

ORIGINAL

Evolution of acupressure research in maternal health

Evolución de la investigación sobre acupresión en la salud materna

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ABSTRACT

Introduction: pregnancy is often accompanied by various physical and psychological discomforts such as nausea and vomiting, back pain, anxiety, and sleep disturbances. Acupressure at the P6 point is effective in reducing nausea and vomiting in pregnancy, in addition to acupressure has the potential to improve sleep quality in pregnant women

Objective: data were obtained through a search on the Scopus database with the keywords “acupressure therapy” OR acupressure AND “pregnant women” OR pregnancy. Data collection was limited to September 5, 2024 at 19,31 WITA, so articles published after that time were not included. After the data was collected, the next stage was data cleaning using the OpenRefine application version 3.8.2 to ensure data quality and consistency before further analysis. The third stage involved data sharing and analysis using two software: R Studio and VOSviewer. R Studio was used for statistical analysis and more complex data manipulation, while VOSviewer 1.6.20 was utilized for network analysis and bibliometric mapping. The final stage was data visualization, which was performed using Tableau 2024.1 and VOSviewer 1.6.20. Tableau was chosen for its ability to create interactive and dynamic visualizations, while VOSviewer was used specifically to create bibliometric maps of keyword co-occurrence

Method: the method uses a bibliometric analysis approach to evaluate the development and trends of research on acupressure in pregnancy. The research process consists of four main stages: data collection, data cleaning, data sharing, and data visualization .

Results: the bibliometric data on acupressure in pregnant women analyzed covered a fairly long time span, from 1979 to 2024, with a total of 438 documents from 234 sources, with an annual growth rate of 7,42 %. The increasing trend of acupressure research in pregnancy, one publication in 1979 and peaking in 2022 with 38 publications. The geographic distribution of publications showed a dominance of the United States with 102 articles, reflecting the substantial US investment in acupressure research in pregnancy. The most influential journals revealed the central role of the Cochrane Database of Systematic Reviews with 16 publications and 826 citations, this journal ranked first in both the number of publications and the impact of citations, followed by the “Journal of Midwifery and Women’s Health” with 15 articles. The analysis of affiliates with the most publications showed that Western Sydney University was in the lead with 36 articles, followed by Shiraz University of Medical Sciences with 26 articles.

Conclusions: these results indicate an increasing interest and relevance of this topic in the scientific

community. Therefore, these findings indicate the potential of acupressure as a non-pharmacological approach to addressing various pregnancy problems, especially nausea and vomiting, which can provide an alternative or complement to conventional treatments.

Keywords: Acupressure Pregnant Women; Pre-Eclampsia.

RESUMEN

Introducción: el embarazo suele ir acompañado de diversas molestias físicas y psicológicas como náuseas y vómitos, dolor de espalda, ansiedad y trastornos del sueño. La acupresión en el punto p6 es eficaz para reducir las náuseas y los vómitos en el embarazo, además de que la acupresión tiene el potencial de mejorar la calidad del sueño en las mujeres embarazadas

Objetivo: los datos se obtuvieron a través de una búsqueda en la base de datos scopus con las palabras clave “acupressure therapy” or acupressure and “pregnant women” or pregnancy. La recogida de datos se limitó al 5 de septiembre de 2024 a las 19,31 wita, por lo que no se incluyeron artículos publicados después de esa fecha. Una vez recopilados los datos, la siguiente etapa fue la limpieza de los datos mediante la aplicación openrefine versión 3.8.2 para garantizar la calidad y coherencia de los datos antes de su posterior análisis. La tercera etapa consistió en la puesta en común y el análisis de los datos mediante dos programas informáticos: r studio y vosviewer. R studio se utilizó para el análisis estadístico y la manipulación de datos más complejos, mientras que vosviewer 1.6.20 se utilizó para el análisis de redes y la cartografía bibliométrica. La etapa final fue la visualización de datos, que se realizó utilizando tableau 2024.1 y vosviewer 1.6.20. Se eligió tableau por su capacidad para crear visualizaciones interactivas y dinámicas, mientras que vosviewer se utilizó específicamente para crear mapas bibliométricos de co-ocurrencia de palabras clave.

Método: el método utiliza un enfoque de análisis bibliométrico para evaluar el desarrollo y las tendencias de la investigación sobre la acupresión en el embarazo. El proceso de investigación consta de cuatro etapas principales: recogida de datos, limpieza de datos, puesta en común de datos y visualización de datos .

Resultados: los datos bibliométricos sobre acupresión en embarazadas analizados abarcaron un período de tiempo bastante largo, de 1979 a 2024, con un total de 438 documentos de 234 fuentes, con una tasa de crecimiento anual del 7,42 %. La tendencia creciente de la investigación de la acupresión en el embarazo, una publicación en 1979 y alcanzando su punto máximo en 2022 con 38 publicaciones. La distribución geográfica de las publicaciones mostró un predominio de los estados unidos con 102 artículos, lo que refleja la importante inversión estadounidense en la investigación de la acupresión en el embarazo. Las revistas más influyentes revelaron el papel central de la “cochrane database of systematic reviews” con 16 publicaciones y 826 citas, esta revista ocupó el primer lugar tanto en el número de publicaciones como en el impacto de las citas, seguida de la “journal of midwifery and women’s health” con 15 artículos. El análisis de las filiales con más publicaciones mostró que la universidad de western sydney se situaba en cabeza con 36 artículos, seguida de la universidad de ciencias médicas de shiraz con 26 artículos.

