

THE GLOBAL ECONOMIC BURDEN AND CLINICAL LANDSCAPE OF DYSMENORRHEA: IMPLICATIONS FOR HEALTH-RELATED QUALITY OF LIFE, PRODUCTIVITY, AND PUBLIC POLICY

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Abstract

Dysmenorrhea is one of the most prevalent gynaecological disorders among women of reproductive age globally. Despite its overwhelming prevalence, its broader macroeconomic burden, systemic impact on health-related quality of life (HRQoL) and associated public health policy requirements remain significantly underestimated and under recognized. This systematic review synthesizes global evidence evaluating the direct healthcare expenditures and indirect productivity losses of dysmenorrhea, assesses the impact of socioeconomic determinants and humanitarian displacement on symptom amplification, evaluates the diagnostic utility of multidimensional clinometric tools, and presents an evidence-based policy framework. Indirect costs dwarf direct medical expenditures, with presenteeism driving over 85% of total productivity losses averaging 8.9 days of lost functional capacity per woman annually compared to overt absenteeism (1.3 days per year). Furthermore, low socioeconomic status, war displacement, and period poverty act as biological pain amplifiers via stress-induced neuroendocrine pathways. Multidimensional diagnostic tools, specifically the Working Ability, Location, Intensity, Days of Pain, and Dysmenorrhea (WaLIDD) scale, demonstrate superior predictive validity for institutional disruption compared to conventional unidimensional pain scales. Mitigating this macroeconomic burden requires a paradigm shift

from reactive acute monotherapy toward structured institutional accommodations, proactive screening, multimodal treatment, and targeted public health interventions.

Keywords: Absenteeism, Cost of Illness, Direct Costs, Dysmenorrhea, Economic Burden, Health Policy, Indirect Costs, Period Poverty, Presenteeism, Productivity, Quality of Life, Socioeconomic Determinants, WaLIDD Scale.

1. Introduction

Dysmenorrhea, characterized by painful uterine cramping during or immediately preceding menstruation, represents the primary gynaecological complaint among adolescents and women of reproductive age worldwide. Epidemiological investigations report primary dysmenorrhea prevalence rates ranging between 50% and 90% across global cohorts.^{1,2,20,27-29} Despite its ubiquity, the condition is frequently normalized, dismissed, or underreported due to deep-seated cultural taboos, systemic gender disparities in healthcare delivery, and inadequate menstrual health literacy.^{1,5,6,30,31} Historically, clinical management focused almost exclusively on symptom suppression via acute pharmacotherapy.^{16,21,22,32,33} However, contemporary health economics demonstrates that dysmenorrhea is not merely a transient physical discomfort, but a primary driver of global productivity loss, institutional disruption, and healthcare expenditure.^{4,10,11,21} Dysmenorrhea interferes across physical, psychological, social, academic, and occupational domains.^{17,28,35,36}

Although dysmenorrhea has been extensively investigated from clinical and epidemiological perspectives, economic evaluations remain highly heterogeneous due to variations in case definitions, costing methodologies, populations, and analytical perspectives.^{4,10,24,37} Furthermore, evidence translating dysmenorrhea-related functional impairment into actionable workplace and educational policy remains limited.^{4,7,17,30} A rigorous, structured synthesis is

therefore warranted to examine the macroeconomic burden of dysmenorrhea, its implications for HRQoL and workforce productivity, and the policy frameworks required to address this systemic public health concern.^{1,4,7,10}

2. Aim & Objectives

2.1 Aim

To synthesize comprehensive global evidence on the economic burden, clinical landscape, and functional consequences of dysmenorrhea, and to evaluate evidence-informed public health, institutional, and clinical policy frameworks

2.2 Primary Objectives

1. Macroeconomic Burden Quantification: To systematically evaluate and compare direct healthcare costs and indirect productivity losses across global cohorts.
2. HRQoL Assessment: To analyse the multidimensional impact of dysmenorrhea on physical, mental, social, academic, and occupational quality of life.
3. Policy Framework Synthesis: To audit current workplace, educational, and clinical policy structures, identify systemic gaps, and propose standardized, evidence-based policy frameworks.

