Review

Obstetrics And Gynecology Education In Iran: A Bibliometric Analysis

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Abstract

Background: to profile the bibliometrics of publication of the scientific literature of the Obstetrics and gynecology education in Iran.

Method: In this bibliometric study, an advanced Search on Web of Science was conducted to refine the search strategy for medical manuscripts related to obstetrics and gynecology education in Iran. A Bibliometric Analysis, including network and keyword analyses, was performed to assess publication trends, citation patterns, collaborative networks, and emerging themes in the field. Bradford's Law categorized journals based on productivity, while Lotka's Law analyzed author publication productivity.

Result: In the bibliometric analysis of medical education in obstetrics and gynecology in Iran from 1999 to 2024, 1475 authors contributed to 370 documents, with 27.3% international co-authorship. The average document age was 6.45 years, and the total references amounted to 12,229, with an average of 12.21 citations per document. Scientific production exhibited a dynamic trajectory, with a noticeable upswing from 2002, peaking in 2022 with 49 articles. Tabriz University of Medical Sciences led in affiliations, followed by Shahid Beheshti University and Tehran University. MIRGHAFOURVAND M was a significant contributor with 36 articles. Bradford's Law highlighted concentration in core journals, including BMC Pregnancy and Childbirth and Iranian Red Crescent Medical Journal. Lotka's Law revealed a skewed author distribution, with the majority contributing only one document. Seven clusters of collaborations were identified with minimal interaction between them.

Conclusion: This study showed stopped increasing trend of the publication of articles about this topic by Iranian authors and showed the lead universities and authors. Also, there were no good collaboration between universities.

Keywords: Obstetrics, Gynecology, Education, Iran, Bibliometric Analysis

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Introduction

The education of Obstetrics and Gynecology (OB/GYN) has a rich history dating back to the late 19th century. In 1899, John Whitridge Williams became the first director of Obstetrics at the Johns Hopkins School of Medicine, making great efforts in establishing the field of OB/GYN [1]; while the first school of midwifery was established in 18th century in Florence [2]. After that, various institutions have developed their own educational curriculums for OB/GYN education. In 1972, Parsey et al. established a curriculum for OB/GYN education for medical interns. I was aimed at enhancing their knowledge in providing general women's health care [3]. OB/GYN residency programs have also changed over the past decade [4]. With increased number of OB/GYN residents, various subspecialities have been emerged compared to previous years [5-7].

The World Health Organization (WHO) and the Organization for Economic Co-operation and Development (OECD) provide key indicator related to female health entitled “gynecologists per 100,000 people” [8]. In Europe, this ratio has raised form 16.87 in 2000 to 17.87 in 2014 [8]. In 2021, a review analyzed the growth of Ob-Gyn residency and fellowships in Iran from 1979 to 2017; The ratio of active gynecologists per 100,000 people increased from 5.0 in 1979 to 8.05 in 2017 [9]. The Iranian educational program aims to equip physicians with expertise in fetomaternal medicine and secure childbirth [10]. Several studies have been conducted to understand Ob-Gyn residency programs, emphasizing the importance of research in education of this medical specialty [11]. There is also a focus on curriculum development in many studies [12-14].

Bibliometrics is the quantitative analysis of scholarly publications to assess research impact, trends, and collaboration [15]. For example, the study of Brandt et al. showed how top cited articles in OB/GYN are different with other studies and what make them getting more citations [16]. Bibliometrics studies are also used to evaluate the link between the OB/GYN and social audience [17]. While there is only few bibliometrics studies about its education, as well as the study of Chunyu et al. evaluating the pattern of publication of Chinese research on midwifery education [18]. Also in Iran, the profile of the publication of the scientific literature of the OB/GYN education is not evaluated in any study. Understanding the dominant research themes and areas of interest and comparing the bibliometric indicators of OB/GYN education in Iran with international benchmarks will provide a broader perspective on the country's standing in the global research community. The findings of this study can inform policymakers and educators about the areas of OB/GYN education that require attention. By identifying gaps in research and highlighting successful strategies, the study can contribute to evidence-based decision-making in curriculum development and educational policy.

Method

In conducting an Advanced Search on Web of Science, the research focused on refining the search strategy for medical manuscripts related to education and training in obstetrics and gynecology. This involved strategically employing medical manuscript phrases and relevant keywords, accompanied by the use of Boolean operators and controlled vocabulary to enhance the precision of the search. To narrow down the results, a filter was applied to isolate records specifically associated with obstetrics and gynecology, and the dataset was geographically restricted to publications originating from the region of Iran. Subsequently, relevant records were downloaded to retrieve specific information on education and training in obstetrics and gynecology within the specified geographical scope.