Conclusiones: estos resultados indican un creciente interés y relevancia de este tema en la comunidad científica. Por lo tanto, estos resultados indican el potencial de la acupresión como enfoque no farmacológico para tratar diversos problemas del embarazo, especialmente las náuseas y los vómitos, que puede constituir una alternativa o un complemento a los tratamientos convencionales.

Palabras clave: Acupresión; Embarazadas; Preeclampsia.

INTRODUCTION

Acupressure is a traditional healing technique rooted in traditional Chinese medicine that has the same function as acupuncture but without the use of clock work. Acupressure applies pressure to specific points that function to balance energy in the body.⁽¹⁾ This treatment method involves applying pressure to specific points on the body, which is believed to balance the flow of vital energy and relieve symptoms such as anxiety.⁽²⁾ In the context of modern healthcare, acupressure has gained recognition as a potential complementary therapy, especially in the management of chronic conditions and improving quality of life.⁽³⁾

Over the past few decades, interest in complementary and alternative medicine in pregnancy care has increased significantly.⁽⁴⁾ Pregnant women often seek non-pharmacological approaches to manage the discomforts and complications that may arise during pregnancy.⁽⁵⁾ Acupressure has emerged as one such non-pharmacological treatment, offering potential benefits without the risk of frequent side effects and the potential to reduce the need for cesarean sections in pregnancy.⁽⁶⁾

Pregnancy is often accompanied by various physical and psychological discomforts such as nausea and

vomiting, back pain, anxiety, and sleep disturbances.⁽⁷⁾ Early studies have shown that acupressure may be effective in addressing some of these issues. For example, a study by Saberi et al. demonstrated the effectiveness of acupressure at the P6 point in reducing nausea and vomiting in pregnancy.⁽⁸⁾ Meanwhile, Yeung et al. reported the potential of acupressure in improving sleep quality in pregnant women.⁽⁹⁾

Objective

As acupressure in pregnancy care continues to grow in popularity, there is a growing need for evidence-based research to support its efficacy and safety.⁽¹⁰⁾ Researchers have begun to investigate various aspects of acupressure use during pregnancy, including symptom management, labor outcomes, and overall maternal well-being.⁽¹¹⁾ These studies aim not only to validate traditional practices, but also to optimize acupressure treatment protocols and identify underlying physiological mechanisms.⁽¹²⁾

Research on the effectiveness of acupressure in pregnancy has shown promising results in reducing a variety of symptoms. Several studies have reported benefits of acupressure in reducing nausea and vomiting in pregnancy,^(13,14) relieving back and pelvic pain,⁽¹⁵⁾ reducing anxiety and improving sleep quality.⁽⁹⁾

As interest in complementary medicine in pregnancy care has grown, the number of studies on acupressure in pregnancy has also increased significantly in recent decades. This increase reflects not only the growing interest in the medical community, but also the need for a deeper understanding of the potential and limitations of this therapy. However, despite the increasing volume of research, significant knowledge gaps remain and a need for a more comprehensive synthesis of the evidence.

To understand the development of research in this field comprehensively, bibliometric analysis offers a qualitative approach that is able to provide an overview of publication trends on a topic.⁽¹⁶⁾ Bibliometric analysis is a quantitative method for evaluating scientific literature, allowing the identification of trends, patterns, and gaps in a particular field of research.⁽¹⁷⁾ In the context of acupressure in pregnancy, bibliometric analysis can provide valuable insights into the evolution of the field, including key research topics, international collaborations, and the most influential journals.⁽¹⁸⁾

A comprehensive understanding of the research landscape of acupressure in pregnancy is important for several reasons. First, it can help identify areas in need of further research, allowing for more efficient allocation of research resources.⁽¹⁹⁾ Second, bibliometric analysis can reveal emerging trends and innovations in clinical practice, potentially improving patient care.⁽²⁰⁾

In addition, bibliometric analysis can assist in identifying knowledge gaps and areas of controversy in the existing literature.⁽²¹⁾ This is particularly important in the field of acupressure in pregnancy, where the available evidence may be limited or conflicting for some indications.⁽²²⁾ By comprehensively mapping the research landscape, researchers and practitioners can better direct their efforts to areas that require clarification or further investigation.⁽²³⁾

Given the importance of this topic and the potential benefits of bibliometric analysis, this study aims to provide a comprehensive review of the development of acupressure research in pregnancy. Using bibliometric techniques, this study will investigate publication trends, collaboration patterns, and key research topics in this field over the past two decades. The results of this analysis are expected to provide valuable insights for researchers, clinical practitioners, and policy makers, as well as inform future directions of research and practice in the use of acupressure during pregnancy.⁽²⁴⁾

METHOD

This study uses a bibliometric analysis approach to evaluate the development and trends of research on acupressure in pregnancy. The research process consists of four main stages: data collection, data cleaning, data sharing, and data visualization.

At the data collection stage, bibliometric data were obtained from the Scopus database. The search was conducted using a combination of the keywords “acupressure therapy” OR acupressure AND “pregnant women” OR pregnancy. The selection of Scopus as a data source was based on its broad coverage and reputation as one of the leading databases for scientific literature. To avoid inconsistencies in the amount of data, data collection was limited to September 5, 2024 at 19:31 WITA, so articles published after that time were not included.