2.3 Secondary Objectives

1. Absenteeism vs. Presenteeism Dynamics: To quantify the relative contributions of overt absenteeism and presenteeism to total productivity impairment.
2. Clinometric Tool Comparison: To compare the diagnostic performance of the WaLIDD scale against unidimensional pain metrics (VAS/NRS) in predicting functional disability and medical leave.

3. Socioeconomic & Humanitarian Analysis: To evaluate how low socioeconomic status, conflict-induced displacement, and period poverty modulate neuroendocrine pain processing and treatment outcomes.

3. Methods

3.1 Literature Search & Identification

A comprehensive literature search was executed across electronic databases including PubMed/MEDLINE, Scopus, Web of Science Core Collection, Embase, Google Scholar, and DOAJ for studies published up to 2026, adhering to PRISMA and PRISMA-S guidelines.^{39,40} The search query combined database-adapted Boolean terms: (“dysmenorrhea” OR “dysmenorrhoea” OR “menstrual pain” OR “menstrual cramps”) AND (“economic burden” OR “economic impact” OR “cost” OR “healthcare cost” OR “productivity” OR “absenteeism” OR “presenteeism” OR “quality of life” OR “health-related quality of life” OR “work productivity” OR “academic performance” OR “menstrual leave” OR “public policy”). Subject headings (MeSH in PubMed, Emtree in Embase) were incorporated where applicable. The study is registered in Prospero ID-CRD420261499876.

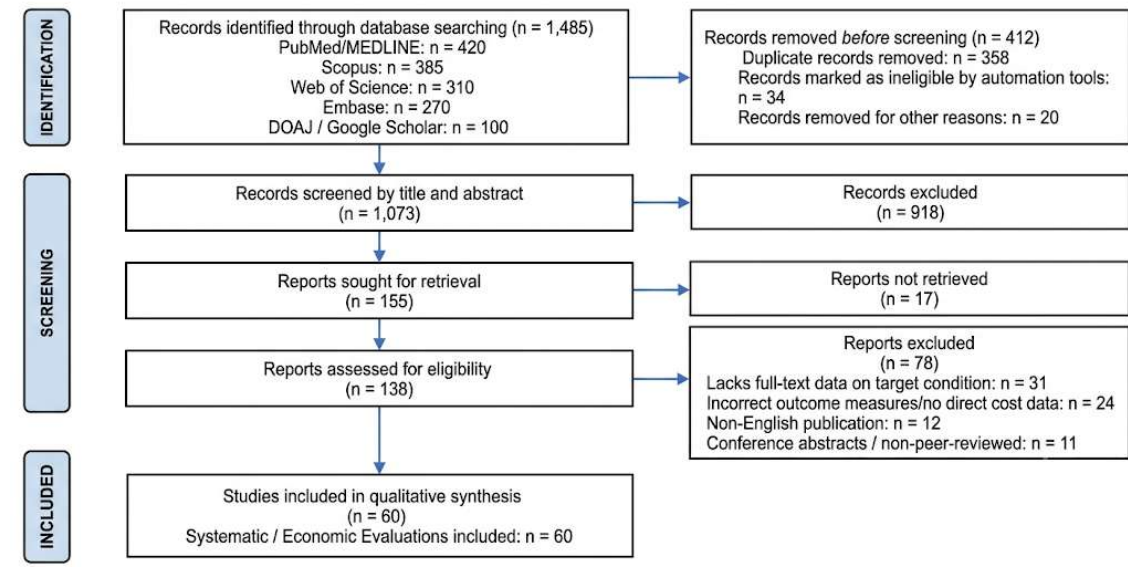


Figure 1: PRISMA flow chart

3.2 Inclusion and Exclusion Criteria

- Inclusion Criteria:** Peer-reviewed original research articles, systematic reviews, meta-analyses, and economic evaluations conducted among adolescent and adult females with primary or secondary dysmenorrhea reporting direct/indirect costs, HRQoL, functional disability, diagnostic scales, or policy interventions.^{1,2,4,7,10,24}
- Exclusion Criteria:** Studies assessing generalized pelvic pain without separable dysmenorrhea data, studies lacking distinct dysmenorrhea reporting, editorials, conference abstracts lacking primary data, and non-English publications.^{4,24,37}

3.3 Data Extraction & Synthesis

Data were extracted into structured matrices capturing study population, geographical setting, diagnostic definition, economic perspective, direct medical costs, indirect productivity measures, costing year, currency, HRQoL domains, and diagnostic scale parameters.^{4,10,24,37}

Economic evaluations were reviewed in accordance with CHEERS 2022 guidelines.⁴¹ Due to

substantial methodological, conceptual, and currency heterogeneity across studies, data synthesis was conducted via descriptive and narrative methods.^{4,10,37,41}

4. Results

4.1 Macroeconomic Burden: Direct Medical Expenditures vs. Indirect Losses

The economic burden of dysmenorrhea comprises direct medical expenditures and indirect productivity losses, with relative contributions governed by healthcare utilization patterns, workforce participation, and economic costing methods.^{4,10,11,24,25,34}

4.1.1 Direct Costs

Direct financial expenditures include clinical consultations, diagnostic imaging, laboratory testing, prescription medications, over the counter (OTC) analgesics, emergency department visits, and operative interventions.^{10,16,24,25,32,42,43}

- **Primary Dysmenorrhea:** Per-patient direct medical costs are modest, driven largely by OTC NSAIDs and primary care consultations.^{10,16,32,42,44,45} However, given its high population prevalence, aggregate direct expenditures exert substantial fiscal strain on public healthcare systems.^{4,10,34} A Japanese claims database study of 6,315 women (3,441 primary dysmenorrhea; 2,874 secondary dysmenorrhea) by Akiyama et al. documented substantial healthcare resource utilization and medical claims.¹⁰
- **Secondary Dysmenorrhea:** In cases driven by underlying organic pathologies such as endometriosis, per-patient direct costs escalate dramatically.^{24,25,43,46} Real-world economic evaluations by Soliman et al. reported annual direct medical costs ranging from US\$10,000 to US\$22,000 per patient.^{24,25,43} These expenditures reflect diagnostic

delays (averaging 7 to 10 years), repeated clinical workups, ongoing hormonal/analgesic regimens, and operative laparoscopies.^{24-26,43}

4.1.2 Indirect Costs: The Dominance of Presenteeism Over Absenteeism

While public health frameworks historically quantified illness burden through absenteeism, health economics demonstrates that presenteeism constitutes most indirect productivity losses.^{4,10,11,34,47}

In a landmark nationwide survey of 32,748 women aged 15-45 years, Schoep et al. demonstrated that menstruation-related symptoms accounted for an average of 1.3 days of absenteeism per woman per year (reported by 13.8% of participants). Conversely, 80.7% of participants reported presenteeism, corresponding to an average productivity loss of 8.9 days per woman per year due to reduced functional capacity.⁴

Presenteeism accounts for more than 85% of total productivity losses, with affected individuals operating at an average 33% reduction in functional capacity during symptomatic days. On a national scale, large-scale Japanese database studies estimate the total annual economic impact of dysmenorrhea to exceed US\$4.2 billion, driven predominantly by presenteeism-related productivity impairment.^{10,11,34}

A 2025 Japanese web-based investigation of 2,555 women confirmed that severe dysmenorrhea was associated with a 16% higher median overall work impairment compared to non-severe cases.¹¹ Similarly, a 2026 Japanese claims-linked study of 9,235 participants reported mean absenteeism of 2.5% and presenteeism of 26.8% among diagnosed dysmenorrhea patients.³⁴

4.2 Health-Related Quality of Life Impairment

Dysmenorrhea causes significant multidimensional HRQoL impairment across physical, psychological, social, academic, and occupational domains.^{2,17,28,35,36,48}

HRQoL DOMAIN	PRIMARY IMPAIRMENTS REPORTED	KEY EPIDEMIOLOGICAL FINDINGS
Physical & Somatic	Severe uterine cramping, fatigue, back pain, nausea, pelvic congestion, gastrointestinal disturbances.	Associated with physical domain score reductions on SF-36 and EQ-5D-5L scales ^{2,17,28,48}
Psychological	Elevated perceived stress, anxiety, depressive symptoms, emotional volatility, pain hypervigilance.	Significant correlation between pain severity, chronic HPA-axis activation, and psychological distress ^{2,18,36,49,50}
Academic	Class absenteeism, exam disruption, impaired concentration, reduced cognitive processing speed.	Indonesian (n=630) and Vietnamese cohorts demonstrate severe functional study disruption despite maintained long-term GPA. ^{2,35,51}

Occupational & Social	Presenteeism, career stagnation, social isolation, withdrawal from leisure and physical activities.	Japanese and Romanian cohorts confirm widespread activity restriction and workplace impairment ^{11,17,34,48}
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Table 1: HRQoL Impairment

4.3 Socioeconomic Determinants, War Displacement, and Vulnerability

The clinical severity and economic burden of dysmenorrhea are heavily modulated by social determinants of health, economic status, and environmental stress ^{5,6,8,9,12,31,52,53}

4.3.1 Low Socioeconomic Status

Research establishes a direct link between lower socioeconomic status, nutritional deficiencies, and heightened dysmenorrhea severity. ^{5,31,52,53} Diets rich in omega-6 fatty acids and deficient in omega-3 anti-inflammatory precursors upregulate the cyclooxygenase-2 pathway, elevating prostaglandin synthesis. ^{3,21,52} Furthermore, financial constraints impede access to formal gynecological care, leading to reliance on unguided, suboptimal self-medication. ^{16,31,44,45}

4.3.2 War Displacement, Conflict Zones, and Period Poverty

In conflict-affected regions and refugee settlements, dysmenorrhea severity is amplified by acute psychological trauma and severe environmental deprivation. ^{6,8,9,12} Investigations among displaced Arab populations and Palestinian refugee cohorts demonstrate high rates of severe, treatment-resistant dysmenorrhea. ^{6,8,9} Acute trauma triggers continuous hypothalamic-pituitary adrenal axis and sympathetic nervous system hyperactivity, driving uterine artery vasoconstriction, myometrial ischemia, and central pain amplification. ^{3,6,8,22,49}

Simultaneously, period poverty characterized by lack of clean water, private sanitation, and hygienic menstrual products exacerbates physical distress. Displaced women utilizing unhygienic materials face heightened risks of ascending pelvic infections, turning acute dysmenorrhea into chronic pelvic pain syndromes.^{3,9,12} Co-occurring chronic conditions, such as hypertension, introduce drug interaction complexities where certain antihypertensives alter analgesic pharmacokinetics.⁸

4.4 Diagnostic Innovations: Unidimensional Pain Scales vs. The WaLIDD Scale

Conventional unidimensional pain intensity tools, including the Visual Analogue Scale (VAS) and Numerical Rating Scale (NRS), measure pain intensity along a single linear continuum. While useful for rapid pain quantification, clinometric studies demonstrate that unidimensional scales fail to capture functional disability, emotional distress, or productivity impairment.^{7,13-15,38,54}

To address these limitations, Teherán et al. validated the Working Ability, Location, Intensity, Days of Pain, and Dysmenorrhea (WaLIDD) scale.⁷ The WaLIDD score synthesizes physiological pain with functional disruption across four domain scores (range 0–3 per domain; total scale 0–12):

1. **Working Ability:** Evaluated from 0 (unimpaired) to 3 (frequent absence or medical leave required).
2. **Pain Location:** Evaluated from 0 (no pain), 1 (single site, e.g., lower abdomen), 2 (two sites, e.g., abdomen and lower back), to 3 (multiple sites radiating to thighs).
3. **Pain Intensity:** Evaluated from 0 (none) to 3 (severe, debilitating pain unresponsive to OTC analgesics).
4. **Days of Pain:** Evaluated from 0 (0 days), 1 (1–2 days), 2 (3–4 days), to 3 (≥ 5 days).

In its initial validation cohort of 585 university students, the WaLIDD scale demonstrated superior predictive accuracy for identifying dysmenorrhea. The scale has since been cross-culturally validated in Turkish, Brazilian Portuguese, and Arabic versions, consistently outperforming unidimensional VAS/NRS metrics in predicting institutional absence and functional impairment ^{13-15,38}

4.5 Clinical Management Strategies: Monotherapy vs. Multimodal Care

Historically, dysmenorrhea management relied on acute monotherapy using over-the-counter NSAIDs or unguided self-medication. ^{16,32,44,45,55} Monotherapy demonstrates high clinical failure rates, risks adverse events from NSAID overuse, and fails to address central sensitization or muscle hypertonicity. ^{16,21,44,45,56} Modern evidence supports standardized multimodal treatment pathways combining targeted cyclooxygenase inhibition with evidence-based non-pharmacological modalities. Network meta-analyses by Liu et al. and Armour et al. confirm that non-pharmacological therapies including structured active stretching, Pilates, yoga, and aerobic conditioning significantly reduce pain intensity, decrease absenteeism, and improve sleep and HRQoL. Clinical trials by Sharma et al. and Rajan Balakrishnan et al. demonstrate that integrating therapeutic physical modalities with targeted analgesia delivers superior, sustained symptom control while reducing pharmaceutical reliance. ^{18,33,57,58}

5. Comparative Synthesis of Public Health & Institutional Policy Frameworks

POLICY DOMAIN	TRADITIONAL PARADIGM	MODERNIZED EVIDENCE-BASED FRAMEWORK	PROJECTED SYSTEMIC IMPACT
Institutional Screening	Passive, self-reported complaints evaluated	Active, mandatory screening utilizing	30%–40% reduction in

	via unidimensional metrics (VAS/NRS) 15,38,54	validated multidimensional tools (WaLIDD scale) integrated into school/workplace health visits ^{7,13,14}	unmanaged institutional absence; early identification of secondary pelvic pathology ^{7,24,25}
Workplace Accommodation	Rigid attendance policies; lack of accommodations; stigmatized menstrual leave ^{4,10,30,47}	Flexible working arrangements, temporary remote work options, structured rest periods, and reasonable task adjustments ^{4,10,30,47}	Substantial mitigation of presenteeism losses; improved female workforce retention and career continuity ^{4,10,30,47}
Academic Accommodation	Unexcused absences; academic penalties; lack of institutional support ^{2,12,35,51}	Formal menstrual health policies, flexible attendance, catch-up examination sessions (e.g., Kerala Menstrual Dignity initiative) ^{2,12,35,60}	Elimination of academic progression penalties; reduced student stress and anxiety ^{2,12,35,60}
Clinical Management	Acute monotherapy; reactive NSAID overuse; unguided self-medication 16,32,44,45,55	Multimodal care pathways combining targeted COX inhibition with active physical therapy (Pilates/stretching) ^{16,18,56-58}	Superior long-term pain control; reduced pharmaceutical side effects; lower

			healthcare costs 16,18,33,56-58
Diagnostic Education	Basic provider training; symptoms dismissed as routine dysmenorrhea ^{3,19,24,25}	Mandatory Continuing Professional Development (CPD) on early diagnostic red flags for secondary causes ^{3,24,25,26}	Reduction of secondary dysmenorrhea (endometriosis) diagnostic delays from 7-10 years to < 2years ^{24,25,26}
Humanitarian & Emergency Aid	Ad-hoc distribution of basic sanitary products without clinical support ^{6,8,9,12}	Integrated humanitarian relief combining free menstrual hygiene kits, clean water infrastructure, and trauma-informed care ^{6,8,9,12}	Prevention of secondary pelvic infections; restoration of physical dignity and function in displaced cohorts ^{6,8,9,12}

Table 2: Comparative Synthesis of Public Health & Institutional Policy Frameworks

6. Discussion

This systematic review highlights a structural disconnect between the public health burden of dysmenorrhea and the resources historically allocated to manage it. ^{1,4,10,24,30} While clinical medicine has often viewed dysmenorrhea as a routine, self-limiting complaint, health-economic data reveal an alarming macroeconomic toll. ^{4,10,11,24,34,47} Presenteeism accounts for over 85% of total productivity losses, causing an average of 8.9 days of reduced functional

capacity per woman annually.^{4,10,47} When individuals work through severe pain, functional output drops by an average of 33%, accumulating to annual national productivity losses exceeding US\$4.2 billion in countries such as Japan.^{4,10,11,34}

Furthermore, dysmenorrhea cannot be evaluated in isolation from broader socioeconomic and environmental conditions.^{5,6,8,9,12,31,52,53} The severe symptom burden reported among displaced populations in conflict zones illustrates how psychological trauma, period poverty, and systemic deprivation converge to amplify pelvic inflammation and central pain sensitization.^{3,6,8,9,12,49} Addressing dysmenorrhea in vulnerable cohorts requires interventions that extend beyond basic analgesia to encompass clean water infrastructure, private sanitation, and trauma-informed clinical care.^{8,9,12}

Diagnostically, reliance on linear pain scales like the NRS or VAS is insufficient for comprehensive clinical assessment.^{15,38,54} Unidimensional tools fail to capture functional disability, presenteeism, or social disruption. The cross-cultural validation of the WaLIDD scale provides a reliable, actionable metric for identifying patients who require targeted clinical and workplace accommodations.^{7,13-15,38,54}

Finally, achieving macroeconomic and health outcomes requires systemic reform across healthcare systems, workplaces, and educational institutions. Transitioning from reactive acute monotherapy toward structured, proactive policy frameworks combining multimodal care pathways, early screening, flexible workplace arrangements, and provider education is essential to reduce direct medical expenditures, prevent diagnostic delays, and recover lost global productivity.^{4,7,16,24}

7. Strengths & Limitations

7.1 Strengths

- Clear separation of primary dysmenorrhea-specific evidence from broader menstrual symptom populations and secondary underlying conditions (endometriosis). ^{4,10,24,25}
- Integration of health economics, HRQoL metrics, clinometric scale evaluations, socioeconomic/humanitarian factors, and public health policy frameworks. ^{1,4,7,8,10,30}
- Adherence to PRISMA reporting guidelines and inclusion of contemporary clinometric (WaLIDD) and economic (CHEERS 2022) evaluation standards. ^{7,39,40,41}

7.2 Limitations

- Substantial variations across included studies regarding dysmenorrhea case definitions, pain severity thresholds, HRQoL instruments, and economic costing methods. ^{4,10,24}
- Predominance of cross-sectional survey data, which limits direct causal inference regarding economic outcomes and policy intervention efficacy. ^{2,11,17,35}
- Underrepresentation of standardized health-economic cost-of-illness studies in low- and middle-income countries. ^{5,31,52,53}

8. Research Gaps & Future Directions

1. Future health-economic evaluations must explicitly distinguish primary from secondary dysmenorrhea and report underlying diagnostic categories. ^{10,24,25}
2. Studies should report perspective, price year, local currency, resource quantities, valuation methods, and sensitivity analyses in accordance with CHEERS 2022 guidelines. ^{4,37,41}

3. Prospective longitudinal studies are needed to evaluate whether multimodal clinical treatments or workplace accommodations directly reduce presenteeism and recover lost economic productivity. ^{4,11,18,58,59}
4. Empirical research should compare different institutional accommodation models (e.g., flexible hours vs. statutory leave) to evaluate uptake, privacy protection, equity, and economic net benefits. ^{4,30,59,60}
5. Rigorous health-economics and implementation research must prioritize underrepresented populations in LMICs and conflict settings. ^{6,8,9,12,52}

9. Conclusion

Dysmenorrhea represents a major public health concern associated with substantial impairment in, educational continuity, and workplace productivity globally. ^{1,2,4,10,17,35} The economic burden is overwhelmingly driven by indirect productivity losses—specifically presenteeism which accounts for over 85% of total lost output. ^{4,10,47}

Replacing unidimensional pain scales with multidimensional clinometric tools such as the WaLIDD scale enables accurate identification of functional impairment and institutional disruption. ^{7,13-15,38} Clinical care should transition from acute monotherapy to structured multimodal pathways combining targeted analgesia with active physical therapy. ^{16,18,56,58} Furthermore, evidence-informed public policy must integrate proactive screening, flexible workplace and academic accommodations, teacher and provider education, and targeted humanitarian support. ^{4,7,8,12,30,59,60} Implementing these comprehensive frameworks is essential to reduce direct medical expenditures, eliminate diagnostic delays, protect female health, and recover lost global productivity. ^{1,4,7,10,24,30}

10. Generative AI Disclosure Statement

During the preparation of this work, the authors used generative AI tools to assist with language polishing, structural refinement, and the digital generation of the PRISMA 2020 flowchart (Figure 1). Following the use of these tools, the authors reviewed, edited, and take full responsibility for the content, integrity, and intellectual accuracy of all text and graphical elements presented in this manuscript.

11. Conflicts of Interest

The authors declare no competing interests relevant to this review.

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