International Seminar and Workshop on Public Health Action
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Research Trends in Nutrition and Dysmenorrhea (2010-2025): A Bibliometric Analysis

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Article Info

Article History
Submitted: 05-08-2025
Revised: 04-09-2025
Accepted: 24-08-2025

Keywords:
Bibliometric, dysmenorrhea, menstrual health, nutrition, nutritional status

Abstract

Dysmenorrhea remains a concern among women of productive age. The role of nutritional status in modulating pain severity is still need to be explored. This study aimed to visualize profiles and hotspots in dysmenorrhea related to nutritional status through a bibliometric analysis. Relevant publications were retrieved from Scopus (2010 to 2025). We used combinations of keywords such as “anemia”, "dysmenorrhea," "nutrition," "diet," “nutriotional status”, and "micronutrients." The publications were limit to: article, review, final publication stage, and english language. Bibliometric indicators were analyzed using Scopus Analyze and VOSviewer. A total 1192 papers were selected. The volume of dysmenorrhea-related publications has increased significantly in the past four years. Iran leads in research output, followed by China and the United States. Shahid Beheshti University of Medical Sciences contributed the highest number of articles (n = 35), while Nutrients published the most papers (n = 39). Keyword co-occurrence analysis revealed four thematic clusters: (1) risk factors, menstrual patterns, and impact; (2) symptoms, pathogenesis, and pharmacological treatment; (3) in vivo studies; and (4) alternative therapies, including diet, supplements, and acupuncture. Dysmenorrhea remains a relevant research topic, with studies expanding from risk factors to biomarkers and therapies.

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eISSN 3063-2439

Introduction

Dysmenorrhea remains a concern among women of productive age. Dysmenorrhea is a pain or cramps in cyclic lower abdominal or pelvic during menstruation. This pain can significantly impair daily functioning, emotional well-being, and overall quality of life.(Ju, Jones, & Mishra, 2014) The discomfort experienced is not limited to the lower abdomen; it may also radiate to the lower back, thighs, and legs.(Bernardi, Lazzeri, Perelli, Reis, & Petraglia, 2017; Karout et al., 2021) Dysmenorrhea is categorized into primary dysmenorrhea (PD) and secondary dysmenorrhea (SD).(Bernardi et al., 2017; Iacovides, Avidon, & Baker, 2015; Karout et al., 2021) Primary dysmenorrhea occurs without underlying pelvic pathology, while secondary dysmenorrhea, is associated with identifiable clinical conditions such as endometriosis, adenomyosis, congenital anatomic abnormalities, or uterine fibroids.(Bernardi et al., 2017; Gutman, Nunez, & Fisher, 2022; Kho & Shields, 2020) Despite its high prevalence reported to affect up to 90% of menstruating women in some populations(Ju et al., 2014; L. Wang et al., 2022; Zulimartin et al., 2025), dysmenorrhea remains under addressed in both clinical and public health contexts.

Diet and nutrition play a critical role in supporting overall population health, including woman’s health. Deficiencies in essential nutrients can negatively influence health outcomes, while poor health may also impair nutritional status. Moreover, interactions between genetic factors and dietary components are increasingly recognized as key determinants in disease prevention and health management.(Ciebiera et al., 2021) Recent research has highlighted the role of lifestyle factors, particularly nutrition, in modulating the severity and frequency of menstrual pain(Primalova & Stefani, 2024). Nutritional intake influences

hormonal regulation, inflammatory responses, and vascular function, all of which are implicated in the pathophysiology of dysmenorrhea.(Ciebiera et al., 2021; Hsu et al., 2024)

The efficacy of supplements and nutrients has been investigated as a preventive approach to dysmenorrhea.(Ciebiera et al., 2021) For example, an adequate intake of dietary calcium and magnesium has been shown to exert a protective role in reducing the severity of dysmenorrhea. Once absorbed in the upper intestinal tract, these minerals contribute to the regulation of muscle cell responsiveness to neural stimulation through various physiological mechanisms.(Naz et al., 2020) Zinc, vitamin D, and curcumin have demonstrated anti-inflammatory properties that contribute to the downregulation of prostaglandin synthesis. By modulating inflammatory pathways, these compounds play a role in alleviating the severity of menstrual pain associated with dysmenorrhea.(Chen et al., 2023; Hsu et al., 2024; Sharifipour et al., 2024). The other nutrients that have been associated with dysmenorrhea are live Oil, Dietary Fiber, Omega-3 and Omega-6 Fatty Acids, Vitamin E, Vitamin K, and some herbs(Ciebiera et al., 2021)

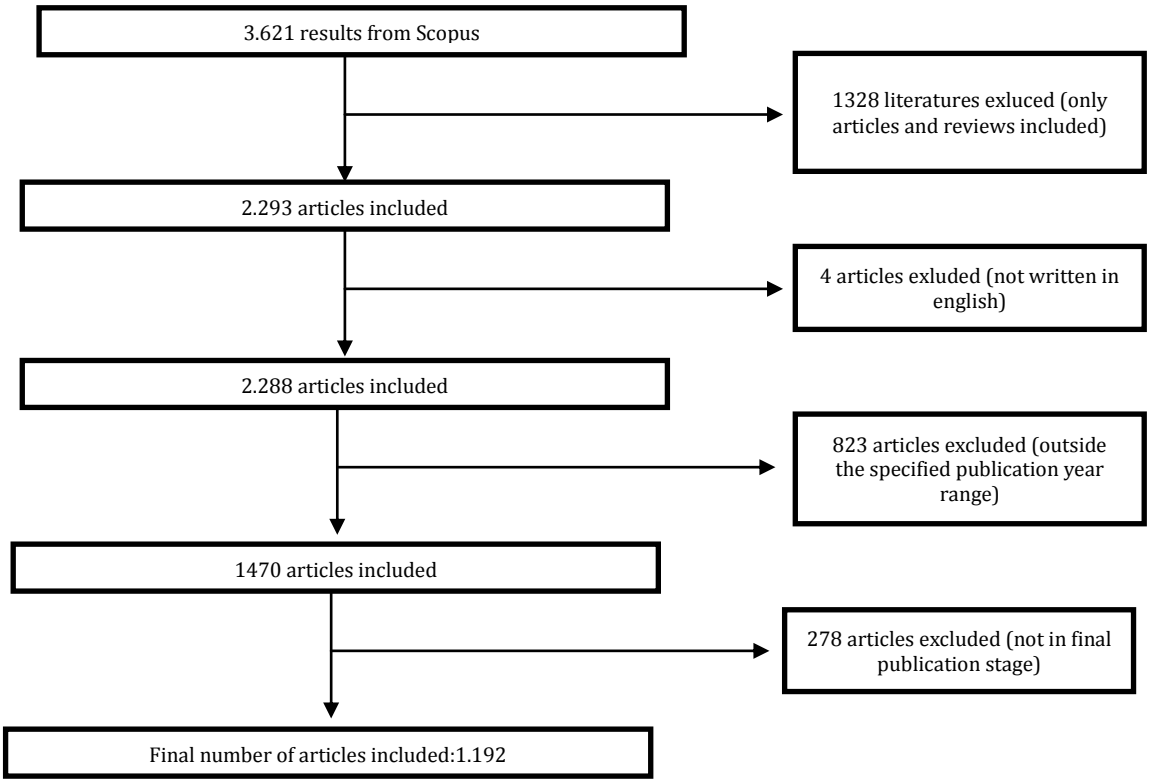
Conversely, poor dietary habits, including high intake of processed foods and low micronutrient consumption, may exacerbate symptoms. Recent studies have demonstrated a significant association between junk food consumption and menstrual irregularities, including dysmenorrhea. (Latif, Naz, Ashraf, & Jafri, 2022; Rathod, Rathi, Tiwari, & Borgaonkar, 2023). Inline with this dietary habbit, Studies have found that an increase in Body Mass Index (BMI) is associated with a higher incidence of dysmenorrhea. (Takata, Kotani, & Umino, 2023) However, findings across studies remain inconclusive due to methodological heterogeneity and varying definitions of dietary patterns.

Bibliometric analysis offers a strategic method to map the intellectual landscape of research on dysmenorrhea and nutrition. By examining publication trends, keyword co-occurrence, and authorship networks, this approach enables scholars to identify influential contributors, thematic shifts, and existing knowledge gaps. Such insights are essential for guiding future investigations and informing evidence-based interventions that integrate nutritional strategies into menstrual health management. This study aims to conduct a bibliometric analysis of global research output related to dysmenorrhea and nutrition, with the objective of uncovering patterns in scholarly productivity, collaboration, and thematic evolution. The findings are expected to support researchers, clinicians, and policymakers in advancing integrative approaches to menstrual health through targeted nutritional research and practice.

Methods

This study using a bibliometric approach for analysis. Bibliometric analysis offers a systematic approach to examining research dynamics, including publication trends, collaborative networks, and the conceptual framework of a discipline. Through the evaluation of large scale quantitative data, such as citation metrics, keyword frequency, and publication volume, it facilitates the identification of knowledge gaps, the generation of novel research directions, and the strategic alignment of scholarly contributions within the wider academic discourse(Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021).

We retrieved literature on Scopus, where this database has high-quality indexing, extensive metadata, and compatibility with bibliometric tools(Garg, Mishra, Pandey, Kabra, & Kaushal, 2025), and also be a source of literature searches in previous bibliometric articles. (Farizi, 2024; Garg et al., 2025; Sweileh, 2018) Relevant publications were retrieved from Scopus, from 1st January 2010 to 28th July 2025. We used combinations of keywords such as “anemia”, "dysmenorrhea," "nutrition," "diet," “nutriotional status”, and "micronutrients.". The order of keywords used were: dysmenorrhea AND (Nutritional status OR diet OR nutrition OR micronutrient OR anemia). The publications were limit to: article, review, final publication stage, and english language (Figure 1).



Results

A total 1192 papers were selected. The number of articles fluctuated from 2010 to 2019 and then consistently increased until 2024 (Figure 2). The number of articles in 2025 was also potentially higher than in 2024, as the total number of publications at the time of data collection (July 2025) had reached 117.

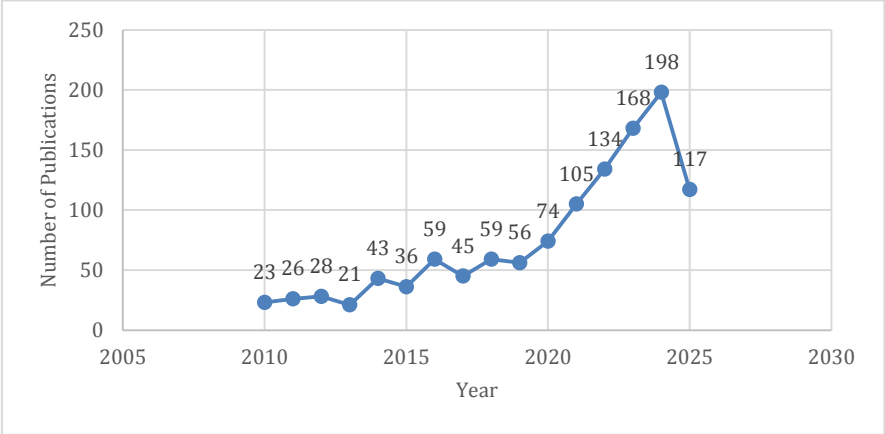
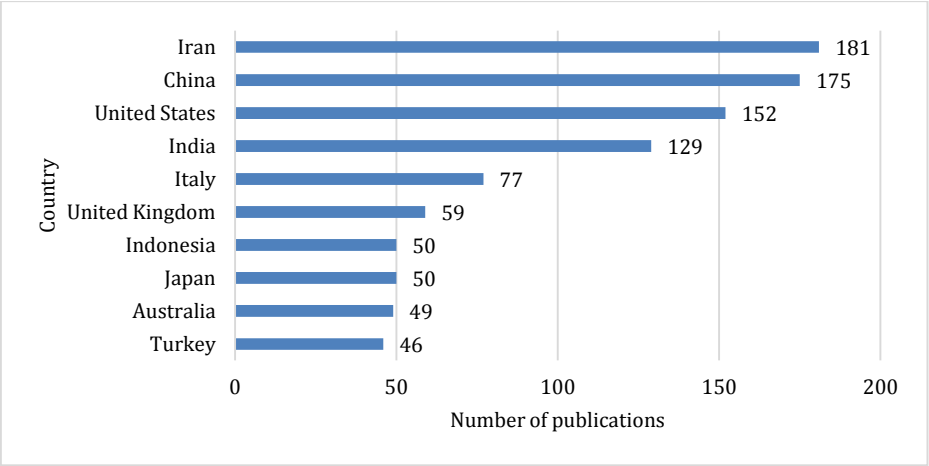
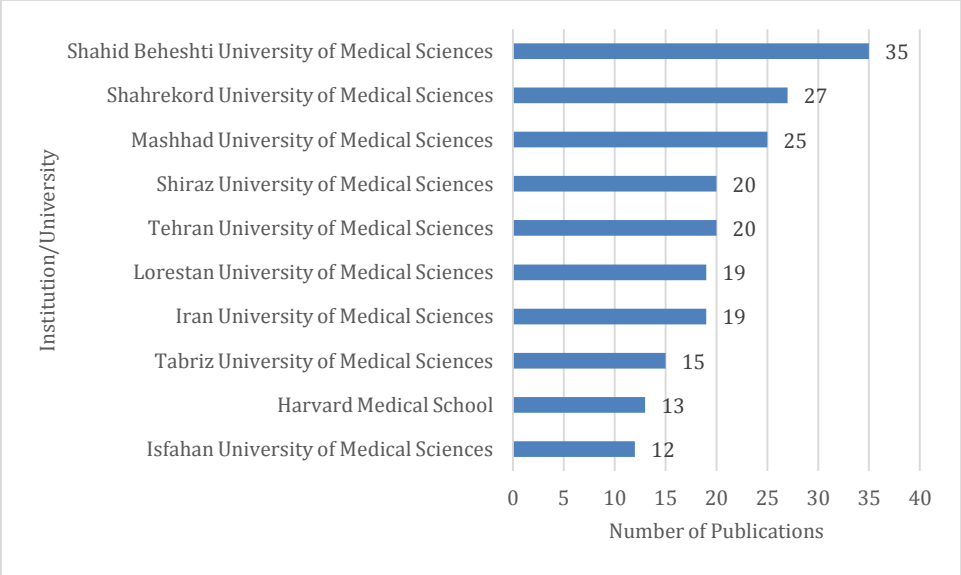


Figure 2 Line chart of annual publications from 2010 to 2025

Based on country distribution (Figure 3), articles on dysmenorrhea-related nutrition were spread across many countries (n=105). Iran leads in research output (181 articles), followed by China (175 articles) and the United States (152 articles). In the affiliation analysis, 160 institutions/universities were recorded as researching dysmenorrhea related to nutritional status. Shahid Beheshti University of Medical Sciences contributed the highest number of articles (n = 35), followed by Shahrekord University of Medical Sciences (n = 25), Mashhad University of Medical Sciences (n = 25), Shiraz University of Medical Sciences (n = 20), and Tehran University of Medical Sciences (n = 20). This is consistent with the results of the country distribution, where all five universities are located in Iran, which is the country with the most published related articles.



a. Country Distribution



b. Affiliation Distribution

Figure 3 Distribution of Published Articles by (a) Country and (b) Affiliated Institution

A total of 159 journals were identified as having published articles related to dysmenorrhea and nutrition. As shown in Table 1, *Nutrients* emerged as the most prolific journal, contributing the highest number of publications within this thematic area. Other notable journals included *Journal of Ethnopharmacology*, *BMC Women S Health*, *Plos One*, and *International Journal of Molecular Sciences*, each reflecting a growing interdisciplinary interest in menstrual health and nutritional interventions. The diversity of journals underscores the broad relevance of this topic across clinical, public health, and nutritional sciences.

Table 1. List of Journals Publishing Articles on Dysmenorrhea and Nutrition

No	Journals	Number of Publications	Number of citations
1	Nutrients	39	1098
2	Journal of Ethnopharmacology	25	1071
3	Plos One	15	655
4	BMC Women S Health	15	362
5	Phytotherapy Research	14	590
6	International Journal of Molecular Sciences	14	795
7	Molecules	13	1118
8	Frontiers in Pharmacology	13	538
9	International Journal of Environmental Research and	10	91

No	Journals	Number of Publications	Number of citations
	Public Health		
10	Scientific Reports	10	112
11	Frontiers in Nutrition	10	61

Analysis of Keyword

There were 12551 keywords extrated in this study. The keywords analyzed in this study represent the combined total of author keywords and index keywords. When limited to author-derived keywords alone, a total of 3,220 unique terms were identified. For the subsequent analytical phase, the unit of analysis employed was "all keywords," encompassing both categories.

Keyword co-occurrence analysis revealed four thematic clusters (Figure 4): (1) risk factors, menstrual patterns, and impact (red cluster); (2) symptoms, pathogenesis, pharmacological treatment, and medical plant or herbal medicine (green cluster); (3) in vivo studies, in vitro studies and metabolism (blue cluster); and (4) alternative therapies, including diet, supplements, and acupuncture (yellow cluster). From overlay visualization, the research trend indicates a growing focus on nutritional and biomolecular approaches to pain management and therapeutic development in dysmenorrhea. For example, in the biomolecular field, in vivo and in vitro studies, inflammation, endometriosis, and oxidative stress are some of the keywords used in recent years. Meanwhile, in the nutrition field, these include dietary supplements, obesity, vitamins, and iron. Additionally, topics such as quality of life, anxiety, exercise, lifestyle, and physical activity also show growing research trends related to dysmenorrhea and nutrition. (Figure 5).

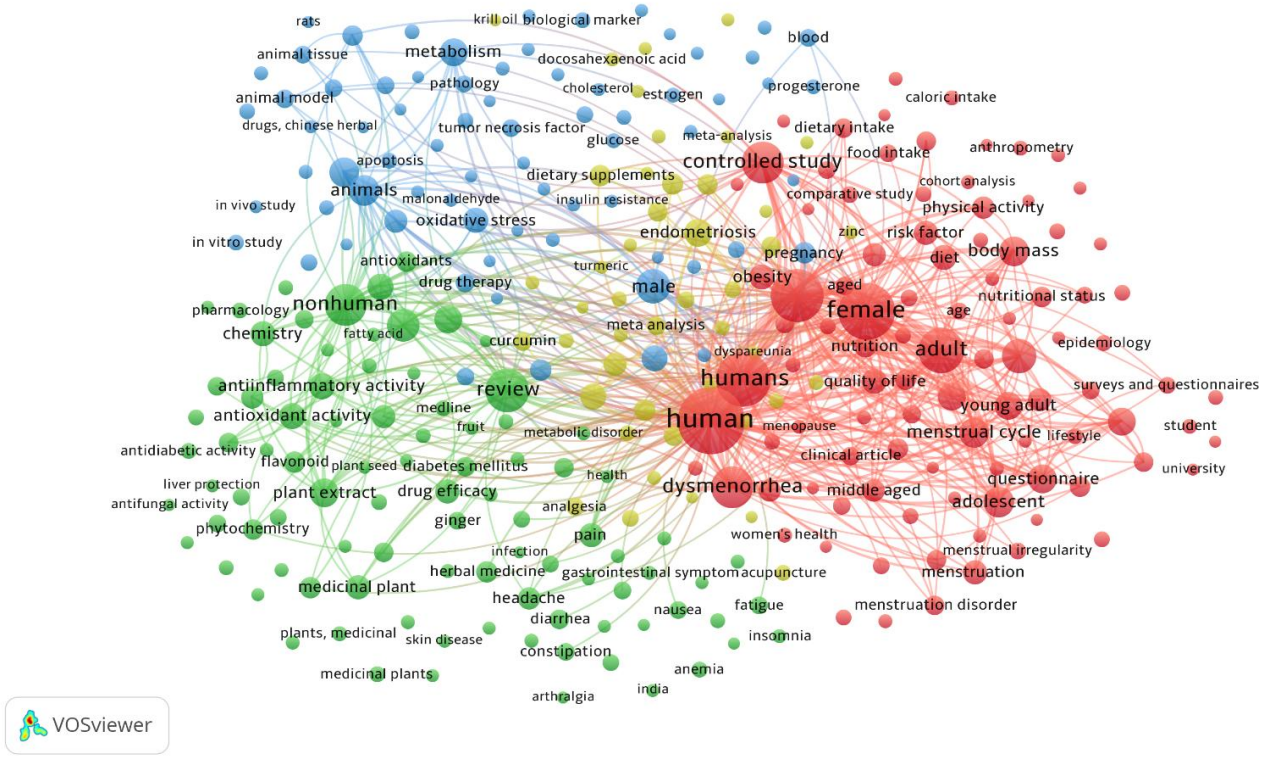


Figure 4. Keywords co-occurrence clusterization

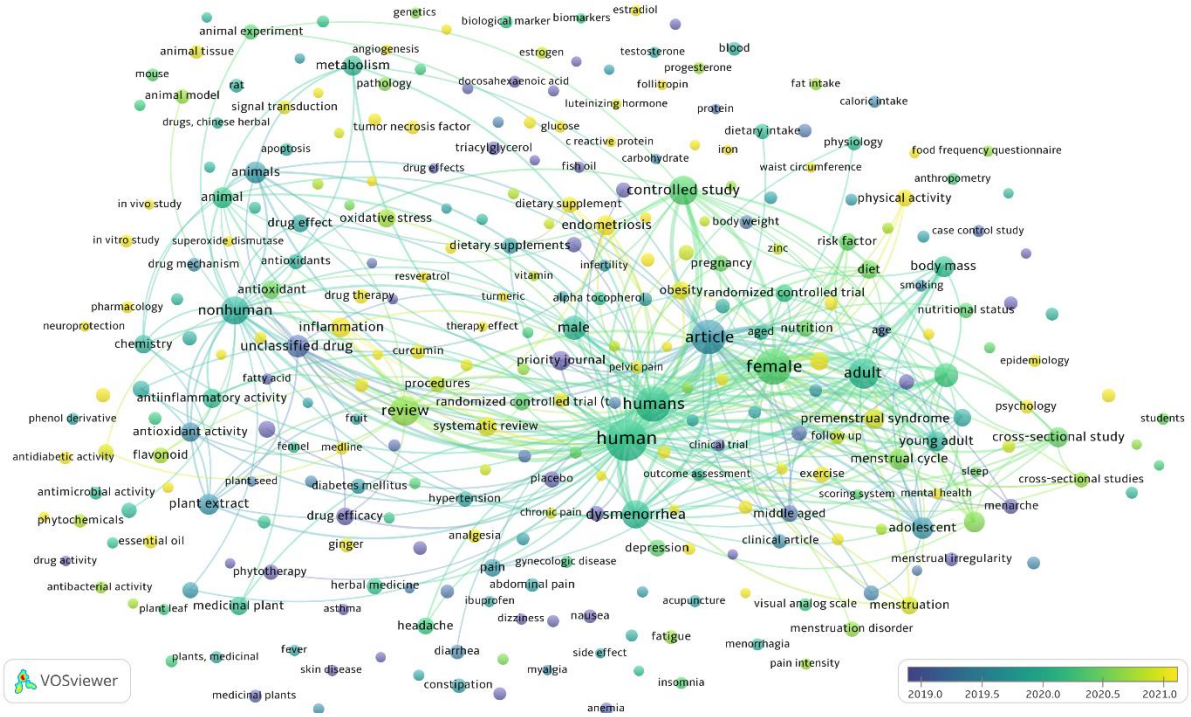


Figure 5. Overlay Visualization of Keyword Co-occurrence in Dysmenorrhea and Nutrition Research

Discussion

Over the past fifteen years, research on dysmenorrhea and nutrition has shown a fluctuating trajectory, particularly during the first decade (2010–2019), where publication output varied due to limited interdisciplinary engagement and methodological diversity. However, a notable upward trend has emerged in the last five years (2019–2024), reflecting increased scholarly attention to non-pharmacological interventions for menstrual health. This surge aligns with broader global interest in lifestyle-based approaches to gynecological disorders, as highlighted in bibliometric analyses by Liu et al. (2023), who reported a consistent rise in dysmenorrhea-related publications across multidisciplinary platforms(Z. Liu, Li, Meng, Gu, & Cui, 2023). The upward trend in publication output is also evident in similar bibliometric studies utilizing different databases, such as Web of Science (C. Wang, Liu, & Bai, 2023). The growing volume of research suggests a shift toward integrative frameworks that combine nutrition science, reproductive health, and public health perspectives.

Geographic analysis of publication output reveals that Iran leads global contributions in dysmenorrhea related nutrition research, followed by China and the United States. Iranian scholars have been particularly active in exploring phytotherapeutic and micronutrient-based interventions, often within ethnobotanical contexts. This trend is exemplified by the study conducted by Bahmani, which systematically reviewed the use of various herbal therapies including mint, platyloba, anise, valerian, thyme, mountain tea, ginger, lemon balm, sage, vitakous, dill, cinnamon, chamomile, celery, saffron, and others in the management of dysmenorrhea(Bahmani et al., 2015). In addition, studies have also examined the dietary intake of micronutrients and antioxidants in relation to premenstrual syndrome (Farrokhfall et al., 2023; Pramanik, Pattnaik, & Pramanik, 2025; Sharifan et al., 2024). China has demonstrated strong institutional productivity, especially in clinical and pathophysiological studies(Huang et al., 2025; Li, Liu, & Guo, 2012; J. Liu, Luo, Hu, & Peng, 2023; X. Liu et al., 2022), while the United States has contributed significantly to public health and behavioral research(Hirsch et al., 2024; Missmer et al., 2010).

The affiliation analysis revealed a total of 160 institutions actively contributing to research on dysmenorrhea in relation to nutritional status. Notably, Shahid Beheshti University of Medical Sciences emerged as the leading contributor with 35 publications, followed by Shahrekord and Mashhad Universities of Medical Sciences (each with 25 articles), and Shiraz and Tehran Universities of Medical Sciences (each with 20 articles). This concentration of scholarly output is consistent with the country level distribution, wherein Iran ranks as the most prolific nation in this research domain. The dominance of Iranian institutions reflects a strong national emphasis on reproductive health and complementary nutritional interventions, particularly within the framework of ethnomedicine and micronutrient therapy. For example, Mahmoud Rafieian Kopaei has conducted extensive research on medicinal plants for therapeutic purposes, including the treatment of dysmenorrhea(Raisi Dehkordi, Rafieian-kopaei, & Hosseini-Baharanchi, 2019; Shahrahmani et al., 2021) and various other health conditions. However, the

clustering of research within a limited number of institutions suggests potential gaps in global collaboration and underscores the need for broader geographic diversification in future studies.

The identification of 159 journals publishing on dysmenorrhea and nutrition highlights the thematic breadth and interdisciplinary appeal of this research area. Nutrients stands out as the most prolific journal, reflecting its central role in disseminating evidence on dietary interventions and menstrual health. Other prominent journals such as the Journal of Ethnopharmacology, BMC Women's Health, PLOS ONE, and the International Journal of Molecular Sciences demonstrate the integration of clinical, ethnobotanical, molecular, and public health perspectives. This diversity suggests that dysmenorrhea is increasingly being approached not only as a gynecological condition but also as a multifaceted issue influenced by lifestyle, nutrition, and systemic inflammation. The wide journal distribution also indicates opportunities for cross-disciplinary collaboration and knowledge translation across sectors.

Thematic evolution over time indicates expanding interest in personalized nutrition and integrative care models for menstrual health. Dysmenorrhea is no longer confined to epidemiological studies focusing solely on prevalence, risk factors, and associated impacts. The findings of this study are also consistent with previous bibliometri c analyses that focused specifically on dysmenorrhea, in which key research trends and hotspots included potential central mechanisms, syndromic patterns, evaluation indices, diagnosis of adenomyosis-associated dysmenorrhea, and various treatment approaches (Fang, Liu, Wang, & Wang, 2023).

In relation to nutrition and dysmenorrhea, this study identified several specific keywords, including dietary supplements, insulin resistance, antioxidants, and medicinal plants. These findings reflect the broad scope of inquiry that can be further explored within the intersection of nutritional science and menstrual health. Nutritional status can affect an individual's overall health, including reproductive health. Both underweight and overweight or obese conditions may be associated with dysmenorrhea through distinct mechanisms. Underweight may increase the risk of developing primary dymesnorrhea(Khalid et al., 2020; Wu, Zhang, Tang, & Fang, 2022). Underweight status in women is often associated with reduced body fat and potential nutritional deficiencies. Adequate body fat plays a critical role in supporting normal ovulatory function; however, insufficient fat stores may disrupt ovulation and menstrual regularity, potentially triggering elevated prostaglandin production (Çinar et al., 2021; Ju, Jones, & Mishra, 2015; Wu et al., 2022). However, this finding still inconsistent with other studies. Antoher studies have found that an increase in Body Mass Index (BMI) is associated with a higher incidence of dysmenorrhea. (Donayeva et al., 2023; Takata et al., 2023).

Research on dysmenorrhea management continues to advance, with micronutrients, dietary supplements and herbal medicine increasingly studied for their role in reducing symptom severity. The influence of all these factors on the severity of dysmenorrhea can be explained through various underlying mechanisms (Guimarães & Póvoa, 2020). Calcium and magnesium contribute to the regulation of muscle cell responsiveness to neural stimulation (Naz et al., 2020). Vitamin E contribute to inhibiting prostaglandin production and promoting prostacyclin action, with consequent vasodilation and muscle relaxation (Guimarães & Póvoa, 2020). Vitamin B1 has been shown to alleviate typical symptoms associated with its deficiency, including muscle cramps, physical fatigue, and reduced pain threshold (Doty & Attaran, 2006; Guimarães & Póvoa, 2020). Zinc, vitamin D, and curcumin have demonstrated anti-inflammatory properties that contribute to the downregulation of prostaglandin synthesis. By modulating inflammatory pathways, these compounds play a role in alleviating the severity of menstrual pain associated with dysmenorrhea.(Chen et al., 2023; Hsu et al., 2024; Sharifipour et al., 2024).

Research on dysmenorrhea and nutrition continues to expand in quantity, reflecting a progressively broader scope of inquiry. This progression reflects a growing interest in personalized nutrition and integrative care models that address the multifactorial nature of menstrual pain. Recent studies have begun to explore the biological underpinnings of dysmenorrhea, including the role of inflammatory biomarkers, hormonal regulation, and genetic polymorphisms, particularly those related to circadian rhythm genes. As highlighted by Wang et al. (2023), the diversification of research themes and treatment nodes, including acupuncture, acupressure, and anti-inflammatory diets, signals a paradigm shift toward holistic, evidence-based approaches in dysmenorrhea care(C. Wang et al., 2023). This thematic expansion not only enhances scientific understanding but also opens new avenues for personalized, culturally sensitive, and sustainable interventions.

Conclussion

This study reveals a growing interdisciplinary interest in dysmenorrhea and nutritional interventions, with Iran leading in institutional and national contributions. Thematic evolution shows a shift from epidemiological focus toward mechanistic, genetic, and therapeutic research, supported by diverse journal outlets and keyword trends. Based on these findings, future research should aim to bridge geographic and

disciplinary gaps by fostering inclusive international collaboration and expanding the scope of inquiry beyond epidemiological patterns. Researchers are encouraged to explore integrative frameworks that combine nutritional science, molecular mechanisms, and culturally grounded interventions. Emphasis should also be placed on developing personalized dietary strategies and evaluating their effectiveness through robust longitudinal and interventional designs. Strengthening knowledge translation efforts such as community-based education and policy integration will be essential to ensure that scientific insights on dysmenorrhea and nutrition can inform real-world menstrual health solutions.

Author Contributions

RR: designing research, writing manuscript, collecting and analyzing data. DK: search for relevant literature and write a manuscript (discussion and introduction). SK: search for relevant literature, analyzing data, and editing. N: search for relevant literature and write a manuscript (discussion)

Funding

This work was supported by Universitas Riau through Lembaga Penelitian dan Pengabdian Kepada Masyarakat (LPPM) Universitas Riau with grant number : 29144/UN19.5.1.3/AL.04/2025.

Acknowledgments

The authors would like to thank the committee of the 5th International Seminar and Workshop on Public Health Action (ISWOPHA 2025) for the opportunity and support in this publication process. We also would like thank to Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas Riau and Faculty of Medicine Universitas Riau.

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