After the data is collected, the next step is data cleaning using the OpenRefine application version 3.8.2. This process is important to ensure the quality and consistency of the data before further analysis. OpenRefine was chosen because of its ability to handle and clean large datasets efficiently.

The third stage involved data sharing and analysis using two software: R Studio and VOSviewer. R Studio was used for statistical analysis and more complex data manipulation, while VOSviewer 1.6.20 was utilized for network analysis and bibliometric mapping. The combination of these two tools allowed for a comprehensive analysis of various bibliometric aspects.

The final stage was data visualization, which was performed using Tableau 2024.1 and VOSviewer 1.6.20. Tableau was chosen for its ability to create interactive and dynamic visualizations, while VOSviewer was used

specifically to create bibliometric maps of keyword co-occurrence. The use of these two tools allows for a rich and informative visual representation of the analysis results.

RESULTS

General Information about Data

The bibliometric data on acupressure in pregnant women analyzed covers a fairly long period of time, from 1979 to 2024, showing the development of acupressure research in pregnancy for more than four decades. With a total of 438 documents from 234 sources, research in this area shows a steady growth with an annual growth rate of 7,42 %. These results indicate an increasing interest and relevance of this topic in the scientific community.

Description	Results
Main Information About Data	
Timespan	1979:2024
Sources (Journals, Books, etc)	234
Documents	438
Annual Growth Rate %	7,42
Document Average Age	10,7
Average citations per doc	23,29
References	16220
Document Contents	
Keywords Plus (ID)	2927
Author's Keywords (DE)	614
Authors	
Authors	1281
Authors of single-authored docs	59
Authors Collaboration	
Single-authored docs	74
Co-Authors per Doc	3,56
International co-authorships %	11,19
Document Types	
articles	293
conference paper	8
review	137

The relatively young average age of documents (10,7 years) and the relatively high average number of citations per document (23,29) indicate that research in this area is still active and has a significant impact. The large number of references (16 220) indicates that this research is built on a strong and diverse literature base.

Collaboration between authors appears to be quite intensive, with an average of 3,56 authors per document. However, the relatively low percentage of international collaboration (11,19 %) suggests that there is scope for increased cross-country collaboration in the future. The dominance of articles (293) and reviews (137) as the main document types illustrates that this field focuses not only on primary research, but also on the synthesis and critical evaluation of existing evidence.

Development of Publications per Year

Analysis of the development of publications per year shows a consistent upward trend in research on acupressure in pregnancy. From one publication in 1979, the number of annual publications increased significantly, reaching a peak in 2022 with 38 publications. The initial period (1979-1990) was characterized by sporadic publications and limited numbers, reflecting the early phase of exploration of acupressure in the context of pregnancy. A significant increase began to be seen in the early 2000s, with a spike in the number of publications from 5 in 2000 to 12 in 2001, marking the beginning of a new era in research in this field. The years 2010 to 2020 showed a more stable and consistent growth, with an average annual publication ranging from 11 to 20 documents. The peak of productivity was seen in 2022 with 38 publications, followed by 28 publications

in 2020 and 2023.

Despite yearly fluctuations, the long-term trend shows a steady increase. The slight declines in 2023 and 2024 may not reflect a decline in interest, but rather a delay in indexing or the impact of the global pandemic. This consistent increase in publications suggests that acupressure in pregnancy remains a relevant and growing area of research in obstetrics and complementary medicine.

