Trends in Research Studies on Menstrual Distress and Self-efficacy Among Adolescent Girls: A Bibliometric Analysis

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Abstract

Menstrual hygiene is a complex issue that requires coordinated efforts at various levels, especially for adolescent girls. However, the lack of basic facilities like sanitary products, water supply, and a safe environment for changing pads limits their options for safe menstrual hygiene. To understand more about menstrual distress and self-efficacy among school-going girls, we analyzed 6,681 publications from the Web of Science (WoS) Core Collection and 4,974 records from 2008 to 2022. The study used CiteSpace 6.1.R6 software for a thorough analysis, including Document Co-citation Analysis (DCA) to identify important studies and research clusters, as well as keyword co-occurrence analysis to reveal emerging trends in the literature. Furthermore, temporal analysis was conducted to examine publication trends over time, showing a notable rise in research output, especially in the past five years. The research on menstrual distress and self-efficacy is primarily focused in countries like the United States, England, China, Australia, and Canada, and institutions like the University of California, University of London, Harvard University, Pennsylvania Commonwealth System of Higher Education, and the University of North Carolina. Keywords like distress, life event, psychopathology, memory, and salivary cortisol indicate emerging trends in this field. The Document Co-citation Analysis (DCA) revealed that the studies on young women in middle-income countries are the predominant cluster in the domain of menstrual distress and self-efficacy. This bibliometric analysis helps identify potential contributors for future research on menstrual distress and hygiene among adolescent girls.

Keywords: Adolescent Girls, Bibliometric Analysis, Menstrual Distress, Self-Efficacy.

Introduction

Menstrual distress includes physical, emotional, and psychological symptoms experienced during menstruation, such as pain, fatigue, mood swings, anxiety, and depression. Self-efficacy is an individual's belief in their ability to succeed in a specific task or situation (1,2). These factors are interconnected in various ways. Physical symptoms and self-efficacy can impact severe menstrual pain, affecting the self-efficacy to limit a woman's ability to engage in daily activities and leading to feelings of inadequacy and frustration. Emotional symptoms and self-efficacy can affect hormonal changes, resulting in mood swings and emotional instability, which can impact self-esteem and self-confidence. Individuals can improve their well-being by addressing menstrual symptoms and promoting self-efficacy (3-6). Menstrual distress and self-efficacy are closely linked factors that significantly impact the well-being of adolescent girls. Menstrual distress, which includes physical and emotional symptoms, can affect self-efficacy, the belief in one's abilities (7). On the other hand, a strong sense of self-efficacy can help girls cope with menstrual difficulties and thrive (8). Self-efficacy is crucial in navigating the physical and emotional challenges of menstruation, leading to better self-care practices. Understanding the connection between self-efficacy and menstrual health is essential for developing interventions that promote positive menstrual experiences and well-being in adolescent girls (9).This study examines the relationship between menstrual distress and self-efficacy through the lens of Self-Determination Theory (SDT), a psychological framework focused on human motivation. SDT highlights autonomy, competence, and relatedness as essential psychological needs that impact motivation and well-being. By empowering adolescent girls to manage their menstrual experiences autonomously, cope competently with

distress, and seek relatedness through social support, their self-efficacy can be enhanced, enabling them to navigate menstrual challenges effectively and improve their overall well-being (6). Menstrual Hygiene Management (MHM), refers to the practice of handling menstrual discharges which includes using sanitary materials, disposing of the used materials safely, cleaning the body and accessing the facilities for them (10-12). The facilities are used in a safe and secured washroom with adequate water supply, collection and disposal area for used materials, and electric burners. Regular sanitation in schools, work environments or well-being centres is prioritized (10). But, globally, at least 500 million women especially young girls lack such facilities for maintaining hygiene during menstruation. This may lead to the inability of girls to manage their menstrual hygiene in schools which results in various effects such as absenteeism, lack of attention in studies, and serious physical and psychological distress. Hence, there is a negative impact on girls' overall academic performance and social engagement. It is necessary to have adequate knowledge and guidance for girls before their puberty to handle their first menstrual period. Because, in today's scenario, most girls attained puberty in schools which leads to experiencing unnecessary fear, discomfort, and embarrassment in managing menstruation (13-16).

Previous studies have also shown that adolescent girls still need basic facilities with proper maintenance and hygienic manners (17,18). Hence, it is also necessary for the school administration including teachers to have awareness of the requirement of basic facilities especially for girls. In the real scenario, most of the schools are predominantly managed by male administrators (including teachers) and may be unaware of the girls' challenges in availing of basic facilities. This directly affects the girls both psychologically and physically (19-21). It may infer that more awareness programmes on menstrual education have to be conducted for society, particularly in the areas of providing knowledge on management and product usage in schools, and handling of physical and psychological disturbance from the environment. Empowering the knowledge about these factors will reduce their menstrual distress, school dropouts, school truant etc., which in turn

increase the self-confidence and self-efficacy of school-going girls (18).