Following data retrieval, a Bibliometric Analysis was carried out using the bibliometriX R package. This involved extracting and processing data to calculate descriptive parameters such as publication counts, citation counts, and other bibliometric indicators. Advanced network analysis was employed, utilizing article titles,

authors, affiliations, and keywords to unveil patterns and connections within the dataset. Moving forward, a comprehensive array of variables was collected for a holistic assessment of the landscape of education and training in obstetrics and gynecology. The examination included descriptive parameters such as publication trends, citation patterns, and geographical distribution.

Furthermore, the study delved into Network Analysis, investigating networks based on article titles to identify key themes and interconnections. Author networks were explored to discern collaborative patterns and research clusters, while affiliation networks were analyzed to understand institutional collaborations in the field. The research also encompassed Keyword Analysis, where keywords associated with education and training in obstetrics and gynecology were extracted and evaluated. This involved investigating the frequency and co-occurrence of keywords to identify emerging themes and research foci within the field.

We used Bradford's Law, a bibliometric principle, to organize and prioritize scientific journals based on the distribution of articles across different sources. It categorizes the journals based on the productivity. The zone categorizes sources based on their productivity, with Zone 1 having the most prolific sources, Zone 2 containing moderately productive sources, and Zone 3 comprising less productive sources.

Lotka's Law is a principle in bibliometrics that describes the frequency distribution of publication productivity among authors. Lotka's Law is often expressed using a power-law distribution, where the number of authors (N) who have published n papers is proportional to 1/n^2. The exponent 'n' is a key parameter, and its calculation involves fitting the observed data to the power-law distribution. Deviations from the expected distribution can indicate the degree to which an author population adheres to Lotka's Law.

Result

In the bibliometric analysis spanning from 1999 to 2024, focusing on medical education in obstetrics and gynecology in Iran, a total of 1475 authors contributed to 370 documents. International co-authorship stood at 27.3%. The average age of documents was 6.45 years. The considerable number of references, totaling 12,229, while the average citations per document stood at 12.21.

The annual scientific production in the field of medical education in obstetrics and gynecology in Iran presents a dynamic trajectory from 1999 to 2024. In the initial years, minimal output is observed, with only one article in 1999 and no publications in 2000 and 2001. However, a noticeable upswing is evident starting in 2002, with a gradual increase in the number of articles each year. The growth becomes more pronounced from 2009 onwards, peaking in 2022 with 49 articles. The year 2016 marks a notable surge, with 23 articles, and this upward trend continues until 2022. Despite a slight decline in 2023, the overall trend reflects a substantial increase in scientific output over the years. Mean citations per year was showing a fluctuating pattern with peaks at 2006, 2010, 2014, and 2020. In case of journals, BMC pregnancy and childbirth tops the list with 31 articles, followed by Iranian red crescent medical journal with 18 articles and journal of maternal-fetal & neonatal medicine with 14 articles. The compilation also includes journals like Iranian journal of pediatrics, reproductive health, archives of Iranian medicine, breastfeeding medicine, eastern mediterranean health journal, Iranian journal of public health, and journal of reproductive and infant psychology, each contributing a varying number of articles

As can be seen in the three-field plot (figure 1.a), Tabriz university of medical sciences was the leading affiliation working on the education of the OB & GYN, followed by Shahid Beheshti university and Tehran university. Mirghafourvand emerges as a significant contributor with 36 articles, representing a substantial 8.08% fractionalized contribution. Following closely are CHARANDABI SMA with

14 articles and a 3.37% fractionalized contribution, Mohammad alizadeh charandabi with 12 articles and a 2.40% fractionalized contribution, and AMIRI-FARAHANI L with 11 articles and a 3.03% fractionalized contribution.

As shown in the figure 1.b, based on the Bradford's Law, the information reveals the concentration of articles in a few core sources, with BMC Pregnancy and Childbirth, Iranian Red Crescent Medical Journal, and The Journal of Maternal-Fetal & Neonatal Medicine being among the most prominent in Zone 1.