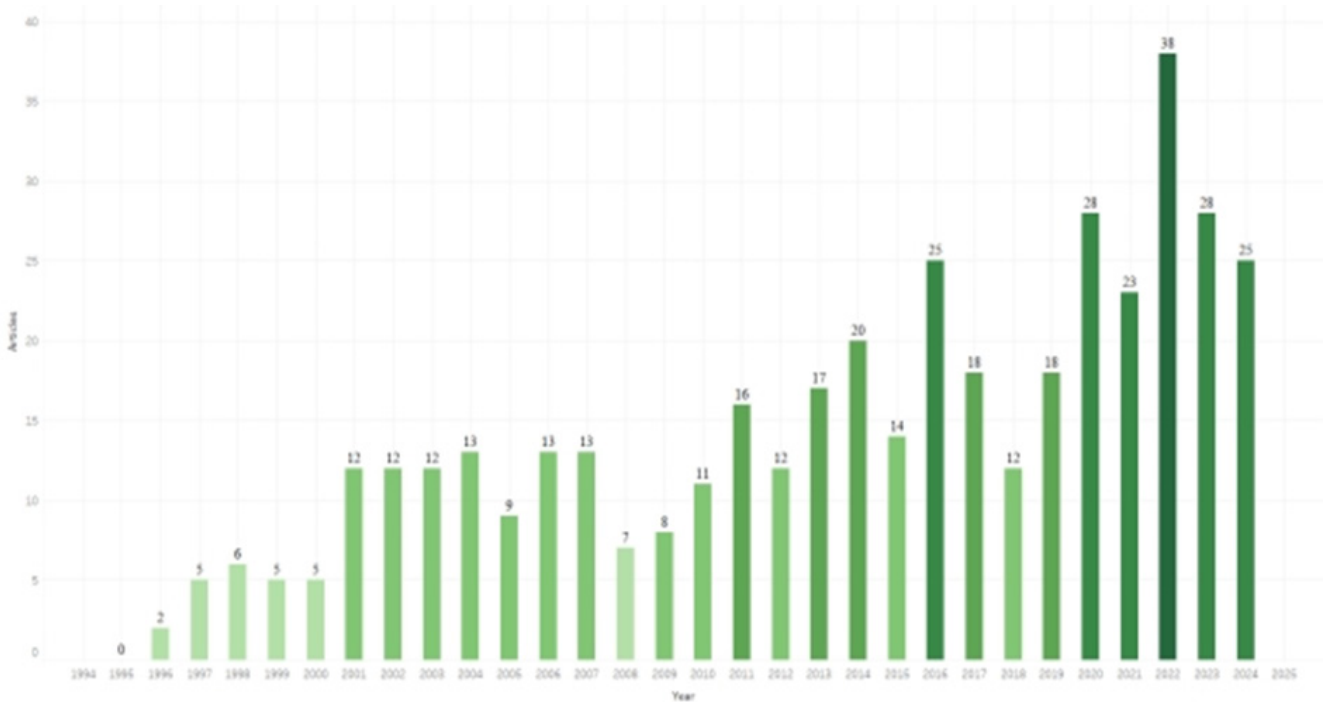


Figure 1. Annual Publication Trends of Acupressure Research in Pregnancy from 1994-2024

Countries with the most articles

Analysis of the geographic distribution of publications shows a dominance of the United States with 102 articles, far surpassing other countries. This reflects the substantial investment by the United States in acupressure research in pregnancy, perhaps driven by its advanced health system and growing interest in integrative approaches to prenatal care. Iran ranks second with 66 articles, indicating a strong focus on this area in that country, perhaps influenced by the strong tradition of complementary medicine in the Middle East.

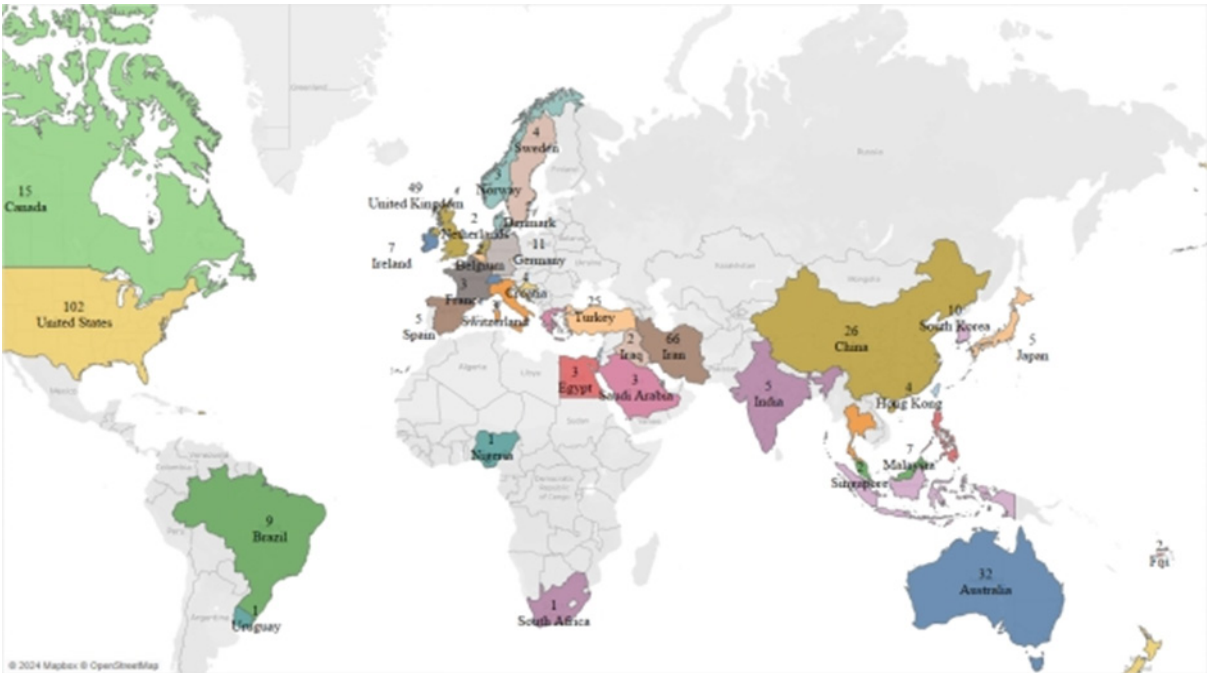


Figure 2. Geographic Distribution of Research Publications on Acupressure in Pregnancy

Countries such as the UK (49 articles), Australia (32 articles), and China (26 articles) among the top five contributing countries illustrate the global distribution of this research. This shows that acupressure in pregnancy is a topic that has attracted the attention of researchers in various parts of the world, including Western and Eastern countries.

Interestingly, Indonesia appears on the list with 10 articles, ranking on par with South Korea. This shows promising developments in acupressure research in pregnancy in Indonesia, although it still lags behind the top contributing countries.

The presence of Asian countries such as China, South Korea, and Indonesia in the top 10 list illustrates the cultural relevance of acupressure in this region. This is in line with the findings of Park et al. who reported high use of traditional medicine during pregnancy in Asian countries. Significant contributions from Western countries such as Australia, Canada, and Germany indicate global acceptance of complementary approaches in pregnancy care. Journals with the highest total publications.

Journals with the largest total publications

Analysis of the most influential journals revealed the central role of the Cochrane Database of Systematic Reviews in the dissemination of research on acupressure in pregnancy. With 16 publications and 826 citations, this journal ranked first in both the number of publications and citation impact, followed by the “Journal of Midwifery and Women’s Health” with 15 articles. The presence of specific journals such as the “Iranian Journal of Obstetrics, Gynecology and Infertility” (12 articles) and “Complementary Therapies in Clinical Practice” (11 articles) in the top positions illustrates the significant contribution of regional research and the focus on the integration of complementary therapies in clinical practice.

The diversity of journals on this list, which includes general medicine, obstetrics, gynecology, and complementary therapies, demonstrates the interdisciplinary nature of acupressure research in pregnancy. This reflects the complexity of the topic, which requires perspectives from multiple disciplines. Furthermore, the presence of journals with high impact factors on this list, such as the American Journal of Obstetrics and Gynecology, suggests that research in this area is increasingly accepted and valued by the broader scientific community.

Table 2. List of Top 10 Journals by Number of Research Publications on Acupressure in Pregnancy

Journal	Doc.	Quartile	Main Areas of the Journal	Publisher
Cochrane Database of Systematic Reviews	16	Q1	Evidence-based medicine, Systematic review	Wiley Blackwell
Journal Of Midwifery and Women’s Health	15	Q1	Midwifery, Women’s Health	Wiley Blackwell
Iranian Journal of Obstetrics, Gynecology and Infertility	12	Q4	Obstetrics, Gynecology, Infertility	Mashhad University of Medical Sciences
Complementary Therapies in Clinical Practice	11	Q2	Complementary and Alternative Medicine	Elsevier
Complementary Therapies in Medicine	10	Q2	Complementary and Alternative Medicine	Elsevier
Explore	9	Q2	Integrative Medicine, Holistic Health	Elsevier
Jams Journal of Acupuncture and Meridian Studies	7	Q3	Acupuncture, Traditional Medicine	Elsevier
American Family Physician	6	Q1	Family Medicine, Primary Care	American Academy of Family Physicians
American Journal of Obstetrics and Gynecology	6	Q1	Obstetrics and Gynecology	Elsevier
Cochrane Database of Systematic Reviews (Online)	6	Q1	Evidence-based medicine, Systematic review	Wiley Blackwell

Affiliates with the most total publications

Table 3 displays the top 10 institutions with the highest contribution to acupressure in pregnancy research publications. Information includes the name of the institution, number of articles, and country of origin. Analysis of the affiliation with the highest publications shows that Western Sydney University leads with 36 articles, followed by Shiraz University of Medical Sciences with 26 articles, and Mashhad University of Medical Sciences with 21 articles. The dominance of these institutions reflects the strong research focus on acupressure in pregnancy in Australia and Iran. The presence of institutions from various countries in the top 20, including Newcastle University (UK), Thammasat University (Thailand), and Zhejiang University (China), illustrates the global distribution of centers of excellence in acupressure in pregnancy research.

Table 3. List of Top 10 Institutions by Number of Research Publications on Acupressure in Pregnancy

Institutions	Document	Country
Western Sydney University	36	Australia
Shiraz University of Medical Sciences	26	Iran
Mashhad University of Medical Sciences	21	Iran
Newcastle University	20	United Kingdom
Thammasat University	20	Thailand
Shahid Beheshti University of Medical Sciences	18	Iran
Zhejiang University	15	China (China)
Chengdu University of Traditional Chinese Medicine	14	China (China)
Hamadan University of Medical Sciences	14	Iran
Qazvin University of Medical Sciences	14	Iran

Interestingly, several hospitals also appear on this list, such as San Gerardo Hospital and Women's and Children's Hospital. This indicates that acupressure research in pregnancy is not only limited to academic settings, but also involves direct clinical practitioners. Integration between academic institutions and health facilities in this research can facilitate the direct application of research findings into clinical practice, accelerating the translation of knowledge from "bench to bedside".

Most Influential Writers

Table 4 presents information about the 10 most productive and influential authors in acupressure research in pregnancy. Data include author name, number of documents (Doc.), total citations (TC), country, primary affiliation, and year of first publication (PY Start). Smith, CA leads with 9 publications, followed by Akbarzadeh, M. with 8 publications, and Dahlen, HG with 7 publications.

Table 4. List of the 10 most influential authors in Acupressure Research in Pregnancy

Writer	Doc.	TC	Country	Main Affiliates	PY Start
Caroline A. Smith	9	633	Australia	Western Sidney University	2006
Marzieh Akbarzadeh	8	71	Iran	School of Nursing and Midwifery	2012
Hannah G. Dahlen	7	291	Australia	Western Sydney University	2014
Adrienne R.N. Einarson	6	265	Canada	The Hospital for Sick Children	2002
Kate M. Levett	6	391	United States	University of Notre Dame	2011
Mike J. Armour	5	133	Australia	Western Sidney University	2016
Gideon Koren	5	159	Israel	Ariel University	2002
Zahra Masoudi	5	64	Iran	School of Nursing and Midwifery	2014
Najaf Zare	5	65	Iran	Infertility Research Center (SUMS)	2012
Carmer T. Collins	4	433	Australia	Adelaide Medical School	2006

The presence of authors such as Einarson, A. and Koren, G., who are known for their research in the pharmacology of pregnancy, demonstrates the interdisciplinary approach to acupressure research in pregnancy. This reflects the complexity of the topic that requires perspectives from various disciplines, including obstetrics, complementary medicine, and pharmacology.

Although the list is dominated by researchers from Western institutions, the presence of authors such as Akbarzadeh, M. and Masoudi, Z. demonstrates the important contributions of researchers from countries with strong complementary medicine traditions. This enriches the literature with culturally diverse perspectives and may facilitate the application of acupressure in a variety of health care contexts. However, the relatively small number of highly productive authors (only 10 authors with 4 or more publications) suggests that the field still has room for further growth and specialization.

Keyword Analysis

Network Visualization

This network visualization illustrates the relationships between keywords in acupressure research in pregnancy. Four main clusters are identified that represent the focus of the research: methodology and population (red), symptoms and pharmacological interventions (green), alternative treatment modalities (blue),

and study design (yellow). Node size indicates the frequency of keyword occurrence, while lines indicate the relationships between keywords. The red cluster, the most dominant, focuses on aspects of study methodology and the population studied. Keywords such as “randomized controlled trial,” “controlled study,” and “double-blind method” indicate an emphasis on rigorous and standardized study design. The study populations include “pregnant women,” “adults,” and various stages of gestation. The cluster also includes aspects related to labor such as “labor pain” and “cesarean section,” indicating that the research focuses not only on pregnancy but also on the birth process.

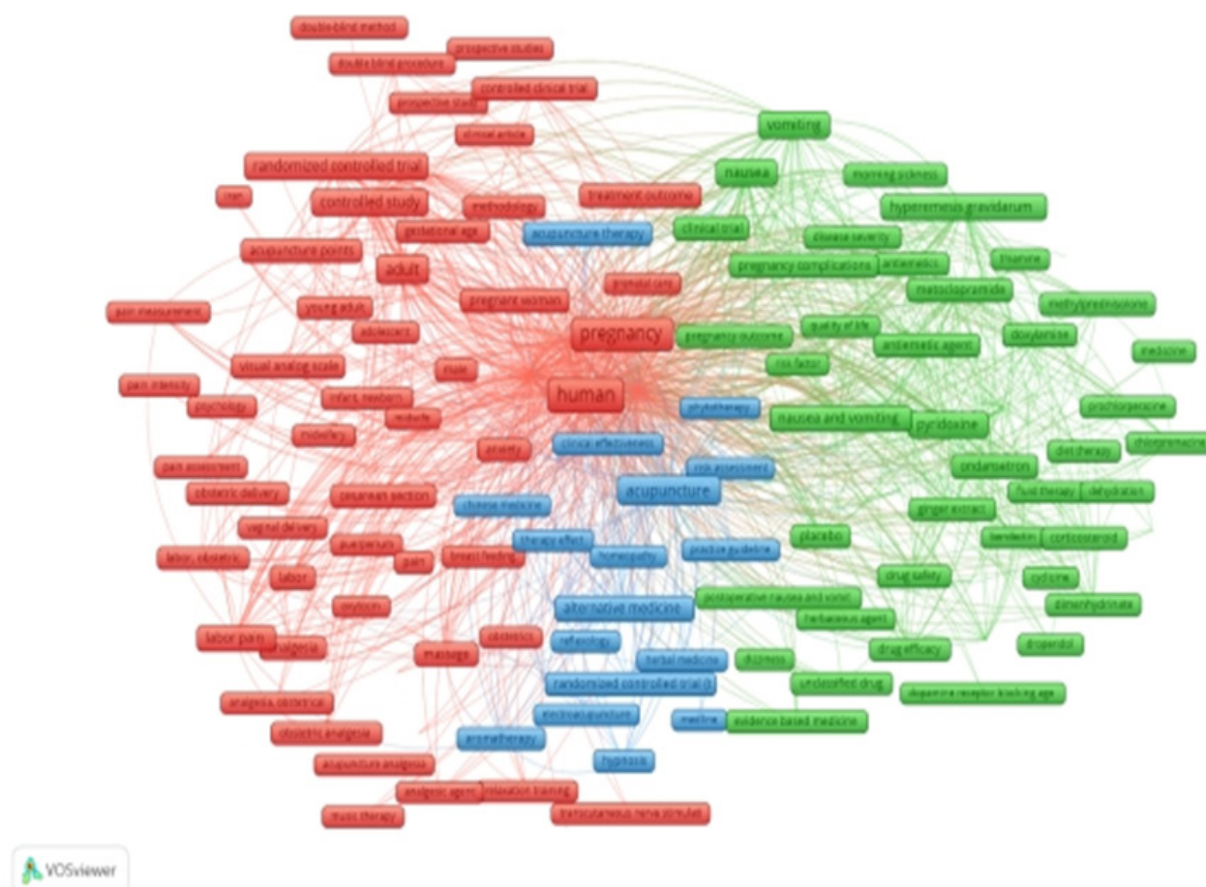


Figure 3. Network Visualization of Keywords in Acupressure Research in Pregnancy

The green cluster illustrates a focus on pregnancy symptoms and complications as well as pharmacological interventions. Keywords such as “vomiting,” “nausea,” and “hyperemesis gravidarum” indicate a specific focus on nausea and vomiting during pregnancy. A variety of antiemetic drugs and other pharmacological therapies such as “ondansetron,” “metoclopramide,” and “pyridoxine” appear in this cluster, indicating research on the effectiveness of various pharmacological approaches in managing these symptoms. The presence of the keywords “pregnancy complications” and “disease severity” also indicates that research covers a broad spectrum of health issues during pregnancy.