It is observed that there is a lack of studies in the literature on how inadequate school facilities will affect the concentration of girls and how the girls manage their menstruation in such an uncomfortable environment with its impact on their self-efficacy and self-esteem. Also, there have been no proper studies found in the literature related to reducing cruel behaviourism of society on girls during their menstruation and improving self-confidence, and self-efficacy by the girls against such behaviourism through interventional programmes. Hence this study aims to improve menstrual hygiene management and psychological well-being (self-confidence, self-esteem, and self-efficacy) for adolescent girls. However, in the last two decades, there have been more number of publications related to studies on menstruation. However there are fewer reviews conducted using bibliometrics, and analysing systematic data to identify the state-of-the-art in the area of menstrual hygienic management at school levels to suggest for conducting more interventions periodically for future studies. The bibliometric analysis was conducted using CiteSpace 6.1.R6, a specialized software tool for exploring and mapping scientific literature. CiteSpace offers various functions such as Document Co-citation Analysis (DCA) to identify related studies based on citation patterns and Keyword Co-occurrence Analysis to reveal research trends. The software's temporal analysis capabilities were valuable for examining publication trends over time and assessing research growth in menstrual distress and self-efficacy. CiteSpace's visualization tools help create interactive maps of the literature, facilitating the interpretation of complex relationships between studies. The choice of CiteSpace was based on its comprehensive features and strong reputation in the academic community, providing a thorough understanding of the current research landscape in this field. In this bibliometric review, CiteSpace Software was used to analyse the published articles related to menstrual distress, and personality issues in the last 15 years (2008-2022) to know the widespread utilization of various approaches in treating menstrual distress worldwide.

Methodology

The objective of this review study is to explore the start of the artworks in the predominant key countries researching menstrual distress, and personality issues associated with adolescent girls. The study used the latest version of CiteSpace 6.1.R6 (64-bit) basic version software to conduct a bibliometric analysis of studies related to menstrual distress and related personality problems (self-efficacy).

Literature Search and Inclusion Criteria

The search and inclusion criteria: Figure 1, flow chart summarizes the overall process of the study, specifically the searching strategy and inclusion criteria of this study using CiteSpace software. The inclusion and exclusion criteria were as follows;

The analysis concentrated on English-language articles published in the Web of Science (WoS) core collection database, which includes Science Citation Index – Expanded (SCI-E), Social Sciences Citation Index (SSCI), and Arts and Humanities Citation Index (A&HCI), from 1989 to December 2022. The study encompassed articles, conference papers, and reviews, while excluding document types like editorials, meeting abstracts, book chapters, notes, book reviews, letters, biographical items, corrections, preprints, and retracted publications.

Implemented Search Strategy for Data Collection

The bibliometric data were collected from advanced search in the Web of Science (WoS) Core Collection, including Science Citation Index-Expanded (SCI-E), Social Sciences Citation Index (SSCI), and Arts and Humanities Citation Index (A and HCI). The data set was collected through the following strategies:

Search Strategy 1 (SET-I): (TS = (menstrual distress) OR TS = (distress) OR TS = (stress) OR TS = (menstruation). A total of 22, 31, 908 data were retrieved in this search strategy.

Search Strategy 2 (SET-II): (TS = (school girls) OR TS = (school performance). A total of 87,129 data were retrieved in this search strategy.

Search Strategy 3 (SET-III): (((TS = (self-efficacy)) OR TS = (efficacy)) OR TS = (self-concept)) AND TS = (coping strategies). A total of 3,616 data were retrieved in this searching strategy.

Strategy 4 (SET-IV): COMBINED SET-II and SET-III using OR Boolean. A total of 90,674 data were retrieved in this strategy. Finally,

Strategy 5 (SET-V): COMBINED SET-IV and SET-I using AND Boolean. A total of 6,739 data were retrieved in this final strategy.

A total of 6,739 data points were obtained by combining strategy 1 (SET-I) and strategy 4 (SET-IV) from 1989 to 2022 (retrieved since December 2022). According to the inclusion criteria, a total of 6,681 data points were found between 1989 and 2022. However, for the bibliometric analysis, only the most recent 15 years were considered, resulting in 4,974 data points for analysis and mapping. All data, including titles, authors, abstracts, keywords, and cited references, were imported into CiteSpace 6.1.R6 (64-bit), a Java-based bibliometric analysis software that incorporates a knowledge mapping tool for visualizing patterns and trends in scientific literature.

Visualization and analysis on Microsoft Excel 2013 and CiteSpace 5.7.R5 (64-bit) W were utilized for image processing. The bibliometric analyses encompassed document co-citation analysis (DCA), national distribution network, institutional analysis, and keyword analysis. The DCA feature in CiteSpace generates a matrix of cited references, which is then divided into co-citation clusters representing the intellectual foundation of the respective speciality (22). CiteSpace software, developed by Professor Chaomei Chen and his team (22), is a widely recognized computational mapping tool and visual citation analysis program used in multiple countries (23). It enables researchers to gain a global perspective of a specific field through bibliometric analysis and mapping techniques. CiteSpace incorporates various fundamental and temporal metrics for analyzing document co-citation references and generating clusters. These metrics include the Silhouette metric for structural analysis and Burst, and Sigma for temporal analysis. The Silhouette metric is valuable in assessing the uncertainty associated with identifying the nature of a cluster, with a range from -1 to 1(23-25). Additionally, the burst detection algorithm detects sudden and significant changes in events (26). The Sigma ($\sum$) value is utilized to measure the scientific novelty (23,24).
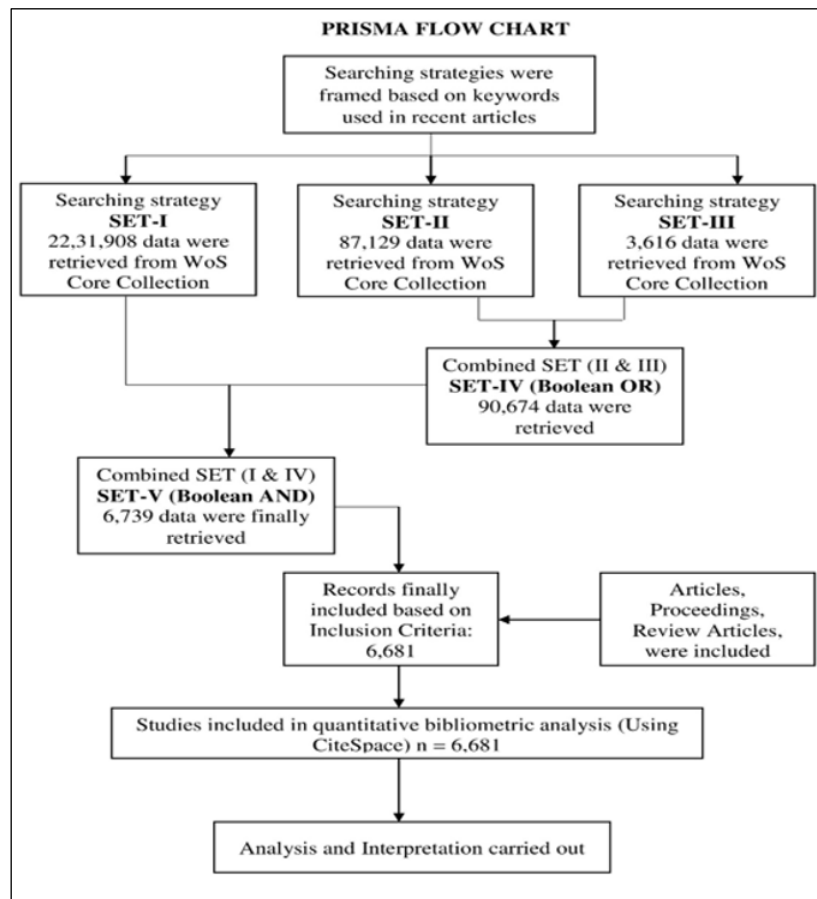
Figure 1: PRISMA