Figure 1.c illustrates Lotka's Law predictions about our topic. It shows a skewed distribution where a small number of authors contribute the majority of work. In this case, the data aligns with the law, as the majority of authors (0.776 proportion) have written only one document, indicating a concentration of less prolific authors. As the number of documents per author increases, the proportion of author's decreases, illustrating that fewer authors contribute to a higher volume of documents. As shown in figure 1.d, Tabriz UMS had the most increasing trend of scientific production in field.

The timeline provided for each topic indicates the years in which the research on these subjects gained prominence. Notable trends include a substantial focus on pregnancy-related themes, with "pregnancy" being the most frequently studied topic, accumulating 58 mentions across the years 2015 to 2021, peaking in 2019. Other prevalent topics include "Iran" (31 mentions), "anxiety" (28 mentions), "education" (22 mentions), "depression" (18 mentions), and "breastfeeding" (15 mentions). Noteworthy emerging topics in recent years include "covid-19" (6 mentions), "fear of childbirth" (9 mentions), and "social support" (10 mentions), reflecting the dynamic nature of research interests. it appears that there are a total of 7 clusters, while interaction between the clusters were so small (sole interaction of Abedini m with Mirghafourvand m's cluster).

Discussion

Our study found that the average citations per document stood at 12.21. In medical sciences, the number of citations per article is considered a crucial indicator of the article's impact and influence within the scientific community. The ideal citation rate per article in medical sciences can vary, but several factors influence citation rates. Research suggests that the number of citations received by an article is considered an objective marker of its importance and quality [19]. Factors influencing citation rates include the Hirsch-index, self-citation rates, the number of authors per article, and the characteristics associated with citation rates [20-23]. While there is no specific threshold universally agreed upon as "good," a higher citation rate generally indicates greater impact and recognition within the scientific community. It's crucial to interpret citation rates alongside other factors and consider the specific field and context of the research [23].

In case of article production rates, despite a slight decline in 2023, the overall trend reflects a substantial increase in scientific output over the years. Unforeseen events, such as COVID-19 health crises or disruptions, could have led to a shift in research priorities, diverting resources and attention away from OB/GYN educational studies in 2023. Educational studies often require rigorous methodologies and time-intensive data collection. Increased methodological complexity might have contributed to a slower publication rate in 2023.

Our study showed that most journals publishing the studies about the education of OB/GYN are non-specific journals to this field. Except for the "BMC pregnancy and childbirth", "maternal-fetal & neonatal medicine", and the reproductive health among the top journals publishing the highest number of these articles, Iranian red crescent medical journal, Iranian journal of pediatrics, archives of Iranian medicine, eastern mediterranean health journal, Iranian journal of public health are non-specific journals. In comparison to our study, The results of Brandt et al. bibliometric study raise important questions about the goals and intentions of OBGYN journals

vs nonspecialty journals, which include general medicine and surgery journals. Specialty OBGYN journals must cater to the specialized needs of practitioners within a field. Consequently, the articles published in specialty journals cover more focused topics and are more likely to be observational studies. In contrast, general medicine and surgery journals are not limited by these constraints and can appeal more broadly to readers with greater potential to be highly cited, often publishing articles with higher levels of evidence [16].

Tabriz University of medical sciences was the leading affiliation working on the education of the OB & GYN in country. Al-Zahra is Tabriz's main academic hospital in obstetrics and gynecology that is administered by a board of trustees. On the other hand, Taleghani Hospital is managed under a centralised administration of Tabriz University of medical sciences; while both hospitals have average Bed Occupancy Rate of equal to standard (85 per cent). [24]. Based on a bibliometric study, Tabriz (rate = 32%), Tehran (rate = 28%), and Shiraz (rate = 28%) were the highest in SJR Q1 rate index among Iranian medical universities [25]. Based on the same study [25]. The median international collaboration rate has followed a growing trend in recent years and was 17% in 2020 that is similar to our study that international co-authorship stood at 27.3%.

The identification of seven clusters of collaborations with minimal interaction between them suggests a lack of collaboration between universities. Each cluster appears to be affiliated with specific universities, indicating a limited cross-university collaboration within the field of medical education in obstetrics and gynecology in Iran. This trend may imply that research and academic contributions within each cluster are more internally focused, with less collaboration or knowledge exchange across different academic institutions. The absence of substantial interaction between these clusters emphasizes a potential need for fostering collaborative efforts and interdisciplinary initiatives to enhance the overall impact and diversity of research outcomes in this field. But this issue is also shown in other country researches. The field of medical education lacks a broad consensus on articles or journals that define its scope, indicating a fragmented landscape with limited collaboration [26]. Moreover, a study on interdisciplinarity in medical education highlights the need for a clearer understanding, pointing towards potential gaps in collaborative efforts between disciplines and institutions [27].