The blue cluster represents alternative and complementary medicine modalities, with “acupuncture” as the central keyword. The presence of keywords such as “acupuncture therapy,” “Chinese medicine,” and “phytotherapy” illustrates the integration of non-conventional approaches in treating pregnancy issues. “Clinical effectiveness” and “risk assessment” in this cluster indicate a focus on evaluating the safety and efficacy of these alternative therapies. Meanwhile, the smaller but closely connected yellow cluster, including keywords such as “clinical trials” and “prospective studies,” emphasizes the importance of scientific evidence in evaluating interventions. Overall, this visualization depicts a comprehensive research landscape, combining conventional and alternative approaches in an effort to improve maternal health and well-being.

Overlay Visualization

This overlay visualization shows the evolution of keywords in acupressure research in pregnancy from 2010 to 2018. Colors indicate time periods: green for early period (2010-2012), blue for middle period (2013-2015),

and purple/yellow for most recent period (2016-2018). This visualization illustrates the shift in research focus from basic methodologies to the integration of complementary medicine and pregnancy-specific symptom management.

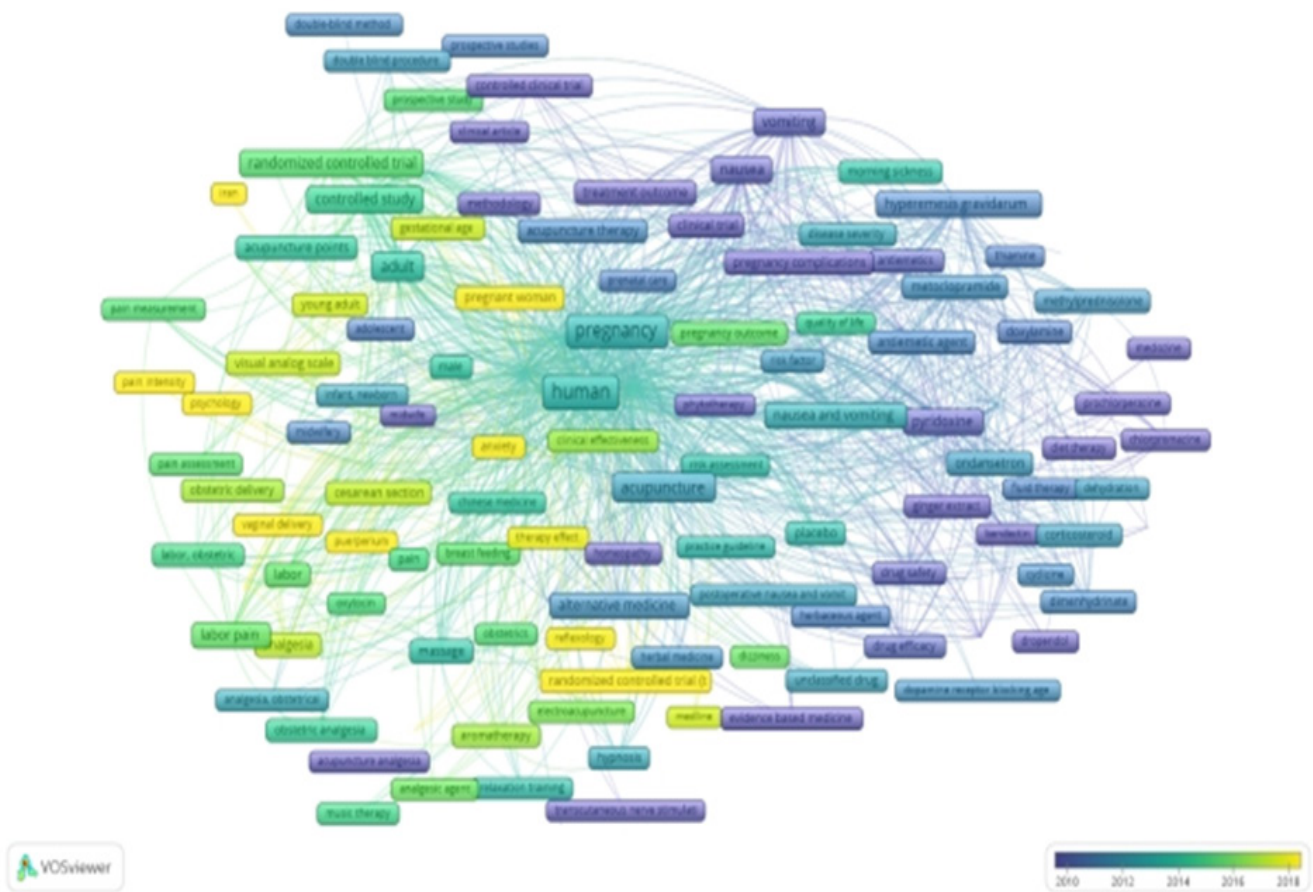


Figure 4. Overlay Visualization of Keyword Evolution in Acupressure Research in Pregnancy (2010-2018)

Keywords marked in green, representing the early period (around 2010-2012), are dominated by terms related to basic research methods such as “randomized controlled trial”, “controlled study”, and “pain measurement”. This indicates that in the early stages, research focused more on building a strong methodological foundation for evaluating the effectiveness of acupressure in the context of pregnancy and childbirth.⁽²⁵⁾

A shift in focus towards blue was seen in the mid-period (2013-2015) with the emergence of keywords such as “acupuncture”, “acupuncture therapy”, and “alternative medicine”. This indicates an increased interest in the integration of traditional and complementary medicine practices in pregnancy health management.⁽²⁶⁾ This period was also marked by increased attention to specific symptoms such as “hyperemesis gravidarum” and “nausea and vomiting”, indicating efforts to address common pregnancy problems through non-pharmacological approaches.^(27,28)

Keywords shown in purple and yellow, representing the most recent period (c. 2016-2018), illustrate further developments in research. The emergence of terms such as “vomiting”, “pregnancy complications”, and different types of antiemetic drugs (e.g. “ondansetron”, “metoclopramide”) indicate a more specific focus on the management of nausea and vomiting during pregnancy, as well as a comparison of the effectiveness of acupuncture therapy and pharmacological interventions. Furthermore, the presence of keywords such as “quality of life” and “pregnancy outcome” indicate a paradigm shift towards a more holistic approach to pregnancy care, considering not only physical symptoms but also aspects of overall well-being. This evolution reflects the maturity of the research field, with increasing complexity and depth of analysis over time.

Future Research Predictions

Based on the network visualization and overlay visualization analysis of research keywords on acupressure in pregnancy, several future research directions can be predicted. The development of acupressure research in pregnancy will likely lead to deeper integration and comparison between acupressure and other therapeutic

modalities, both conventional and complementary. Comparative studies comparing the effectiveness of acupressure with other pharmacological and non-pharmacological interventions, especially in the management of pregnancy-specific symptoms such as nausea, vomiting, and pain, are expected to increase. In addition, research integrating acupressure with herbal therapy and acupuncture in the context of pregnancy care will also likely increase, with the aim of optimizing the integrative treatment approach.

In line with the trend towards precision medicine, future research into acupressure in pregnancy will likely focus more on personalization and precision in therapy. Future studies may explore how individual factors such as genetics, microbiome, and medical history may influence response to acupressure. The development of personalized acupressure protocols based on individual risk profiles and specific stages of pregnancy may be a major focus. This may involve the use of advanced technologies such as artificial intelligence to optimize acupressure points and techniques based on comprehensive patient data, which in turn may improve the effectiveness and safety of therapy.^(29,30,31)

As our understanding of biological mechanisms advances, future research directions are also expected to delve deeper into the molecular and neurobiological effects of acupressure on pregnancy. Studies utilizing brain imaging technologies, biomarker analysis, and -omics approaches (e.g. genomics, proteomics) may increase to uncover the underlying mechanisms of acupressure's effectiveness in addressing various pregnancy complications. A better understanding of the neurophysiological pathways affected by acupressure may pave the way for the development of more targeted and effective interventions. Research in this area will not only strengthen the scientific basis of acupressure but also potentially identify new targets for the development of more effective therapies in maternal health management.

DISCUSSION

Based on the results of the bibliometric analysis conducted, research on acupressure in pregnancy has shown significant development from 1979 to 2024, with a total of 438 documents and an annual growth rate of 7,42 %. This reflects the increasing interest and relevance of this topic in the scientific community. The geographical distribution of research shows a global spread, with the United States leading in the number of publications, followed by Iran and the United Kingdom, as well as important contributions from Asian countries such as China and Indonesia, illustrating the cultural relevance of acupressure. The diversity of journals publishing this research shows the interdisciplinary nature of this topic, spanning from obstetrics to complementary therapies. Keyword analysis revealed four main clusters of research: methodology and population, symptoms and pharmacological interventions, alternative treatment modalities, and study design. There was a shift in focus from basic methodology to the integration of complementary medicine and management of pregnancy-specific symptoms during the period 2010-2018. Despite the increase in research collaboration, the level of international collaboration is still relatively low (11,19 %), indicating opportunities for future improvement.^(31,32) Predictions suggest that future research directions will focus on the integration of acupressure with other treatment modalities, personalization of treatment, and in-depth investigation of the biological mechanisms of acupressure in pregnancy. In conclusion, this study illustrates the rapid development and great potential of acupressure in maternal health. These findings demonstrate the potential of acupressure as a non-pharmacological approach to addressing a variety of pregnancy problems, particularly nausea and vomiting, which may provide an alternative or complement to conventional treatments. However, further research is needed to improve the understanding and clinical application of this technique, especially in the context of personalization of treatment and integration with other treatment modalities. Thus, this area offers significant opportunities for innovation and improvement in maternal health care in the future.

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CONFLICT OF INTEREST

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