Results and Discussion

Distribution of Published Documents

Figure 2 illustrates that a total of 6,681 publications were examined annually, with 4,974 articles from the period 2008 to 2022 being analyzed in the bibliometric review. The distribution of yearly publications showed variation over time. Overall, there has been a significant rise in research interest regarding menstrual distress among adolescent girls in recent years, especially during the lockdown period (Refer to Figure 2).

Figure 2: Annual Publications
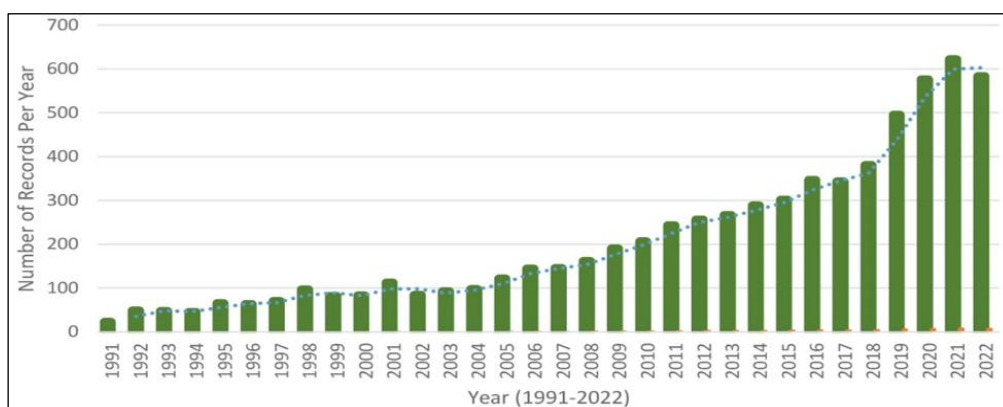
Distribution of Document Type

Based on the search strategy, the study included only three types of documents. Journal articles (6267, 93.80%) were the most prevalent, followed by review articles (414, 6.19%), and proceeding papers (126, 1.81%).

Distribution of Country and Institution

Figure 3 shows the top countries that published records from 2003 to 2022. The 4,974 records

were contributed by 140 different countries. Table 1 displays the top five countries with the highest number of publications: the USA (1675), England (397), China (394), Australia (340), and Germany (290). Colombia had the highest burst score (4.80), followed by Belgium (4.04), Malaysia (3.76), Nigeria (3.68), and Turkey (3.26). In terms of centrality, the USA had the highest score (0.66),

followed by England (0.22), Australia (0.16), Germany (0.11), and Spain (0.11). The country with the highest Sigma ($\sum$) value (1.15) was Colombia, followed by France (1.12), Saudi Arabia (1.09), Turkey (1.06), and Nigeria (1.06). Figure 3 illustrates the countries with the most citations on menstrual distress and self-efficacy of adolescent girls.
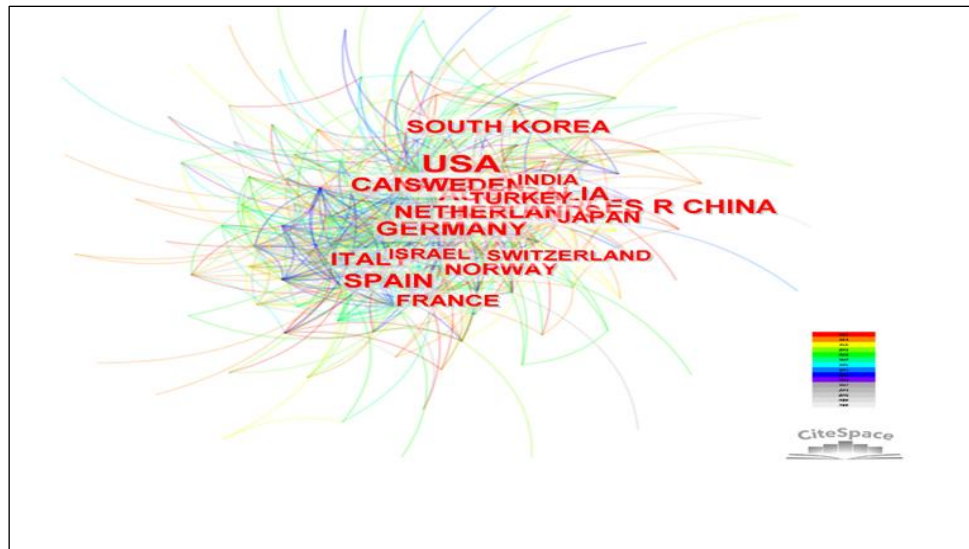