Conclusion

The study reveals a stagnation in the increasing trend of articles by Iranian authors, highlighting leading universities and authors. Notably, there is a lack of significant collaboration between universities in the field of medical education in obstetrics and gynecology in Iran. Institutions can utilize the data for strategic research planning, identifying growth areas and fostering potential collaborations. Policymakers can inform policy development, encouraging collaborative research efforts and addressing barriers to sustained publication growth. Researchers benefit by identifying gaps in publications, contributing to a more comprehensive understanding of the field. Promoting international collaboration enhances diversity and research impact. Additionally, institutions can allocate resources more efficiently by discerning research strengths and weaknesses in medical education in obstetrics and gynecology, thereby optimizing their contributions to this scientific domain.

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References:

1- Hopkinsmedicine, The History of the Department of Gynecology and Obstetrics, [Internet] accessed on March 6, 2024. Available on Https://hopkinsmedicine.org/gynecology-obstetrics/about-us/history.

2- Lippi D, Conti AA, Gensini GF. The historical evolution of obstetrician formation. Medicina nei secoli: Journal of History of Medicine and Medical Humanities. 2004;16(3).

3- Parsey KS, Bastian LA, Couchman GM, Slack KD, Simel DL. The development of a primary care curriculum for obstetrics/gynecology residents. Journal of the American Medical Women's Association (1972). 1998 Jan 1;53(3 Suppl):137-9.

4- Gupta N, Dragovic K, Trester R, Blankstein J. The changing scenario of obstetrics and gynecology residency training. Journal of Graduate Medical Education. 2015 Sep 1;7(3):401-6.

5- Pearse WH, Trabin JR. Subspecialization in obstetrics and gynecology. American Journal of Obstetrics and Gynecology. 1977 Jun 1;128(3):303-6.

6- Trabin JR, Pearse WH, Carter R. Subspecialization manpower in obstetrics and gynecology. Obstetrics & Gynecology. 1978 Apr 1;51(4):494-8.

7- Cekański A. The need for specialization of II degree obstetricians and gynecologists in subspecialties created after the development of this basic branch of medicine. Ginekologia Polska. 1989 Jan 1;60(1):57-60.

8- World Health Organization (WHO). Physicians, obstetric and gynaecological group of specialties (PP), per 100 000. [Internet] accessed on March 6, 2024. Available on https://gateway.euro.who.int/en/indicators/hfa_503-5265-physicians-obstetric-and-gynaecological-group-of-specialties-pp-per-100-000/#id=19578.

9- Tabatabai S, Simforoosh N, Khatibani SE. Obstetrics–Gynecology Educational Achievements in Iran (1979–2017): Trends, Consequences and Future Implications. Iranian Journal of Public Health. 2021 Oct;50(10):2085.

10- Tehran University of Medical Sciences. Obstetrics and Gynecology. [Internet] accessed on March 6, 2024. Available on https://en.tums.ac.ir/en/content/179/obstetrics-and-gynecology.

11- Tolsgaard MG. Medical education research in obstetrics and gynecology. American Journal of Obstetrics & Gynecology. 2019 Jan 1;220(1):121.

12- Garofalo M, Aggarwal R. Competency-based medical education and assessment of training: review of selected national obstetrics and gynaecology curricula. Journal of Obstetrics and Gynaecology Canada. 2017 Jul 1;39(7):534-44.

13- Atiomo WU, Stanley AG, Ezimokhai MM. A literature review and proposed framework for a core curriculum in obstetrics and gynecology for medical students globally. International Journal of Gynecology & Obstetrics. 2023 May;161(2):386-96.

14- Brubaker L, Kenton K. Clinical research education study teams: a research curriculum for obstetric and gynecology residents. Obstetrics & Gynecology. 2011 Jun 1;117(6):1403-7.

15- Broadus RN. Toward a definition of “bibliometrics”. Scientometrics. 1987 Nov;12:373-9.

16- 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 network open. 2019 Dec 2;2(12):e1918007-.

17- Grover S, Elwood AD, Patel JM, Ananth CV, Brandt JS. Altmetric and bibliometric analysis of obstetrics and gynecology research: influence of public engagement on citation potential. American journal of obstetrics and gynecology. 2022 Aug 1;227(2):300-e1.

