Menstrual Disorders and Occupational Performance in Women: A Comprehensive Review

Abstract

Background:

Menstrual disorders are common among working women and are increasingly recognized as factors impacting occupational performance. Despite their prevalence, these conditions remain under-researched and stigmatized in workplace discussions.

Objective:

This review aims to explore the association between menstrual disorders and women's workforce participation, productivity and job performance while identifying workplace factors that mediate or exacerbate this impact.

Methods:

A systematic review was conducted using the Matrix Method of Garrard. Electronic databases including PubMed, Scopus, Web of Science, CINAHL, PsycINFO and Embase were searched for studies published in English between 2019 and 2025. The inclusion criteria encompassed observational and qualitative studies examining menstrual health and occupational outcomes. A total of 7,440 records were identified, 21 studies met the inclusion criteria after applying the PRISMA framework. The STROBE checklist was used for quality assessment.

Results:

The review reveals consistent evidence that menstrual disorders significantly affect workforce participation, leading to increased absenteeism, presenteeism, and reduced work productivity. For instance, moderate to severe dysmenorrhea was associated with a 50% higher likelihood of poor workability. PMS and PMDD were linked to lower job performance and daily functioning. Workplace support, access to menstrual hygiene resources, and flexible policies showed mitigating effects, while stigma and lack of infrastructure worsened outcomes, particularly in low-resource settings.

Conclusion:

Menstrual health must be integrated into workplace health and policy planning. Supportive environments, flexible scheduling, and routine screening can enhance productivity and well-being among menstruating employees. Further research is required to address existing gaps and expand inclusion of informal workers and non-binary populations.

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Keywords: Menstrual disorders, Occupational performance, Work productivity, Dysmenorrhea, Premenstrual syndrome (PMS), Workplace health policies

INTRODUCTION:

Worldwide, menstruating women experience several challenges managing their periods, especially those who are deprived from clean and hygienic environments that are not supportive of menstrual health. Menstrual health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity in relation to menstruation (Hennegan et al., 2021). According to WHO and UNICEF, adequate menstrual health is the incorporation of awareness, self-confidence and information regarding menstrual hygiene besides the provision of safe, hygienic and absorbent materials or products, clean facilities equipped with water and soap and a supporting environment that allows women and girls for the management of periods exclusive of embarrassment (JMP, 2015; Sommer & Caruso, 2015).

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The regular menstrual cycle that is counted from the first day of one menstrual period to the first day of the next cycle is around 21 to 35 days and usually lasts from 3 to 7 days with exact loss of 5-80 ml blood volume (Sharma et al., 2016). Thus, any deviation from the normal pattern or any kind of alterations in the regularity or frequency of onset or duration of flow in addition to the volume of blood loss are referred to as menstrual irregularity (Larramendy & Soloneski, 2017; Mahmood & Jabeen, 2013). Approximately, 70 to 80% of women do not face any problem in continuing their daily activities before and during menstruation but 20 to 30% experience moderate to severe pre-menstrual syndrome (PMS) (Maity et al., 2022). Period pain or dysmenorrhea is the pain that is experienced just prior to or during menstruation (Chen et al., 2018, Armour et al., 2019). Such condition may influence the physical and mental abilities of 95% of menstruating individuals and is conventional across the boundaries of nationality, religion, ethnicity and socio-economic status (Berkley, 2013; Iacovides et al., 2015; Bernardi et al., 2017). Concerns regarding menstrual cycle can negatively impact the quality of life and career continuance of women including the disadvantages of the hiring process and increase of the healthcare costs (Maity et al., 2022; Grandey et al.,2020; Price H, 2022). Dysmenorrhea has been reported to affect women's life with interferences in interpersonal relationships (Iacovides et al., 2014; Unsal et al., 2014; Fernández et al., 2019). Heavy menstruation has been linked to reduced quality of life and enhanced healthcare utilization (Tanaka et al., 2013, Liu et al., 2007). Menstruation is a natural biological process experienced by a significant portion of the workforce. However, its impact on employee productivity has been largely under-researched and often stigmatized in workplace discourse. Studies have shown that menstrual symptoms such as pain, fatigue, and mood changes can significantly hinder daily

functioning and job performance (Schoep et al., 2019). These challenges can be exacerbated in workplaces that lack supportive policies or open communication around menstrual health.

Job satisfaction and workplace support are two critical factors that have been widely linked to employee well-being and productivity. Job satisfaction is a positive emotional state resulting from one's job or job experiences, and it has been shown to influence both motivation and performance outcomes (Locke, 1976; Judge et al., 2001). In contexts where menstruation affects an employee's functioning, supportive workplace environments, including flexible scheduling, empathetic leadership, and accessible menstrual products may buffer the negative impact of menstrual symptoms (van Eijk et al., 2019).

Recent research highlights the importance of workplace culture and accommodations in reducing absenteeism and presenteeism related to menstrual health (Johnston & Chrisler, 2013). When employees feel supported and satisfied with their work environment, they may be more likely to manage menstrual symptoms effectively without experiencing significant declines in productivity. Therefore, exploring the relationship between job satisfaction, workplace support, and menstruation-related productivity loss can offer valuable insights for developing inclusive workplace policies.

METHODS:

Search Method

The matrix method of Garrard was utilized for performing this review (Garrard, 2011). This method enables a structured process to expedite a systemic distinguish of various studies on a specific topic in systematic reviews. Measures taken for the conduction of the study were as follows: systematic literature search, organization of documents for the review, abstracting each document and finally writing of the literature.

Objective

It examines the association between menstrual disorders and women's participation in workplaces.

Search Strategy and databases

A systematic search was done using PubMed, Embase, CINAHL, PsycINFO, Web of Science, and Scopus databases. Studies that proclaimed the association between menstrual disorders and workforce participation of women were included. The search strategy was developed to comprehend articles published from 2019 to 2025. The literature search was restricted to

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articles that are only written in English. Medical Subject Heading (MeSH) terms and keywords were used to search for relevant studies.

Eligibility criteria and study selection

This review comprises of original research studies except randomized controlled trials. Studies that reported findings on association of menstrual disorders and women's participation in the workforce were considered. Qualitative studies were also included. However, the studies that involved students, letters to the editor and unpublished or grey literature were excluded.

Outcome Measurements

The review measures workforce participation using work outcomes inclusive of work absenteeism, work productivity, work performance, employment and work impairment.

Data Extraction

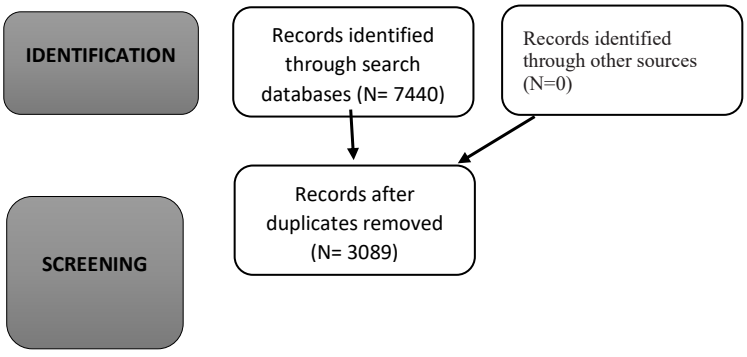
Data extraction was performed independently. A pre-designed form enabled the extraction of data regarding year, name, methodology, location, number of participants and findings of the study.

Quality Assessment

To examine the quality of the studies, the STROBE tool was used in accordance with the nature of studies. STROBE tool in research is "Strengthening the Reporting of Observational Studies in Epidemiology", a set of 22 items for the evaluation of different sections of observational studies. STROBE checklists were used for the improvement of the quality of observational studies.

Data Synthesis

After screening, evaluation of inclusion criteria and assessment of the quality of studies is done and extraction of data was carried out. The final synthesis of findings was performed to manufacture the findings. The findings were presented on the basis of data classification from the studies.



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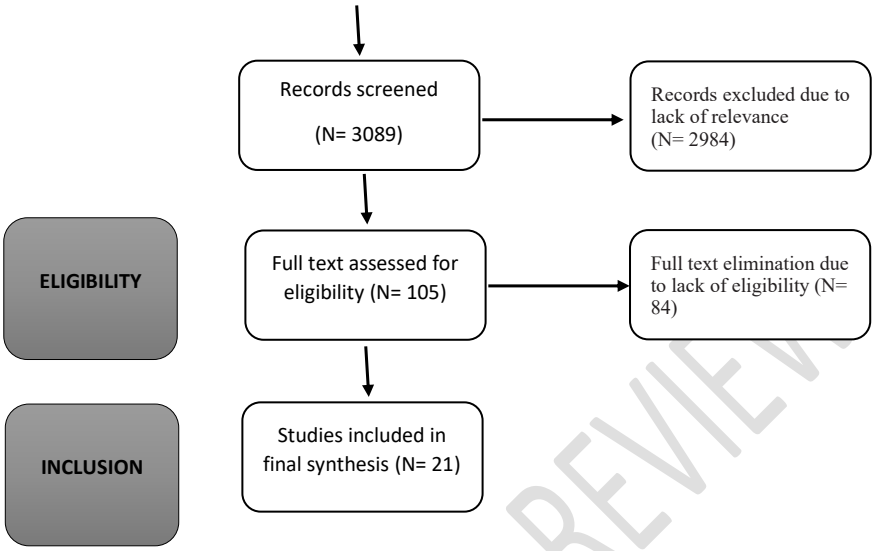

FIG 1: PRISMA FLOW DIAGRAM

FINDINGS:

Study description

The systematic review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure a rigorous and transparent study selection process. A total of 3,180 records were initially identified through searches of electronic databases. No additional records were obtained from other sources. After the removal of duplicates, 3,089 unique records remained and were subjected to title and abstract screening. Of these, 2,984 records were excluded due to a lack of relevance to the research topic. The remaining 105 articles were retrieved for full-text assessment to determine their eligibility based on the inclusion and exclusion criteria defined for the review. Following a detailed evaluation, 84 full-text articles were excluded as they did not meet the eligibility requirements. Ultimately, 21 studies were found to be suitable and were included in the final synthesis. This process ensured that only the most relevant and methodologically sound studies were incorporated into the review.

Quality Assessment

An evaluation of the included studies using the STROBE checklist revealed that, overall, the methodological quality was moderate. Many of the studies showed notable shortcomings, particularly in areas such as addressing potential sources of bias, explaining how sample sizes were determined, clearly describing quantitative variables, and openly acknowledging the limitations of their research. Figure 1 provides a visual overview of the quality assessment results, while Table 1 presents a detailed breakdown of how each study performed against the specific STROBE checklist criteria.

Table 1 : **Impact of Menstrual Health on Work Productivity and Well-Being: A Global Overview of Recent Studies**

NO.	***AUTHOR/ YEAR***	***STUDY DESIGN***	***COUNTRY***	***NO. OF PARTICIPANTS***	***AGE GROUP***	***RESULTS***
1.	Fooladi E, 2023	Cross-sectional	Australia	3555	18-39 years	44.2% reported moderate to severe dysmenorrhea; 21.8% reported heavy bleeding. Dysmenorrhea was associated with a 50% higher likelihood of poor workability and double the risk of absenteeism.
2.	Zhaoqiang Jiang, 2019	Cross-sectional	China	1300	Not specified	41% of nurses reported menstrual disorders. Key occupational risk factors included disinfectant exposure (OR = 1.53), abnormal workload (OR = 1.28), and being a nurse (OR = 1.28). Noise, night

						work, heavy lifting, anticancer drugs, and overtime also showed moderate associations.
3	Biresaw Wassihun Alemu, 2025	Cohort	Australia	11,152	22–48 years	Premenstrual tension was linked with lower odds of working part-time vs full-time (AOR = 0.74), especially in women aged 31–40 (AOR = 0.68). Irregular periods were linked with higher odds of part-time work overall (AOR = 1.32), but lower in women aged 22–30 (AOR = 0.61). Severe period pain increased odds of unemployment, especially among women aged 41+ (AOR = 1.19).
4.	Osborne et al., 2025	Cross-sectional survey	Norway	2,059	13–50 years (grouped: 13–20, 21–30, 31–50)	51.6% reported current hormonal contraceptive (HC) use, highest among women aged 21–30 (62.7%). No significant difference in HC use across

						training categories. HC users reported fewer and less severe menstrual symptoms. Among non-HC users, 30.8% reported menstrual disorders/disturbances, with no significant differences across age or training categories.
5	Kim et al., 2025	Cross-sectional survey	South Korea	13,943	15–45 years	Prevalence of polymenorrhea: 3.1%, oligomenorrhea: 9.0%, and menorrhagia: 5.4%. Key risk factors: underweight and smoking for polymenorrhea; overweight, obesity, alcohol use, depression, and stress for oligomenorrhea; and depression for menorrhagia. The study emphasizes the significant impact of lifestyle and

						psychosocial factors on menstrual health in Korean women.
6.	Loukzadeh Z, Eslamy N, Dehghan M, Mehrparvar AH / 2024	Cross-sectional study	Iran	358	18–51 years	33.8% had PMS/PMDD. Teachers had higher prevalence (41%) than workers (24.7%). PMS significantly reduced work productivity, ADL ability, and functional capacity. PMDD showed the worst outcomes. Education and stress linked.
7.	Osamu Yoshino, Noriko Takahashi & Yoshimi Suzukamo (2022)	Prospective observational study	Japan	397	Adult women	Dysmenorrhea significantly reduced HRQL and work productivity. LEP group (n=251) showed significant improvements in menstrual symptoms, HRQL (mental and 7/8 SF-36 domains), and work productivity. Non-LEP group (n=146) showed no significant change.

8.	Schoep ME et al. / 2019	Cross-sectional survey	Netherlands	32,748	15–45 years	13.8% reported absenteeism (mean 1.3 days/year); 80.7% reported presenteeism (mean 23.2 days/year, 33% reduced productivity = 8.9 lost days/year). Women <21 years more likely to report absenteeism. 67.7% wished for more flexibility at work/school.
9.	Koh S., Okawara M., Hirashima K. et al. / 2025	Cross-sectional survey	Japan	3,332	Working women	Higher severity of menstrual-related symptoms was significantly associated with greater levels of presenteeism. Poisson regression showed a trend of increasing work impairment with symptom severity ($P < 0.001$).
10.	Okamoto M., Matsumura K., Takahashi A. et al. / 2024	Cross-sectional study	Japan	238 (eligible women)	Working women	Relative presenteeism significantly decreased in women with severe PMS and menstrual symptoms. Mean

						presenteeism scores: 91% (no symptoms), 69% (PMS only), 76% (menstruation only), and 69% (both). Severe PMS had a strong negative impact on work performance ($p < 0.01$).
11.	Tahara Y., Okawara M., Hirashima K. et al. / 2025	Cross-sectional study	Japan	19,451	20–60 years	47.1% reported heavy menstrual bleeding (HMB). HMB was significantly associated with increased presenteeism. Prevalence ratios for HMB and presenteeism were 1.38 (age-adjusted) and 1.35 (multivariable). Higher SAMANTA scores correlated with greater productivity loss.
12.	Mardon A.K., White S., Howe D. et al. / 2024	Cross-sectional survey	Australia	1,238	Median age: 33 yrs; subgroups: 18–24	77% reported bothersome menstrual symptoms; 44% reported missed work/study days.

					and 35–44 years	Younger women (18–24) more affected than older (35–44). Estimated national economic burden was AUD $14.2 billion annually due to menstrual symptoms.
13	Poonam Bharti et al. (2019)	Cross-sectional study	India	493 female HCPs	20–50 years	Prevalence of PMS was 51.3%. PMS severity was significantly associated with worsened Quality of Life (QoL) ($p < 0.001$). Significant associations with QoL were also found for age, occupation, marital status, regularity of menstrual cycles. Women with severe PMS had poorer QoL. Physiotherapists, unmarried women, and those with irregular cycles showed higher mean QoL scores

						(indicating poorer QoL).
14.	Prerna Maheshwari et al. (2023)	Cross-sectional study	India (Kochi)	600 working women	Not specified	PMS prevalence was 48%. Among those with PMS, 35% had a lower quality of work life (QWL) ($p < 0.001$). PMS was significantly associated with highest education, occupation, and sexual activity. Study calls for workplace policies to improve women's QWL and address menstruation-related challenges.
15.	Julie Hennegan et al. (2022)	Cross-sectional survey	Uganda	525 (435 market workers, 45 teachers, 45 health workers)	Not specified	15% missed work due to their last period; 41% preferred not to work during menstruation. Menstrual pain, use of improvised materials, lack of workplace openness, and cultural norms were significantly associated with absenteeism. Unmet needs, poor social support, and pain

						were linked to lower psychological wellbeing (WHO-5). Study stresses need for supportive policies and menstrual care at work.
16.	Al-harbi A. S., Alrahili M., Al-harbi S. S. (2019)	Cross-sectional observational survey	Saudi Arabia (Princess Nourah bint Abdulrahman University, Riyadh)	395 completed surveys analyzed (500 distributed, 79% response rate)	20–34 yrs (32%, 125); 35–44 yrs (53%, 211); 45–54 yrs (14%, 55); 55–64 yrs (1%, 4)	95% reported decreased physical activity during menstruation, 67% had back pain, 33% abdominal pain,47% felt depressed,60% felt focus/concentration was not decreased, 59% said performance differed little,73% never requested vacation due to period pain; 36% never asked leave,73% didn't require assistance from colleagues,50% used Panadol, 66% used herbs, 10% used water bags to manage pain
17.	Armour M. et al. (2020)	Cross-sectional online	Australia	4,202 adolescent &	aged 13–25 years	Dysmenorrhea prevalence: 92% reported menstrual

		survey via Qualtrics (Nov 2017–Jan 2018)		young women		pain at a moderate intensity (median 6/10), with no significant change across age (rs = 0.012, P = .477) Nearly 50% missed at least one class/lecture in the past three periods; 77% at school and 70% in tertiary education reported concentration problems during menstruation
18.	Nishikitani et al., 2017	Cross-sectional	Japan	505	23–43 years	Short work-rest intervals (<11 hours) were associated with higher anxiety and health dissatisfaction; menstrual irregularities were more frequent but influenced more by biological than psychosocial factors.
19.	Krenz & Strulik, 2019	Observational (Propensity Score Matching)	Burkina Faso	3556 females	15 to 49 year	Access to disposable sanitary pads significantly reduced work absenteeism by ~21 percentage points; effect was significant among Muslim women but not Christian women.
20.	Priyadharshini & Hemalatha, 2024	Descriptive	India	126	18–44 years	Menstrual-related symptoms were significantly and negatively correlated with contextual (ρ = -0.288, p = 0.001)

						and task performance (ρ = -0.176, p = 0.048) among female IT employees. Severity of symptoms led to a measurable decline in job performance.
21.	Czura, Menzel & Miotto, 2023	Randomized Controlled Trial	Bangladesh	~1,900	Adult women (age not specified)	Free pad provision and hygiene education improved menstrual hygiene practices and reduced taboo adherence. However, no significant effects were found on absenteeism, worker turnover, or self-reported well-being at work.

Discussion :

This review gathers evidence from 21 studies across varied socio-cultural and economic contexts for evaluating the relationship between menstrual disorders and occupational performance of women. The findings consistently indicate that menstrual disorders that include dysmenorrhea and premenstrual syndrome (PMS) are significantly associated with loss of work productivity, increased absenteeism and impaired job performance.

Dysmenorrhea surfaced as a particularly disruptive factor. Moderate to severe dysmenorrhea increased the pausability of poor workability by 50% and increased the risk of absenteeism among Australian women (Fooladi et al, 2023). Similar trends were resonated where dysmenorrhea significantly reduced both health-related quality of life and productivity. Although these effects were alleviated among women who used low dose estrogen and progestin therapy (Nuranna et al., 2018). Nearly 50% of young women missed at least one class or lecture due to menstrual pain with 70 to 77% report concentration difficulties focusing on the early onset of menstrual related performance issues (Armour et al., 2020).

A similar study emphasized the role of psychosocial factors such as depression and stress as key contributors to menstrual disorders which suggest that mental health and menstrual health are closely implicated (Kim et al, 2025). In another study, 33.8% of women experienced PMS or PMDD with teachers showing the highest prevalence. PMS significantly reduced

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productivity and activities of daily living with PMDD showing the most severe disabilities (Loukzadeh et al, 2024). Two studies confirmed that higher symptom severity was associated with significantly greater presenteeism and lower relative productivity (Koh et al, 2025; Okamoto et al., 2024). These findings imply that women often continue to work through symptoms, potentially masking the true cost of menstrual health challenges on productivity.

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In lower-income settings, the challenges are compounded by infrastructural and cultural barriers. Hennegan et al. (2022) in Uganda found that 15% of women missed work during their last period and 41% preferred not to work during menstruation due to pain, poor sanitation, and stigma. Similarly, Krenz & Strulik (2019) reported that access to disposable sanitary pads significantly reduced absenteeism by 21 percentage points in Burkina Faso, emphasizing the tangible benefits of menstrual hygiene interventions.

Studies in India also identified critical intersections between menstruation and occupational well-being. Bharti et al. (2019) and Maheshwari et al. (2023) demonstrated that PMS significantly affected the quality of life and work life among female health professionals and working women, respectively. Priyadharshini & Hemalatha (2024) further found a negative correlation between menstrual-related symptoms and both task and contextual performance in female IT professionals, reinforcing the direct impact on productivity.

Interestingly, while interventions such as hygiene education and free pad distribution improved practices and reduced stigma in a randomized trial in Bangladesh, they did not yield significant improvements in absenteeism or worker turnover, suggesting that more comprehensive support structures may be needed (Czura et al., 2019).

Despite these valuable insights, the review reveals several research gaps. Many included studies employed cross-sectional designs, limiting causal interpretations. Moreover, inconsistent definitions and measurements of menstrual disorders and work outcomes hindered cross-study comparisons. The underrepresentation of informal workers, adolescents in employment, and non-binary menstruators is also a notable limitation.

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CONCLUSION:

Collectively, the evidence points to the urgent need for menstrual health to be recognized as a workplace health issue. Implementing flexible work schedules, providing menstrual products, and fostering supportive and stigma-free environments may help mitigate productivity loss and improve the overall well-being of menstruating employees. Furthermore, inclusion of

menstrual health in occupational health policies and regular screening for PMS and dysmenorrhea may lead to better management and reduced burden on both employees and organizations.

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REFERENCES:

1. Hennegan, J., Winkler, I. T., Bobel, C., Keiser, D., Hampton, J., Larsson, G., ... & Mahon, T. (2021). Menstrual health: a definition for policy, practice, and research. *Sexual and reproductive health matters*, *29*(1), 31-38.
2. WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation 2015
3. Sommer, M., & Caruso, B. A. (2015). Menstrual hygiene management and WASH. In *Routledge Handbook of Water and Health* (pp. 522-530). Routledge.
4. Sharma, S., Deuja, S., & Saha, C. G. (2016). Menstrual pattern among adolescent girls of Pokhara Valley: a cross sectional study. *BMC women's health*, *16*, 1-6.
5. Larramendy, M. L., & Soloneski, S. (Eds.). (2017). Chromosomal Abnormalities - A Hallmark Manifestation of Genomic Instability. InTech. doi: 10.5772/65142
6. Mahmood M and Jabeen N., Pattern of menstrual irregularities amongst women presenting to gynaecological outpatient department. Journal of Islamabad Medical and Dental College, 2013. 2(1): p. 9–12.
7. Maity, S., Wray, J., Coffin, T., Nath, R., Nauhria, S., Sah, R., ... & Nauhria, S. (2022). Academic and social impact of menstrual disturbances in female medical students: A systematic review and meta-analysis. *Frontiers in medicine*, *9*, 821908.
8. Chen C, Shieh C, McBride A, Carpenter JS. Reasons women do not seek health care for dysmenorrhea. J Clin Nurs [Internet]. 2018;27(1–2):301–8. https://doi.org/10.1111/jocn.13946.
9. Armour M, Parry K, Manohar N, Holmes K, Ferfolja T, Curry C, et al. The prevalence and academic impact of dysmenorrhea in 21,573 young women: a systematic review and meta-analysis. J Womens Health [Inter net]. 2019;28(8):1161–71. https://doi.org/10.1089/jwh.2018.7615.
10. Berkley KJ. Primary dysmenorrhea: an urgent mandate. Pain Clin Updates. 2013;21(3):1–7.
11. Iacovides S, Avidon I, Baker F. What we know about primary dys menorrhea today: a critical review. Hum Reprod Update [Internet]. 2015;21(6):762–78. https://doi.org/10.1093/humupd/dmv039.

12. Bernardi M, Lazzeri L, Perelli F, Reis FM, Petraglia F. Dysmenorrhea and related disorders. F1000 Fac Rev [Internet]. 2017;6:1–7. https:// doi.org/10. 12688/f1000research.11682.1).
13. Grandey AA, Gabriel AS and King EB. Tackling taboo topics: a review of the three Ms in working women's lives. J Manag 2020; 46: 7–35. 23.
14. Price H. Periodic leave: an analysis of menstrual leave as a legal workplace benefit. Okla Law Rev 2022; 74: 187.
15. Iacovides S, Avidon I, Bentley A, et al. Reduced quality of life when experiencing menstrual pain in women with primary dysmenorrhea. Acta Obstet Gynecol Scand 2014; 93: 213–217.
16. Unsal A, Ayranci U, Tozun M, et al. Prevalence of dysmenorrhea and its effect on quality of life among a group of female university students. Ups J Med Sci 2010; 115: 138–145.
17. Fernández-Martínez E, Onieva-Zafra MD and Parra-Fernández ML. The impact of dysmenorrhea on quality of life among Spanish female university students. Int J Environ Res Public Health 2019; 16(5): 713. doi:10.3390/ijerph16050713
18. Tanaka E, Momoeda M, Osuga Y, et al. Burden of menstrual symptoms in Japanese women: results from a survey-based study. J Med Econ 2013; 16: 1255–1266.
19. Liu Z, Doan QV, Blumenthal P, et al. A systematic review evaluating health-related quality of life, work impairment, and health-care costs and utilization in abnormal uterine bleeding. Value Health J Int Soc Pharmacoeconomics Outcomes Res 2007; 10: 183–194.
20. Schoep, M. E., Adang, E. M., Maas, J. W., De Bie, B., Aarts, J. W., & Nieboer, T. E. (2019). Productivity loss due to menstruation-related symptoms: A nationwide cross-sectional survey among 32,748 women. BMJ Open, 9(6), e026186.
21. Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), Handbook of industrial and organizational psychology (pp. 1297–1349). Rand McNally.
22. Judge, T. A., Thoresen, C. J., Bono, J. E., & Patton, G. K. (2001). The job satisfaction–job performance relationship: A qualitative and quantitative review. Psychological Bulletin, 127(3), 376–407.
23. van Eijk, A. M., Sivakami, M., Thakkar, M. B., Bauman, A., Laserson, K. F., Coates, S., & Phillips-Howard, P. A. (2019). Menstrual hygiene management among adolescent girls in India: a systematic review and meta-analysis. BMJ Open, 6(3), e010290.

24. Johnston-Robledo, I., & Chrisler, J. C. (2013). The Menstrual Mark: Menstruation as Social Stigma. Sex Roles, 68(1), 9–18.
25. Garrard J. Health sciences literature review made easy: The Matrix method. 3rd ed. Jones & Bartlett Publishers; 2011. p. 61–137.
26. Fooladi E, Bell RJ, Robinson PJ, Skiba M, Davis SR. Dysmenorrhea, Workability, and Absenteeism in Australian Women. J Womens Health (Larchmt). 2023 Nov;32(11):1249-1256. doi: 10.1089/jwh.2023.0199. Epub 2023 Aug 30. PMID: 37651151.
27. Jiang Z, Wang J, Guo X, Feng L, Yu M, Zhou J, Ye Y, Mei L, Ju L, Yu D, Shi L, Lu Alex C, Yu W, Lou J. Menstrual disorders and occupational exposures among female nurses: A nationwide cross-sectional study. Int J Nurs Stud. 2019 Jul;95:49-55. doi: 10.1016/j.ijnurstu.2019.04.010. Epub 2019 Apr 19. PMID: 31059897.
28. Alemu BW, Waller M, Tooth LR. The Association Between Menstrual Disorders and Workforce Participation: A Prospective Longitudinal Study. BJOG. 2025 Jun;132(7):961-971. doi: 10.1111/1471-0528.18109. Epub 2025 Feb 25. PMID: 39996384; PMCID: PMC12051242.
29. Osborne, J. O., Storvand, J. H., Engseth, T. P., Solli, G. S., Morseth, B., Taylor, M. Y., ... & Noordhof, D. A. (2025). Prevalence of Hormonal Contraceptive Use and Self-Reported Symptomatic Experiences Attributed to the Menstrual Cycle or Hormonal Contraceptive Use in Norwegian Women: The Effect of Training Categories and Age Groups-The FENDURA Project. *Scandinavian Journal of Medicine & Science in Sports*, *35*(7), e70096.
30. Kim, Y.-L., Chang, J. Y., Kim, S., Yoon, M., Ha, J.-N., Um, K. H., Lee, B., & Jeong, K. S. (2025). Prevalence and Risk Factors of Menstrual Disorders in Korean Women. *Healthcare*, *13*(6), 606. https://doi.org/10.3390/healthcare13060606
31. Loukzadeh, Z., Eslamy, N., Dehghan, M., & Mehrparvar, A. H. (2024). The impact of premenstrual disorders on work disruptions among working women: A cross-sectional study. *International Journal of Reproductive BioMedicine*, *22*(2), 149.
32. Nuranna, L., Abdullah, I., Kayika, I. P. G., & Pratama, G. (2018). The association between menstrual disorder and work disturbance among employees. *Indonesian Journal of Obstetrics and Gynecology*, 10-17.
33. Schoep, M. E., Adang, E. M., Maas, J. W., De Bie, B., Aarts, J. W., & Nieboer, T. E. (2019). Productivity loss due to menstruation-related symptoms: a nationwide cross-sectional survey among 32 748 women. *BMJ open*, *9*(6), e026186.

34. Koh, Sumire MD; Okawara, Makoto MD, PhD; Hirashima, Keiki MD; Kuwazuru, Tomoichiro MD; Yamashita, Satoshi MD; Ohkubo, Naoaki MD, PhD; Tateishi, Seiichiro MD, PhD; Fujino, Yoshihisa MD, MPH, PhD. Association of Menstrual-Related Symptoms and Presenteeism: A Cross-sectional Study of Working Women in Japan. Journal of Occupational and Environmental Medicine 67(5):p e311-e316, May 2025. | DOI: 10.1097/JOM.0000000000003340
35. Okamoto, M., Matsumura, K., Takahashi, A., Kurokawa, A., Watanabe, Y., Narimatsu, H., & Yoshida, H. (2024). The Association between Menstrual Symptoms and Presenteeism: A Cross-Sectional Study for Women Working in Central Tokyo. *International Journal of Environmental Research and Public Health*, *21*(3), 313. https://doi.org/10.3390/ijerph21030313
36. Tahara, Y., Okawara, M., Hirashima, K., Sawamoto, N., Ohkubo, N., Ishimaru, T., ... & Fujino, Y. (2023). Association between Heavy Menstrual Bleeding and Presenteeism among Female Workers: A Cross-Sectional Study in Japan. *Journal of Occupational and Environmental Medicine*, 10-1097.
37. Mardon, A. K., White, S., Howe, D., O'Shea, M., Eathorne, A., Gannott, M., ... & Armour, M. (2024). Problematic periods costing young women—The impact of menstrual symptoms on work and study. *Australian and New Zealand Journal of Obstetrics and Gynaecology*.
38. Bharti, Poonam & Mittal, Anshu & Gupta, Anshu & Gupta, Parul & Jain, Neha. (2019). Premenstrual Syndrome and Associated Factors among Health Care Professionals: A Cross-sectional Study. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 10.7860/JCDR/2019/43109.13392.
39. Maheshwari P, Menon B, Jith A, Bhaskaran R. Prevalence of premenstrual syndrome and its effect on quality of work life in working women in South India. Ind Psychiatry J. 2023 Jul-Dec;32(2):255-259. doi: 10.4103/ipj.ipj_106_22. Epub 2023 May 19. PMID: 38161484; PMCID: PMC10756601.
40. Hennegan J, Bukenya JN, Makumbi FE, Nakamya P, Exum NG, Schwab KJ, Kibira SPS. Menstrual health challenges in the workplace and consequences for women's work and wellbeing: A cross-sectional survey in Mukono, Uganda. PLOS Glob Public Health. 2022 Jul 21;2(7):e0000589. doi: 10.1371/journal.pgph.0000589. PMID: 36962362; PMCID: PMC10021399.
41. Al-harbi AS, Alrahili M, Al-harbi SS (2019) The Impact of Menstrual Periods on Performance of Female Workers. J Women's Health Care 9:483. doi:10.35248/2167-0420.20.9.483.

42. Armour M, Ferfolja T, Curry C, Hyman MS, Parry K, Chalmers KJ, Smith CA, MacMillan F, Holmes K, The prevalence and educational impact of pelvic and menstrual pain in Australia: a national online survey of 4202 young women aged 13-25, Journal of Pediatric and Adolescent Gynecology (2020), doi: https://doi.org/10.1016/j.jpag.2020.06.007
43. Nishikitani M, Nakao M, Tsurugano S, Inoure M, Yano E. Relationship between menstruation status and work conditions in Japan. Biopsychosoc Med. 2017 Oct 4;11:26. doi: 10.1186/s13030-017-0112-x. PMID: 29026436; PMCID: PMC5627597.
44. Krenz, Astrid and Strulik, Holger, Menstruation Hygiene Management and Work Attendance in a Developing Country (January 9, 2019). CEGE Discussion Papers, Number 364 – January 2019 , Available at SSRN: https://ssrn.com/abstract=3312788
45. Priyadharshini P, Hemalatha S. Impact of menstrual-related symptoms on job performance among female IT employees in India. *J Occup Health Psychol*. 2024;29(2):126–33.
46. Czura, K., Menzel, A., & Miotto, M. (2019). Menstrual health, worker productivity and well-being among female Bangladeshi garment workers. *CERGE-EI Working Paper Series*, (649).