Figure 3: Countries

Table 1: The Top 10 Countries Published Records during the Period 2008-2022 on the Menstrual Distress and Self-Efficacy of Adolescent Girls

Rank	Publication	Country	Burst	Country	Centrality	Country	Sigma	Country
1	1675	USA	4.80	Colombia	0.66	USA	1.15	Colombia
2	397	England	4.04	Belgium	0.22	England	1.12	France
3	394	(PRC)China	3.76	Malaysia	0.16	Australia	1.09	Saudi Arabia
4	340	Australia	3.68	Nigeria	0.11	Germany	1.06	Turkey
5	290	Germany	3.26	Turkey	0.11	Spain	1.06	Nigeria
6	273	Canada	2.65	Hungary	0.08	Netherlands	1.05	Hungary
7	258	Spain	2.59	Sri Lanka	0.07	Canada	1.04	Belgium
8	194	Netherlands	2.47	Serbia	0.07	South Africa	1.02	Serbia
9	185	Sweden	2.32	Saudi Arabia	0.06	Italy	1.00	USA
10	167	South Korea	2.25	Greece	0.06	France	1.00	England

CiteSpace software was used to establish an institutional network, revealing that 5352 academic institutions were affiliated and published a total of 4,974 publications on research related to menstruation from 2008 to 2022. According to the records, the University of California system had the highest number of publications (234), followed by the University of London (154), Harvard University

(136), the Pennsylvania Commonwealth of Higher Education PCSHE (124), and the University of North Carolina (111). Figure 4 illustrates the institutions or organizations that have made significant contributions to the field of menstrual distress and related issues concerning adolescent girls.
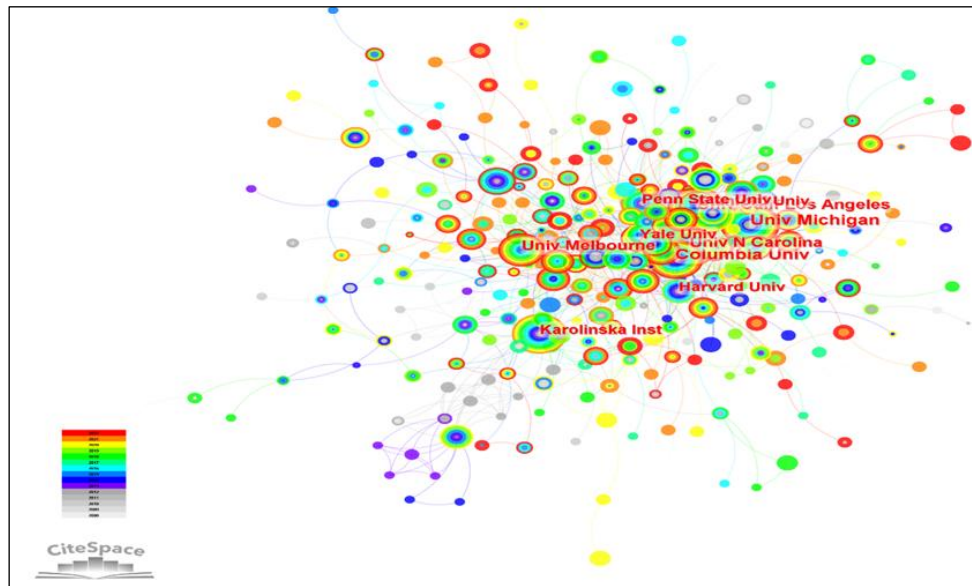
Figure 4: Institutions/Organizations

Distribution of Keywords

Figure 5 displays the keywords found in published records, which assist in identifying the current areas of focus in the field of study. The top 25 keywords based on their strength, as determined from the dataset obtained from the Web of Science (WoS), are listed in Figure 5 the keyword analysis provides a detailed overview of research trends from 2008 to 2022, showing a changing landscape with a growing interest in understanding the psychological impact of different factors. Initially, research focused on distress, life events, and psychopathology, with keywords like "distress" (9.72), "life event" (8.72), and "psychopathology" (8.05) being prominent between 2008 and 2010. Subsequently, the focus shifted towards memory, salivary cortisol, and oxidative stress, with keywords like "memory" (7.46), "salivary cortisol" (7.17), and "oxidative stress" (7.01) gaining importance. In more recent studies, there has been a focus on work engagement, posttraumatic growth, and mindfulness, with keywords like "work engagement" (6.85), "posttraumatic growth" (6.61), and "mindfulness" (5.82) becoming significant. Keywords related to specific populations and contexts, such as "women" (6.29), "diagnosis" (5.97), "nursing student" (5.82), and "family" (5.75), demonstrate a targeted approach in research to understand unique psychological experiences and challenges. The keyword analysis reveals a dynamic research landscape with changing priorities and a growing interest in understanding the psychological impact of various factors.