18- REN Chunyu, LIU Weihua. Bibliometric analysis of clinical midwifery education research based on Web of Science database[J]. Chinese Clinical Nursing, 2021, 13(8): 505-508 https://doi.org/10.3969/j.issn.1674-3768.2021.08.011

19- Annalingam A, Damayanthi H, Jayawardena R, Ranasinghe P. Determinants of the citation rate of medical research publications from a developing country. SpringerPlus. 2014 Dec;3:1-6.

20- Liu MY, Chien TW, Chou W. The Hirsch-index in self-citation rates with articles in Medicine (Baltimore): bibliometric analysis of publications in two stages from 2018 to 2021. Medicine. 2022 Nov 11;101(45):e31609.

21- Jaksic C, Gayet-Ageron A, Perneger T. In health research publications, the number of authors is strongly associated with collective self-citations but less so with citations by others. BMC Medical Research Methodology. 2023 Oct 11;23(1):230.

22- Azer SA, Azer S. Top-cited articles in medical professionalism: a bibliometric analysis versus altmetric scores. BMJ open. 2019 Jul 1;9(7):e029433.

23- Kulkarni AV, Busse JW, Shams I. Characteristics associated with citation rate of the medical literature. PloS one. 2007 May 2;2(5):e403.

24- Gholipour K, Delgoshai B, Masudi-Asl I, Hajinabi K, Iezadi S. Comparing performance of Tabriz obstetrics and gynaecology hospitals managed as autonomous and budgetary units using Pabon Lasso method. The Australasian medical journal. 2013;6(12):701.

25- Khanali J, Malekpour MR, Kolahi AA. Assessing the Research Performance of the Iranian Medical Academics and Universities: A Bibliometric Analysis. Med J Islam Repub Iran. 2023 Apr 3;37:31. doi: 10.47176/mjiri.37.31. PMID: 37180855; PMCID: PMC10169091.

Figure 1:

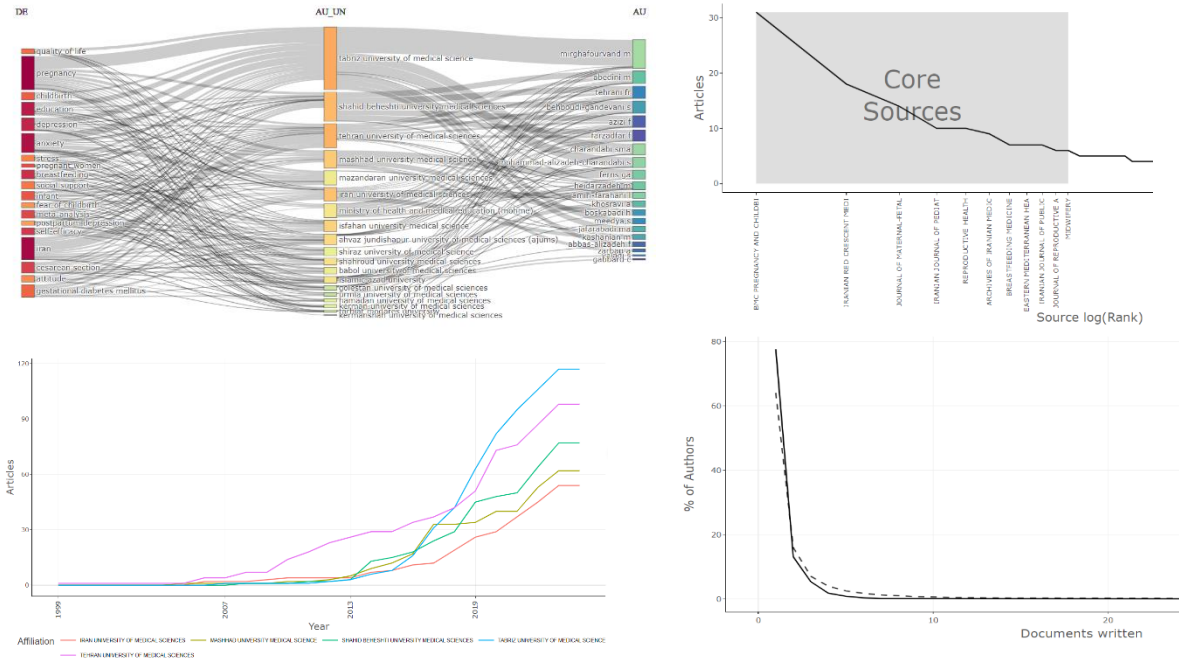

Figure 2: