the novelty and emergence of specific research themes. The parameters for visualization in VOSviewer were set to optimize clarity and interpretability, with the method set to association strength, attraction set to 2, repulsion set to 0, resolution at 1, and minimum cluster size of 1.

Research Questions

- What are the publication trends over time in AI research within Obs&Gyn?
- Which journals, authors, and institutions are the leading contributors to AI research in Obs&Gyn, and what is their impact?
- What are the most frequently cited articles in AI research for Obs&Gyn, and what are their significant contributions?
- What are the dominant themes and keywords in AI research within Obs&Gyn, and what do they reveal about emerging trends?
- What are the patterns of collaboration among authors, institutions, and countries in AI research for Obs&Gyn?
- What is the geographic distribution of AI research in Obs&Gyn, and which regions are emerging as leaders or contributors?
- How can AI address current challenges in Obs&Gyn, including resource limitations, diagnostic inaccuracies, and healthcare inequities?

RESULTS

Analysis of Articles by Year

Figure 1 presents the annual distribution of studies in the dataset created using Web of Science data.

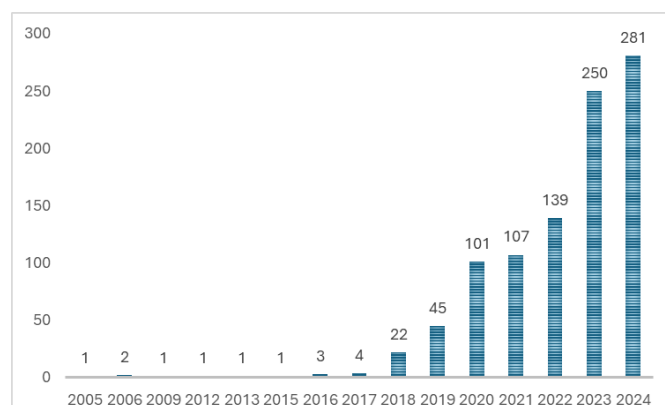


Figure 1. Annual distribution of articles on “artificial intelligence”

When examining the annual distribution of articles on “artificial intelligence” shown in Figure 1, it is evident that research activities in this field were initially limited, with some periods showing no publications. After 2017, academic interest in this area began to rise, and the number of articles increased steadily. This growth can be directly linked to the application of AI technologies across various disciplines, the development of new algorithms, and the popularization of subfields such as machine learning. A consistent upward trend was recorded between 2018 and 2024, with 2024 standing out as the year with the highest number of publications. This reflects the rapid technological advancements in AI, supported by the development of big data and computational power, which have driven academic work in this direction.

Journals with the Most Publications on the Topic

The number of articles related to “artificial intelligence” published in various journals, as recorded in Web of Science, is presented in **Figure 2**.

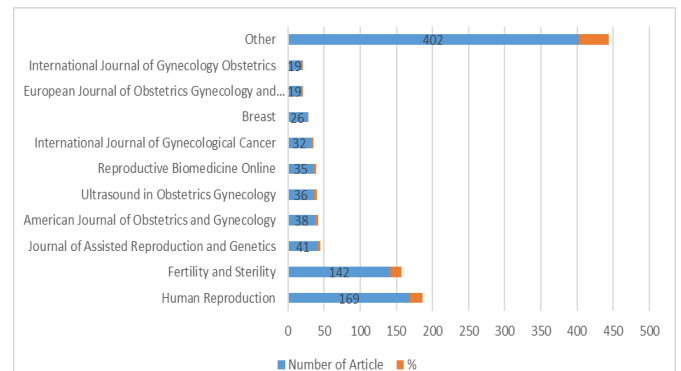


Figure 2. Journal names, number of publications, and percentage distribution of articles

Figure 2 ranks journals publishing on “Artificial Intelligence” by the number of articles. Human Reproduction leads with 169 articles, demonstrating the significant role of AI applications in reproductive health. This is followed by Fertility and Sterility with 142 articles. These two journals have made substantial contributions to the literature by publishing a large portion of the studies in this field. The Journal of Assisted Reproduction and Genetics ranks third with 41 articles, while American Journal of Obstetrics and Gynecology and Ultrasound in Obstetrics and Gynecology follow with 38 and 36 articles, respectively. These publication counts highlight the widespread use of AI-based methods in critical areas such as gynecology and reproductive health.

Additionally, Reproductive Biomedicine Online published 35 articles, International Journal of Gynecological Cancer 32 articles, and Breast 26 articles, showcasing the focus on AI applications in various medical subfields. The European Journal of Obstetrics Gynecology and Reproductive Biology and International Journal of Gynecology Obstetrics each published 19 articles, appearing at the lower end of the rankings. Lastly, the “other” category includes 402 articles, indicating that studies on AI have been published across a broader range of journals. This high number of articles in other journals underscores the interdisciplinary nature of AI research and its wide range of applications.

Authors, Article Titles, Journals, Publication Dates, and Citation Counts of the Most Cited Publications

Table 1 presents the authors, article titles, journals, publication dates, and citation counts for the most-cited publications on “artificial intelligence” in the Web of Science database.

The most-cited article, authored by Tran et al.¹² in 2019, focuses on predictive AI use in reproductive health and has received 186 citations. The second-ranked article by Tagliafico et al.¹³ discusses the use of AI in breast cancer diagnosis, with 167 citations. VerMilyea et al.’s¹⁴ 2020 article, which developed an AI-based model for predicting embryo viability, ranks third with 158 citations. Carter et al.’s¹⁵ article from the same year

Table 1. Details of the most cited articles on “artificial intelligence”

No	Authors	Article title	Journal name	Year	Citation count
1	Tran et al. ¹²	Deep learning as a predictive tool for fetal heart pregnancy following time-lapse incubation and blastocyst transfer	Human Reproduction	2019	186
2	Tagliafico et al. ¹³	Overview of radiomics in breast cancer diagnosis and prognostication	Breast	2020	167
3	VerMilyea et al. ¹⁴	Development of an artificial intelligence-based assessment model for prediction of embryo viability using static images captured by optical light microscopy during IVF	Human Reproduction	2020	158
4	Carter et al. ¹⁵	The ethical, legal and social implications of using artificial intelligence systems in breast cancer care	Breast	2020	123
5	Grünebaum et al. ¹⁶	The exciting potential for ChatGPT in obstetrics and gynecology	American Journal of Obstetrics and Gynecology	2023	112

addresses the ethical and social implications of AI in breast cancer care, with 123 citations. Lastly, Grünebaum et al.'s¹⁶ 2023 article, which explores the use of ChatGPT in obstetrics and gynecology, received 112 citations. These highly cited studies highlight the significant interest in AI's diverse applications in the medical field.

Publication Statistics for the Most Cited Institutions

The institutions where the authors of articles on “artificial intelligence” in the Web of Science database are affiliated, along with the number of articles published and their citation counts, are presented in [Table 2](#).

Table 2. Distribution of the most cited institutions and publications based on WoS data

No	Institution	Number of publications	Citation count
1	The University of Sydney	11	409
2	The University of Adelaide	17	369
3	Harvard Medical School	34	355
4	University of Oxford	17	340
5	Weill Cornell Medicine	20	280

Table 2 provides information on the institutions with the highest citation counts for articles related to “artificial intelligence” in the Web of Science database, along with the number of articles published by these institutions and their corresponding citation counts. Ranked first, the University of Sydney has published 11 articles, receiving a total of 409 citations, making it the institution with the highest citation count. This indicates that the university’s research in the field of artificial intelligence has had a significant academic impact.

In second place, the University of Adelaide has published 17 articles with 369 citations, demonstrating a notable citation performance alongside a high number of publications. Harvard Medical School, which holds the highest number of publications with 34 articles, ranks third in citations with a total of 355. This suggests that while the institution has a broad publication output, its citation-per-article ratio is comparatively lower than other institutions.

The University of Oxford, with 17 articles and 340 citations, is ranked fourth, highlighting its significant academic contribution to the field of artificial intelligence. In fifth place, Weill Cornell Medicine has published 20 articles,

accumulating a total of 280 citations. This result indicates that the institution's publications in this field have been recognized and valued by the academic community, making meaningful contributions to the area.

Overall, the table reveals that research on artificial intelligence is predominantly conducted by certain universities and medical schools, whose studies have had substantial academic influence and resonated across various disciplines.

Trends in the Use of Keywords

The most frequently used keywords and their frequencies in articles on “Artificial Intelligence” in the Web of Science database are presented in [Figure 3](#).

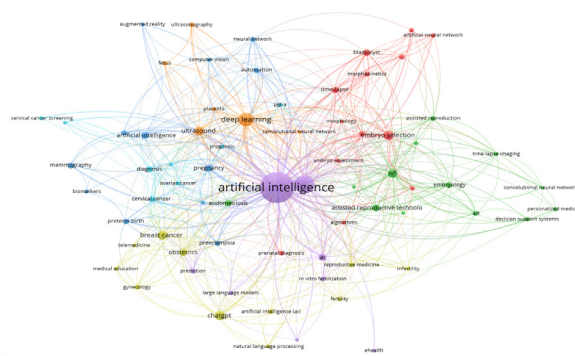


Figure 3. Co-occurring keywords and their frequencies

A bibliometric analysis using Vosviewer software was conducted, setting a minimum threshold of five occurrences for keyword inclusion. This threshold ensures that only more frequently used and semantically significant terms are analyzed. While a total of 1,445 unique keywords were identified during the analysis, only 71 met the threshold and were included in the study. This method demonstrates that only these 71 keywords and their relationships were examined in the analysis.

As a result of the analysis, the most frequently used and strongly interconnected keywords in a specific research field were identified. Additionally, a total of 502 connections and four distinct clusters among the keywords were detected. The findings provide a detailed understanding of the relationships between keywords in the research field. This type of analysis helps to better understand the terminology of the field and offers valuable insights for identifying key concepts for future research.

Figure 1 shows the most frequently used keywords and their frequencies in academic publications on “artificial intelligence.” According to the data, the most frequently used keyword is “artificial intelligence,” which appears 337 times. This demonstrates that the primary focus of the research area is artificial intelligence and emphasizes the critical role of this term in the literature. The second most frequently used keyword is “machine learning,” appearing 114 times, indicating that machine learning is an important subdiscipline within AI research. The third-ranked keyword, “deep learning,” appears 67 times, highlighting its significance as a major research topic in studies related to AI.

Other keywords used less frequently but still notable in the literature include “embryo selection” (30 occurrences), “ChatGPT” (30 occurrences), “IVF” (29 occurrences), and “ultrasound” (28 occurrences). These terms indicate a strong interest in various applications of AI in the medical field. Notably, areas such as embryo selection and IVF appear to be among the priority topics in AI-based decision support systems. This data clearly reflects the main research areas focused on in the literature on “Artificial Intelligence” and their interrelationships. Additionally, the strategic selection of keywords is shown to increase research visibility and contribute to a better understanding of the relationships within the literature.

Inter-Institutional Collaboration Analysis

The affiliations of authors contributing to articles on “artificial intelligence” in the Web of Science database and the collaboration networks between these institutions were analyzed. The findings are visualized in **Figure 4**.

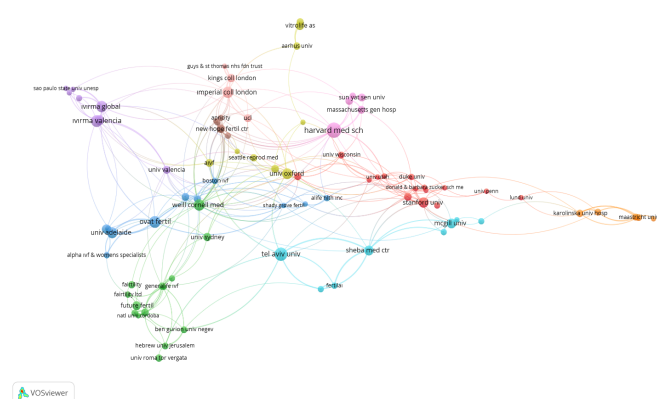


Figure 4. Bibliometric network of institutional collaboration

The bibliometric analysis using Vosviewer software illustrates the collaborations among institutions. In the visualization, the size of the circles represents the publication productivity of the institutions, and the thickness of the lines connecting them indicates the strength of their collaborative relationships. Different colors distinguish thematic or regional groups, while the connections symbolize the collaborations between institutions. The thickness of these lines reflects the intensity of collaboration.

In the network, Harvard Medical School is positioned centrally with 16 collaborations, highlighting its pivotal role in the global network of AI research. This finding indicates that

Harvard Medical School has a broad collaboration network and has established strong relationships with other institutions in the field. Stanford University, with 13 collaborations, ranks second, followed by University of Valencia, which has 12 collaborations and demonstrates significant collaborative activity. Other notable institutions include Sheba Medical Center (9 collaborations) and University of Oxford (8 collaborations), both of which play important roles within the network.

Overall, the observed connections and clustering structures in the visualization reveal that AI research in this field is conducted through intensive collaborations among specific institutions. Such analyses not only evaluate the collaboration potential of institutions but also provide strategic guidance for more effective academic research direction and the identification of new partnership opportunities.

Author Collaboration Analysis

The author collaboration network in the field of “artificial intelligence” was analyzed based on articles in the Web of Science database, and the findings are presented in **Figure 5**.

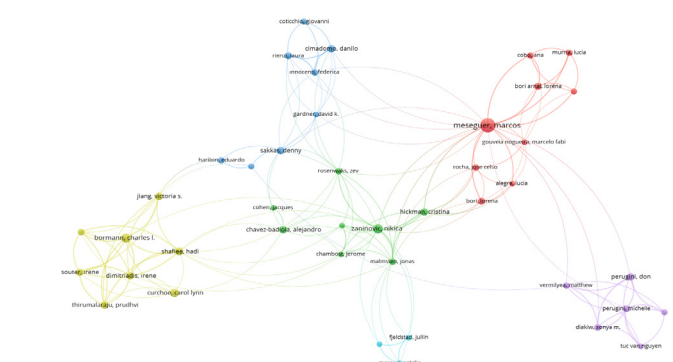


Figure 5. Bibliometric network of author collaborations (circle size represents key authors, and lines between circles indicate collaboration relationships.)

Figure 5 analyzes the bibliographic connections and collaboration networks among authors who have published at least five articles. In total, 4,508 authors were assessed, but only 101 authors who met the specified criteria were included in the analysis. The requirement for authors to have published at least five articles ensures the selection of those who have made a significant contribution to the literature and demonstrated sufficient productivity. This threshold supports the inclusion of only active and influential authors, making the results more meaningful and reliable.

The map visualizes the bibliographic matches and collaboration networks among authors. Each author is represented by a circle, and the size of the circle reflects the extent of their contribution to the literature. The colors of the circles represent the clusters to which the authors belong, indicating thematic or research-oriented groups. The lines connecting the circles signify the strength of bibliographic connections, i.e., the frequency of shared references, providing a detailed view of the scientific relationships among authors.

The analysis identifies authors such as Meseguer-Marcos, Gouveia-Rodrigues, and Rocha-Cristina as central figures

within densely connected clusters. The red cluster represents authors who focus on specific subfields, with Meseguer-Marcos playing a leading role. Similarly, the blue cluster, represented by Coticchio Giovanni and Cimado Danilo, demonstrates extensive collaboration within and beyond their cluster. The green cluster, centered on Nikita Zaninovic and Cristina Hickman, shows strong internal connections, reflecting a thematic focus. Additionally, the yellow cluster represents a smaller group, including Charles Bormann and Irene Dimitriadis, who are involved in tightly-knit collaborations with specific research objectives. The orange and purple clusters, while smaller, exhibit strong internal links and concentrate on distinct research topics.

Overall, the dense connections and clear clustering structures in the visualization demonstrate active collaboration among authors and provide valuable insights for identifying prominent researchers in the field.

Geographic Distribution of Citations

The geographic distribution of citations for articles on “artificial intelligence” in the Web of Science database was analyzed, and the findings are visualized in **Figure 6**.

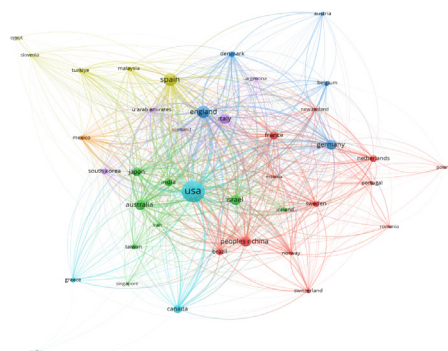


Figure 6. Geographic distribution of citations and collaborations

Figure 6 presents the geographic distribution of citations for articles on “artificial intelligence” and the academic collaboration networks among countries. In the analysis, countries with at least five articles were considered, and of the 76 countries meeting this criterion, 40 were included in the evaluation. Seven distinct clusters were identified, each corresponding to a specific research focus or collaboration network.

In the visualization, circles represent countries, and their size indicates the country’s contribution to the literature. The lines connecting the circles represent collaborations between countries, and the thickness of the lines reflects the strength and frequency of these collaborations. The colors of the clusters indicate thematic or geographic groupings.

The United States is positioned at the center of the map as the leading contributor, with strong collaborations across other countries. The country plays a dominant role in global AI research and has established dense academic networks with many nations. European countries, including the United

Kingdom, Germany, France, and Italy, also stand out as significant contributors, forming a regional powerhouse through strong collaborations with each other. The United Kingdom, in particular, has developed strong ties with the United States, playing a pivotal role in the global academic network.

In Asia, countries such as China, Japan, and South Korea are notable contributors. These nations have established significant collaborations both regionally and internationally, particularly with the United States. China, positioned near the center, highlights its growing influence in the literature and its role in fostering international collaborations.

Türkiye, positioned in the middle of the map, acts as a bridge between Europe, Asia, and the Middle East, highlighting its strategic importance in connecting various regions. Smaller circles represent countries contributing less extensively but still participating in collaborations within niche areas.

Overall, the visualization of geographic distribution underscores the global nature of AI research. The leading roles of the United States, the United Kingdom, Germany, and China are evident, while Turkey and other Asian countries stand out for their regional collaborations. This analysis highlights the importance of fostering international academic collaborations to advance research in this field.

DISCUSSION

The findings of this study provide a comprehensive overview of research trends in AI within Obs&Gyn, highlighting both the progression of the field and its current research hotspots. These findings are compared with those from prominent bibliometric analyses, including studies by Xiao et al.,¹ Levin et al.,⁴ and Sibanda et al.,⁵ to identify overlaps and divergences.

Our study, consistent with Xiao et al.¹ and Levin et al.,⁵ demonstrates a marked increase in AI-related research in Obs&Gyn after 2017. This period coincides with technological advancements in machine learning and deep learning, coupled with increased computational capacity and data availability. Both studies similarly identified 2018-2024 as a phase of accelerated growth, reflecting heightened interest in AI applications for reproductive health and diagnostic tools.

However, while Xiao et al.¹ emphasized a surge in publications related specifically to robotic surgery, our findings indicate a broader diversification of research topics, including embryo selection, IVF, and diagnostic imaging. This broader scope suggests that AI applications in Obs&Gyn extend beyond surgical innovations to encompass various facets of clinical care.

This study identified Human Reproduction and Fertility and Sterility as leading journals in publishing AI-related research in Obs&Gyn. Levin et al.² similarly highlighted these journals but noted that articles on robotic surgery received the highest citations, underscoring their significant impact. Our analysis aligns with this observation but also brings attention to journals like *Ultrasound in Obstetrics & Gynecology* and *Reproductive Biomedicine Online*, which play key roles in disseminating AI research across diverse subfields.

Consistent with Levin et al.⁴ and Sibanda et al.,⁵ this study revealed that institutions in the United States and Europe dominate AI research in Obs&Gyn. Notably, our findings show a growing contribution from Asian countries, particularly China, reflecting the global expansion of research in this domain. Sibanda et al.⁴ also emphasized the emerging contributions from African institutions, particularly in maternal health, which was less apparent in our dataset. This discrepancy highlights the need for more inclusive bibliometric analyses to capture diverse regional contributions.

Our findings confirm the central role of institutions like Harvard Medical School and the University of Oxford in fostering global collaboration networks, as reported by Levin et al.² These institutions act as hubs for multi-institutional research efforts. Additionally, Vosviewer analyses from all studies consistently demonstrate the dominance of North American and European institutions, with developing regions beginning to make noticeable contributions.

The keyword analysis in this study closely aligns with findings from Xiao et al.¹ and Levin et al.² Terms such as “machine learning,” “deep learning,” and “IVF” emerged as prominent themes, reflecting the interdisciplinary nature of AI research in Obs&Gyn. Interestingly, Sibanda et al.⁴ highlighted the role of Industry 4.0 technologies, which was less emphasized in our dataset but represents an emerging frontier in maternal healthcare research.¹⁷⁻¹⁹

The overlaps and divergences across studies point to several critical directions for future research. First, expanding bibliometric datasets by integrating data from multiple platforms such as PubMed and Scopus can help capture more diverse contributions, particularly from underrepresented regions. This approach would provide a more comprehensive understanding of global research activities and their impact. Second, focusing on the ethical and social implications of AI in obstetrics and gynecology, as noted by Sibanda et al.⁴ is crucial for ensuring equitable and responsible deployment of these technologies. Addressing these implications would promote the fair use of AI and mitigate potential disparities in healthcare access and outcomes.¹⁸

Additionally, strengthening collaborations with institutions in developing regions can diversify perspectives and foster innovation in resource-limited settings. Such partnerships would not only enhance global research networks but also empower regions with limited resources to contribute to the evolving AI landscape. Lastly, the integration of AI with emerging technologies like ChatGPT offers promising avenues for enhancing clinical decision-making. Exploring these innovative applications further could pave the way for more efficient and personalized healthcare solutions. These future directions collectively underscore the need for inclusive, ethical, and technologically adaptive approaches to advance AI research in obstetrics and gynecology.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the analysis was confined to publications indexed in the Web of Science Core

Collection database, potentially excluding relevant articles from other databases such as Scopus or PubMed. Second, the study focused only on articles published in English, which may overlook contributions in other languages, particularly from non-English-speaking regions. Lastly, the use of “artificial intelligence” as the sole keyword may have excluded studies using alternative terminology, limiting the scope of the dataset.

CONCLUSION

This bibliometric analysis highlights the rapid growth and interdisciplinary nature of AI research within obstetrics and gynecology over the past two decades. The results demonstrate the increasing global interest in this field, with significant contributions from North America, Europe, and emerging regions such as Asia. Key themes, including machine learning, deep learning, and diagnostic imaging, emphasize the transformative potential of AI in enhancing maternal and fetal healthcare. While the findings underscore the importance of collaboration and innovation, they also reveal disparities in research output and collaboration across regions. Addressing these disparities and fostering inclusive research networks will be crucial for maximizing the global impact of AI in Obs&Gyn. Future research should explore underrepresented regions, integrate data from multiple databases, and address ethical implications to ensure equitable and responsible AI adoption. By offering a detailed understanding of current trends and gaps, this study provides a roadmap for advancing AI research and its application in obstetrics and gynecology.

ETHICAL DECLARATIONS

Ethics Committee Approval

Since our study is a bibliometric analysis based solely on previously published data obtained from public databases, ethical approval is not required.

Informed Consent

Since this research is a bibliometric study, it did not require informed consent.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Xiao P, Li L, Qu J, Wang G. Global research hotspots and trends on robotic surgery in obstetrics and gynecology: a bibliometric analysis based on VOSviewer. *Front Surg.* 2024;11:1308489. doi:10.3389/fsurg.2024.1308489

2. Levin G, Siedhoff M, Wright KN, et al. Robotic surgery in obstetrics and gynecology: a bibliometric study. *J Robot Surg.* 2023;17(5):2387-2397. doi:10.1007/s11701-023-01672-1
3. Lestari D, Maulana FI, Adi PDP, Rahayu A, Nadlifatin R, Widartha VP. Bibliometric analysis of intelligent techniques for obstetric complication prediction in the last 20 years. In: 2024 4th International Conference on Emerging Smart Technologies and Applications (eSmarTA). *IEEE.* 2024: 1-8. doi:10.1109/eSmarTA62850.2024.10638994
4. Sibanda K, Ndayizigamiye P, Twinomurinzi H. Industry 4.0 technologies in maternal health care: bibliometric analysis and research agenda. *JMIR Pediatr Parent.* 2024;7:e47848. doi:10.2196/47848
5. Levin G, Brezinov Y, Meyer R. Exploring the use of ChatGPT in OBGYN: a bibliometric analysis of the first ChatGPT-related publications. *Arch Gynecol Obstet.* 2023;308(6):1785-1789. doi:10.1007/s00404-023-07081-x
6. Ray PP. Bridging the gap: integrating ChatGPT into obstetrics and gynecology research-a call to action. *Arch Gynecol Obstet.* 2024;309(3): 1111-1113. doi:10.1007/s00404-023-07129-y
7. Sreedharan S, Mian M, Robertson RA, Yang N. The top 100 most cited articles in medical artificial intelligence: a bibliometric analysis. *J Med Artif Intell.* 2020;3. doi:10.21037/jmai.2019.11.04
8. Xiong DD, He RQ, Huang ZG, et al. Global bibliometric mapping of the research trends in artificial intelligence-based digital pathology for lung cancer over the past two decades. *Digit Health.* 2024;10: 20552076241277735. doi:10.1177/20552076241277735
9. Fu Q, Lu Z, Sui J, Chang Y, Zhang M. Trends in artificial intelligence and ultrasound medicine: a bibliometric and visualized analysis. Available at SSRN 4333609. 2023.
10. Opreescu AM, Miro-Amarante G, García-Díaz L, Beltrán LM, Rey VE, Romero-Ternero M. Artificial intelligence in pregnancy: a scoping review. *IEEE Access.* 2020;8:181450-181484.
11. Triantafyllopoulos L, Paxinou E, Feretzakis G, Kalles D, Verykios VS. Mapping how artificial intelligence blends with healthcare: insights from a bibliometric analysis. *Future Internet.* 2024;16(7):221. doi:10.3390/fi16070221
12. Tran T, Do TT, Reid I, Carneiro G. Bayesian generative active deep learning. In International conference on machine learning. 2019, pp. 6295-6304). PMLR.
13. Tagliafico AS, Piana M, Schenone D, Lai R, Massone AM, Houssami N. Overview of radiomics in breast cancer diagnosis and prognostication. *Breast.* 2020;49:74-80. doi:10.1016/j.breast.2019.10.018
14. VerMilyea M, Hall JMM, Diakiw SM, et al. Development of an artificial intelligence-based assessment model for prediction of embryo viability using static images captured by optical light microscopy during IVF. *Hum Reprod.* 2020;35(4):770-784. doi:10.1093/humrep/deaa013
15. Carter SM, Rogers W, Win KT, Frazer H, Richards B, Houssami N. The ethical, legal and social implications of using artificial intelligence systems in breast cancer care. *Breast.* 2020;49:25-32. doi:10.1016/j.breast.2019.10.001
16. Grünebaum A, Chervenak J, Pollet SL, Katz A, Chervenak FA. The exciting potential for ChatGPT in obstetrics and gynecology. *Am J Obstet Gynecol.* 2023;228(6):696-705. doi:10.1016/j.ajog.2023.03.009
17. Brandt JS, Hadaya O, Schuster M, Rosen T, Sauer MV, Ananth CV. A bibliometric analysis of top-cited journal articles in obstetrics and gynecology. *JAMA Netw Open.* 2019;2(12):e1918007. doi:10.1001/jama.networkopen.2019.18007
18. Maulana FI, Lestari D, Adi PDP, Hamim M, Rahayu A, Widartha VP. Direction of machine learning research in obstetric care in the last 10 years. In: 2024 4th International Conference on Emerging Smart Technologies and Applications (eSmarTA). *IEEE;* 2024. p. 1-7.
19. Xie Y, Zhai YS, Lu G. Evolution of artificial intelligence in healthcare: a 30-year bibliometric study. *Front Med.* 2024;11:1505692. doi:10.3389/fmed.2024.1505692