Keywords	Year	Strength	Begin	End	2008 – 2022
distress	2008	9.2	2010	2013	
life event	2008	8.72	2008	2010	
psychopathology	2008	8.05	2008	2010	
memory	2010	7.46	2010	2015	
salivary cortisol	2010	7.17	2010	2015	
oxidative stress	2014	7.01	2017	2019	
work engagement	2020	6.85	2020	2022	
posttraumatic growth	2016	6.61	2016	2018	
sport	2013	6.53	2013	2017	
life stress	2010	6.52	2010	2011	
women	2008	6.29	2009	2010	
diagnosis	2008	5.97	2008	2011	
mindfulness	2016	5.82	2020	2022	
nursing student	2018	5.75	2018	2022	
family	2008	5.7	2008	2011	
subjective health complaint	2014	5.67	2014	2017	
university student	2015	5.66	2018	2022	
school children	2010	5.58	2010	2015	
young adult	2014	5.54	2016	2019	
school age children	2010	5.51	2010	2014	
skill	2010	5.47	2017	2019	
stereotype threat	2012	5.38	2012	2014	
school student	2009	5.34	2009	2012	
maltreatment	2009	5.34	2009	2010	
temperament	2013	5.27	2013	2014	

Figure 5: The Top 25 Keywords

Document Co-Citation Analysis (DCA)

Figure 6 depicts the mapping view of cluster-based document co-citation analysis (DCA) with 4,974 articles analyzed for bibliometric purposes from 2008 to 2022. The analysis focused on the top 100 most cited articles each year, revealing 946 nodes and 2,666 links representing co-citation relationships in the dataset. CiteSpace's analysis divided the network into 16 clusters, with Table 2 presenting the five largest clusters and their top five citations for the 2008-2022 period. The network's overall average silhouette value is 0.9538, indicating strong cluster integrity. Table 2 also reveals that the contour values for the largest five clusters ranged from 0.894 to 0.978, indicating high homogeneity within each cluster.
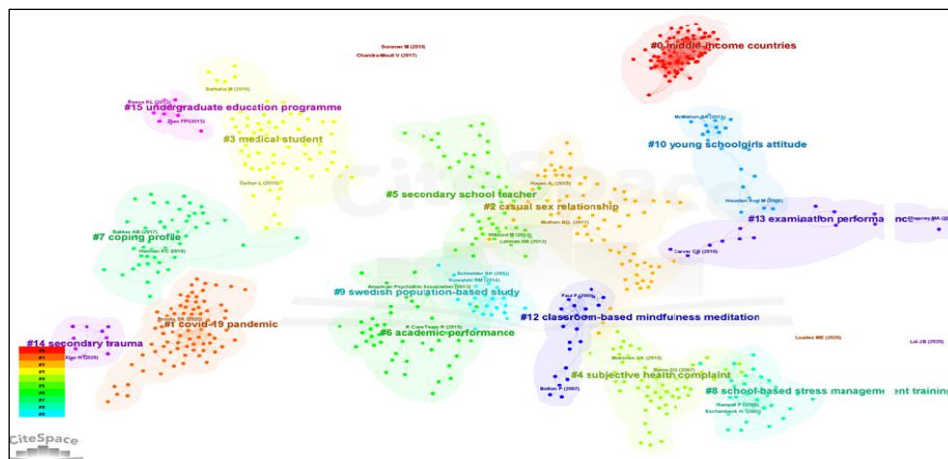

Figure 6: The Mapping View of Cluster-Based Document Co-Citation Analysis (DCA)

Table 2: The Five Largest DCA Clusters with Top-5 Most-Cited References Ranked By Citation Counts

Cluster #	Cluster Size	Silhouette Value	Mean (Year)	cc	Burst	σ	∑	DOI of Cited references
0	81	0.972	2015	40	9.75	0.01	1.07	10.1371/journal.pmed.1001962
				29	5.08	0.10	1.59	10.1371/journal.pone.0146985
				29	5.35	0.01	1.04	10.1186/s12978-017-0293-6
				27	6.55	0.00	1.02	10.1136/bmjopen-2015-010290
				26	8.61	0.01	1.05	10.1371/journal.pmed.1002803
1	79	0.894	2019	21	0.00	0.03	1.00	10.1016/S0140-6736(20)30460-8
				18	0.00	0.00	1.00	10.1016/j.jaac.2020.05.009
				16	0.00	0.00	1.00	10.1007/s00787-020-01541-4
				12	3.95	0.00	1.01	10.3390/ijerph17051729
				11	0.00	0.03	1.00	10.1016/j.psychres.2020.112934
2	79	0.954	2012	90	5.76	0.60	14.92	-
				32	14.14	0.06	2.31	-
				20	11.21	0.08	2.29	10.3758/BRM.40.3.879
				12	2.95	0.00	1.00	10.1016/S2468-2667(17)30118-4
				8	0.00	0.01	1.00	-
3	67	0.978	2016	13	0.00	0.02	1.00	10.1016/j.chb.2015.12.045
				13	4.94	0.02	1.09	10.1111/medu.12927
				11	5.53	0.00	1.01	10.1001/jama.2016.17324
				11	0.00	0.01	1.00	10.5498/wjp.v7.i1.60
				9	4.52	0.01	1.06	10.1186/s12909-016-0841-8
4	54	0.976	2008	15	7.51	0.10	2.00	10.1016/j.adolescence.2006.04.004
				12	6.81	0.03	1.26	10.1111/j.1467-8624.2007.00997.x
				12	6.09	0.12	2.02	10.1016/j.paid.2010.04.012
				8	4.53	0.02	1.08	10.1111/j.1651-2227.2007.00585.x
				7	3.74	0.01	1.02	10.1097/01.chi.0000242237.84925.18

Discussion

A bibliographic analysis of published studies on menstrual distress and related issues from 2008 to December 2022 was conducted using the current version of CiteSpace software [6.1.R6 (64-bit) Base]. The software effectively isolates datasets based on clusters, making the information easier to interpret. A total of 6,681 publications were identified, including 6,267 journal articles (93.80%), 414 review papers (6.19%), and 126 proceeding papers (1.81%). For the bibliometric analysis, 4,974 records from the period 2008 to 2022 were used. The publication trend for articles related to menstrual distress has shown an increase from 2017 to 2022. Recent articles have focused on the importance of maintaining body weight and promoting overall well-being through regular physical activity (27-30).

The study utilized bibliometric analysis to examine recent trends by analyzing the distribution of country, institution, keywords, and reference co-citation analysis (DCA). The findings reveal that the United States is the dominant contributor in terms of publication records (1675) and centrality (0.66), while Colombia stands out in terms of burst (4.80) and sigma (1.15). Furthermore, among the top-5 most productive institutions, four are from the United States. The University of California System leads with 234 publications, followed by the University of London (154), Harvard University, and Pennsylvania Commonwealth System of Higher Education (PCSHE; 124). Colombia, with a burst score of 4.80 and a Sigma score of 1.15, plays a significant role in menstrual distress-related studies, indicating a sudden outbreak of innovative research with scientific novelty. In the current trends, Burst keywords are seen as a sign of, and recent burst terms consist of 'distress', 'life event', 'psychopathology', 'memory' and 'salivary cortisol'. Oxidative stress, work engagement, life stress and stereotype are some additional keywords utilized in recent research, indicating that the temporal hypothesis centred on 'distress' has gained extensive acceptance and implies that

anxiety may develop in salivary cortisol regarding menstrual distress has recently risen.

According to bibliometric analysis using Document Co-citation Analysis (DCA), the main clusters consist of middle-income countries (#0), the covid-19 pandemic (#1), casual sex relationships (#2), medical students (#3), and subjective health complaint (#4). Table 2 presents a summary of cluster size, silhouette value, average year, citation count (CC), centrality (σ), citation burst, sigma value (∑), and DOI number of trend-setting citation references. 'The cluster of middle-income countries (#0) focused on researching Menstrual Hygiene Management (MHM) in low and middle-income countries, such as India (31-34). A recent meta-analytic study conducted by demonstrated the importance of educating adolescent girls about menstrual hygiene and health to maintain their well-being and healthy habits. The study also highlighted the potential for preventing reproductive system infections and their consequences by promoting awareness and safe menstrual practices among adolescent girls (17). The COVID-19 pandemic was the second-largest cluster (#1), and the silhouette value of 0.894 indicated a high level of homogeneity. Cluster #1 primarily focused on the psychological impact of the Covid-19 pandemic on students in different countries. The top five references cited in cluster #1 specifically examined immediate psychological responses and related factors (such as menstrual distress) during the initial phase of Covid-19 and emphasized the need to monitor mental health among college students during and after the pandemic (35,36). In the third cluster (normative sex, #2) researchers have focused more on the theoretical background of mediation and moderation related to marital and menstrual distress (37) and have identified the deleterious effects of adverse childhood experiences (ACEs). Childhood or adolescence. A subsequent study revealed that having multiple ACEs significantly increases the likelihood of various health issues in children and college students. Specifically, violence, mental illness, and substance abuse are particularly linked to experiencing multiple adverse childhood experiences, which can pose risks for future generations (38).

In document co-citation analysis (DCA), the fourth and fifth-largest cluster consists of *medical* students (#3) and subjective health complaints (#4). The medical student Cluster (#3) primarily examines perceived stress (39), depressive and suicidal thoughts (40), smartphone addiction (41), burnout, and other types of distress experienced by medical students throughout their career stages (42,43). Additionally, the research has emphasized the identification of health and psychosocial issues linked to being a victim of bullying (20-21, 44). Followed by, the fifth-largest group primarily addressed health-related issues experienced by teenagers, including stress and emotional distress (45,46) low self-esteem, recurring abdominal pain, headaches, and psychosomatic pain. Additional clusters of research were centred on studies that focused on interventions for adolescent girls and their experiences of distress and other psychosomatic issues associated with menstruation (47,48). This review examined the global perspective on menstrual distress and related issues among adolescent girls from 2008 to 2022. Out of the 4,974 publications collected from the Web of Science (WoS), over half were published in the past five years (2017-2022). The number of studies steadily increased during and after the COVID-19 pandemic, emphasizing the significance of menstrual distress. Research on menstrual distress and self-efficacy among adolescent girls is a global concern, with a significant amount of research concentrated in high-income countries. However, there is a lack of research from low- and middle-income countries, despite the pressing need for studies addressing the unique challenges faced by adolescent girls in these regions. This geographical imbalance underscores the importance of more inclusive research efforts that consider diverse cultural, social, and economic contexts influencing menstrual health. By expanding the focus to include underrepresented regions, researchers can gain a more comprehensive understanding of the global impact of menstrual distress and self-efficacy, leading to more targeted interventions for adolescent girls worldwide. Emphasizing geographical diversity not only highlights existing gaps in the literature but also calls for collaborative initiatives to address these disparities and promote equitable research practices in menstrual health (48).

Conclusion

The connection between menstrual distress and self-efficacy suggests that higher levels of menstrual distress can have a negative impact on

an adolescent girl's self-efficacy. Distress, which includes physical symptoms and psychological factors, can erode confidence in managing menstrual health. On the other hand, higher self-efficacy can serve as a protective factor, helping adolescent's better cope with menstrual challenges and reducing distress. This relationship is likely reciprocal; increased distress can decrease self-efficacy, and low self-efficacy can worsen distress, creating a cycle that further diminishes confidence. Recognizing this connection is essential for developing interventions that boost self-efficacy and alleviate menstrual distress, ultimately improving health outcomes for adolescent. There was a shortage of research that specifically addressed personality-related issues such as self-esteem, self-concept, and self-efficacy. While Colombia made notable contributions to this field, academic institutions in the US held a dominant position. Some meta-analysis studies were conducted in developing countries, particularly India. Nevertheless, there was a scarcity of intervention-based studies in low-middle-income countries. Through document co-citation analysis (DCA), it became evident that menstrual hygiene and health education played a vital role in promoting healthy habits among adolescent girls. Some evidence suggested a link between psychosomatic pain and menstrual distress, but this relationship was seldom explored in relation to self-efficacy and distress among adolescent girls. Further research is necessary to explore new directions and innovative interventions in this field in the future.

Abbreviations

DCA: Document co-citation analysis, WoS: Web of Science, MHM: Menstrual Hygiene Management, SCI-E: Science Citation Index – Expanded, SSCI: Social Sciences Citation Index, A and HCI: Arts and Humanities Citation Index, CC: citation count.

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Author Contributions

Both authors contributed equally.

Conflict of Interest

The content of the article is reliable, and the authors are accountable for it. They collaborate without any conflicts of interest.

Ethics Approval

There is no need for ethical approval for this work.

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References

1. Center for Women's Mood Disorders. Menstrually Related Mood Disorders. Chapel Hill (NC): University of North Carolina; 2024. https://www.med.unc.edu/psych/wm d/resources/mood- disorders/menstrually-related/.
2. Artino AR. Academic self-efficacy: from educational theory to instructional practice. Perspectives on Medical Education. 2012 Apr 11; 1(2):76–85.
3. Belayneh Z and Mekuriaw B. Knowledge and menstrual hygiene practice among adolescent school girls in southern Ethiopia: a cross-sectional study. BMC public health. 2019 Dec;19:1-8.
4. Sissons B. Hormonal imbalance and depression: What to know. 2022.https://www.medicalnewstoda y.com/articles/hormonal-depression.
5. Caprara M, Di Giunta L, Bermúdez J, Caprara GV. How self-efficacy beliefs in dealing with negative emotions are associated to negative affect and to life satisfaction across gender and age. PloS one. 2020 Nov 18;15(11):e0242326.
6. Asgari S, Alimoardi Z, Soleimani MA, Allen KA, Bahrami N. The effect of psychoeducational intervention, based on a self-regulation model on menstrual distress in adolescents: a protocol of a randomized controlled trial. Trials. 2020 Dec; 21: 1-8.
7. Cobham B, Patton L. Self-Will, Power, and Determination: A Qualitative Study of Black Women Faculty and the Role of Self- Efficacy. NASPA J Women Higher Educ. 2015; 8 (1):29-46. doi:10.1080/19407882.2014.987084
8. Hunter EC, Murray SM, Sultana F, Alam MU, Sarker S, Rahman M, Akter N, Mobashara M, Momata M, Winch PJ. Development and validation of the Self-Efficacy in Addressing Menstrual Needs Scale (SAMNS-26) in Bangladeshi schools: A measure of girls' menstrual care confidence. PloS one. 2022 Oct 6;17(10):e0275736.
9. Martinek D, Kipman U. Self-determination, self-efficacy and self-regulation in school: A longitudinal intervention study with primary school pupils. Sociology Study. 2016 Feb;6(2):124-33.
10. World Bank. World Development Report 2019: The Changing Nature of Work. World Bank. 2019. https://www.worldbank.org/en/publication/wdr2 019
11. Sahiledengle B, Atlaw D, Kumie A, Tekalegn Y, Woldeyohannes D, Agho KE. Menstrual hygiene practice among adolescent girls in Ethiopia: a systematic review and meta-analysis. PloS one. 2022 Jan 4; 17(1):e0262295.
12. UNICEF. Girls' education. New York: UNICEF; 2019. https://www.unicef.org/education/girls-education
13. Coast E, Lattof SR, Strong J. Puberty and menstruation knowledge among young adolescents in low-and middle-income countries: a scoping

review. International journal of public health. 2019 Mar 1;64:293-304.

14. Fennie T, Moletsane M, Padmanabhanunni A. Adolescent girls' perceptions and cultural beliefs about menstruation and menstrual practices: A scoping review. African Journal of Reproductive Health. 2022 Apr 25; 26(2):88-105.

15. Hennegan J, Montgomery P. Do menstrual hygiene management interventions improve education and psychosocial outcomes for women and girls in low and middle-income countries? A systematic review. PloS one. 2016 Feb 10;11(2):e0146985.

16. Eckert-Lind C, Busch AS, Petersen JH, Biro FM, Butler G, Bräuner EV, Juul A. Worldwide secular trends in age at pubertal onset assessed by breast development among girls: a systematic review and meta-analysis. JAMA paediatrics. 2020 Apr 1; 174(4):e195881.

17. Majeed J, Sharma P, Ajmera P, Dalal K. Menstrual hygiene practices and associated factors among Indian adolescent girls: a meta-analysis. Reproductive health. 2022 Jun 23;19(1):148.

18. Phillips-Howard PA, Caruso B, Torondel B, Zulaika G, Sahin M, Sommer M. Menstrual hygiene management among adolescent schoolgirls in low-and middle-income countries: research priorities. Global health action. 2016 Dec 1; 9(1):33032.

19. Klomek AB, Marrocco F, Kleinman M, Schonfeld IS, Gould MS. Bullying, depression, and suicidality in adolescents. Journal of the American Academy of Child & Adolescent Psychiatry. 2007 Jan 1;46(1):40-9.

20. Kowalski RM, Giumetti GW, Schroeder AN, Lattanner MR. Bullying in the digital age: a critical review and meta-analysis of cyberbullying research among youth. Psychological bulletin. 2014 Jul;140(4):1073.

21. Moore SE, Norman RE, Suetani S, Thomas HJ, Sly PD, Scott JG. Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. World journal of psychiatry. 2017 Mar 3;7(1):60.

22. Chen C. Science mapping: a systematic review of the literature. Journal of data and information science. 2017 Mar 21; 2(2):1-40.

23. Karim MA and Venkatachalam J. Global trends on studies with cognitive training: Mapping and bibliometric analysis using CiteSpace. Cognition, Brain, Behavior. An Interdisciplinary Journal. 2021 Dec 29; 25(4):311-40.

24. Chen C, Chen Y, Horowitz M, Hou H, Liu Z, Pellegrino D. Towards an explanatory and computational theory of scientific discovery. Journal of Informetrics. 2009 Jul 1; 3(3):191-209.

25. Rousseeuw PJ. Silhouettes: a graphical aid to the interpretation and validation of cluster analysis. Journal of computational and applied mathematics. 1987 Nov 1; 20:53-65.

26. Kleinberg J. Bursty and Hierarchical Structure in Streams. Proc ACM SIGKDD Int Conf Knowl Discov Data Min. 2002; 7:91-100. doi:10.1145/775047.775061.

27. Miiro G, Rutakumwa R, Nakiyingi-Miiro J, Nakuya K, Musoke S, Namakula J, Francis S, Torondel B, Gibson LJ, Ross DA, Weiss HA. Menstrual health and school absenteeism among adolescent girls in Uganda

28. Teixeira AL, Oliveira ÉC, Dias MR. Relação entre o nível de atividade física e a incidência da síndrome pré-menstrual. Revista Brasileira de Ginecologia e Obstetrícia. 2013;35:210-4.

29. Critchley HO, Babayev E, Bulun SE, Clark S, Garcia-Grau I, Gregersen PK, Kilcoyne A, Kim JY, Lavender M, Marsh EE, Matteson KA. Menstruation: science and society. American journal of obstetrics and gynecology. 2020 Nov 1;223(5):624-64.

30. Dars S, Sayed K, Yousufzai Z. Relationship of menstrual irregularities to BMI and nutritional status in adolescent girls. Pakistan journal of medical sciences. 2014 Jan; 30(1):141.

31. Chandra-Mouli V, Patel SV. Mapping the knowledge and understanding of menarche, menstrual hygiene and menstrual health among adolescent girls in low- and middle-income countries. The Palgrave handbook of critical menstruation studies. 2020;14(1):609-36.

32. Hennegan J, Shannon AK, Rubli J, Schwab KJ, Melendez-Torres GJ. Women's and girls' experiences of menstruation in low-and middle-income countries: A systematic review and qualitative metasynthesis. PLoS medicine. 2019 May 16;16(5):e1002803.

33. Sommer M, Caruso BA, Sahin M, Calderon T, Cavill S, Mahon T, Phillips-Howard PA. A time for global action: addressing girls' menstrual hygiene management needs in schools. PLoS medicine. 2016 Feb 23; 13(2):e1001962.

34. Van Eijk AM, Sivakami M, Thakkar MB, Bauman A, Laserson KF, Coates S, Phillips-Howard PA. Menstrual hygiene management among adolescent girls in India: a systematic review and meta-analysis. BMJ open. 2016 Mar 1;6(3):e010290.

35. Cao W, Fang Z, Hou G, Han M, Xu X, Dong J, Zheng J. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry research. 2020 May 1; 287:112934.

36. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. International journal of environmental research and public health. 2020 Mar;17(5):1729.

37. Preacher KJ and Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior research methods. 2008 Aug; 40(3):879-91.

38. Hughes K, Bellis MA, Hardcastle KA, Sethi D, Butchart A, Mikton C, Jones L, Dunne MP. The effect of multiple adverse childhood experiences on health: a systematic review and meta-analysis. The Lancet public health. 2017 Aug 1; 2(8):e356-66.

39. Heinen I, Bullinger M, Kocalevent RD. Perceived stress in first year medical students-associations with personal resources and emotional distress. BMC medical education. 2017 Dec; 17:1-4.

40. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, Sen S, Mata DA. Prevalence of depression, depressive symptoms, and suicidal ideation among

(MENISCUS): a feasibility study. BMC women's health. 2018 Dec;18:1-3.

medical students: a systematic review and meta-analysis. Jama. 2016 Dec 6; 316(21):2214-36.

41. Samaha M and Hawi NS. Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. Computers in human behavior. 2016 Apr 1; 57:321-5.

42. Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, Shanafelt TD. Burnout among US medical students, residents, and early career physicians relative to the general US population. Academic medicine. 2014 Mar 1; 89(3):443-51.

43. Byrne DG, Davenport SC, Mazanov J. Profiles of adolescent stress: The development of the adolescent stress questionnaire (ASQ). Journal of adolescence. 2007 Jun 1;30(3):393-416.

44. Moksnes UK, Moljord IE, Espnes GA, Byrne DG. The association between stress and emotional states in adolescents: The role of gender and self-esteem. Personality and individual differences. 2010 Oct 1;49(5):430-5.

45. Hjern A, Alfven G, Östberg V. School stressors, psychological complaints and psychosomatic pain. Acta paediatrica. 2008 Jan;97(1):112-7.

46. Zenner C, Herrnleben-Kurz S, Walach H. Mindfulness-based interventions in schools—a systematic review and meta-analysis. Frontiers in psychology. 2014 Jun 30;5:603.

47. Shapiro MA and Nguyen ML. Psychosocial stress and abdominal pain in adolescents. Mental health in family medicine. 2010 Jun;7(2):65.

48. Grigorian K, Östberg V, Raninen J, Åhlén J, Låftman SB. Prospective associations between psychosomatic complaints in adolescence and depression and anxiety symptoms in young adulthood: a Swedish national cohort study. SSM-Population Health. 2023 Dec 1; 24:101509.