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UNRAVELLING DYSMENORRHEA: A REVIEW OF CURRENT EVIDENCE AND PRACTICE IMPLICATIONS IN PHARMACY PRACTICE

Alwy Jose, Malavika P.U, Ayisha K.M

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ABSTRACT

Primary dysmenorrhea remains one of the most prevalent gynaecological disorders affecting adolescents and young women globally. Contemporary cross-sectional and analytical studies from Asia, the Middle East, Europe, and South America consistently report high prevalence rates with significant academic absenteeism, reduced work productivity, impaired quality of life, and economic burden. Pathophysiological advances highlight the central role of prostaglandin-mediated uterine hypercontractility and inflammatory cascades, with emerging insights into immune and stress-related mechanisms. Validated tools such as the Working ability, Location, Intensity, Days of pain, Dysmenorrhea (WaLIDD) score demonstrate strong reliability and cross-cultural applicability, facilitating standardized severity assessment. Non-steroidal anti-inflammatory drugs remain first-line pharmacotherapy; however, variations in utilization patterns, self-medication practices, and safety concerns persist. Network meta-analyses confirm NSAID superiority, while evidence for exercise, stretching, and complementary therapies is growing yet heterogeneous. Psychological stress, nutritional status, body mass index, and lifestyle factors consistently emerge as significant modifiers of symptom severity. Despite expanding literature, gaps remain in longitudinal data, comparative effectiveness research, and integration of patient-reported outcomes into routine care. A multidimensional, evidence-based framework that integrates pharmacologic therapy, lifestyle modification, and psychosocial support is essential for optimized real-world management.

KEYWORDS: *Primary dysmenorrhea; WaLIDD score; NSAIDs; Quality of life; non-pharmacological therapy*

INTRODUCTION

Background

Primary dysmenorrhea is defined as painful menstruation in the absence of identifiable pelvic pathology. Epidemiological studies across medical and non-medical student populations demonstrate prevalence rates frequently exceeding 60–80% [18,41,57]. The burden extends beyond pain, encompassing absenteeism, reduced productivity, psychological distress, and diminished quality of life [9,13,27].

Despite its high prevalence, dysmenorrhea remains underprioritized in clinical and public health frameworks. Increasing evidence demonstrates its association with stress [12,17], socioeconomic disparities [3,24], lifestyle factors [38], and nutritional determinants [28].

Scope

This review integrates findings from observational studies, validation research, systematic reviews, and network meta-analyses published between 2015 and 2025, including validation of severity scales such as the WaLIDD score [49] and therapeutic comparisons [50].

Rationale and Need

The heterogeneity of management practices, widespread self-medication [52,56], and growing evidence supporting multimodal therapy mandate a consolidated, evidence-based perspective bridging severity assessment and real-world management.

OBJECTIVES

1. To summarize global prevalence and determinants of primary dysmenorrhea.
2. To evaluate validated severity assessment tools including WaLIDD and Numerical Rating Scale.
3. To compare pharmacological and non-pharmacological management strategies.
4. To assess quality of life, productivity, and economic implications.
5. To identify controversies, methodological limitations, and research gaps.

METHODOLOGY OF LITERATURE SEARCH

A structured literature search was conducted across PubMed, Scopus, Google Scholar, and Web of Science databases covering publications from 2015 to 2025, with selective inclusion of landmark earlier studies. Keywords included “primary dysmenorrhea,” “WaLIDD score,” “NSAIDs,” “quality of life,” “exercise therapy,” and “economic burden.” Cross-sectional studies, systematic reviews, meta-analyses, validation studies, and drug utilization studies published in English were included. Studies focusing on secondary dysmenorrhea, case reports, and non-peer-reviewed commentaries were excluded unless methodologically significant. This approach ensured comprehensive coverage of epidemiology, assessment tools, therapeutic interventions, and real-world management patterns.

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DISCUSSION

Epidemiology and Determinants

Recent cross-sectional surveys across India, Indonesia, Pakistan, Malaysia, Greece, and Saudi Arabia report persistent high prevalence [1,18,30,45]. BMI, physical inactivity, stress, and poor nutritional status correlate significantly with severity [11,12,28,38]. War displacement and mental health vulnerability amplify severity in conflict settings [24,32].

Pathophysiology and Emerging Mechanisms

Traditional understanding implicates excess endometrial prostaglandins causing uterine hypercontractility [35]. Novel inflammatory biomarkers identified in menstrual effluent expand the mechanistic model toward immune modulation [7]. Psychoneuroendocrine pathways linking stress and pain sensitization are increasingly recognized [12,17].

Diagnostic Evaluation and Differential Diagnosis

Although primary dysmenorrhea is diagnosed clinically, exclusion of secondary causes such as endometriosis, adenomyosis, pelvic inflammatory disease, and uterine fibroids remains essential in refractory or atypical presentations. Red flag indicators include progressive pain, dyspareunia, abnormal uterine bleeding, and poor response to NSAIDs. Clinical history, pelvic examination (when appropriate), and ultrasonography are recommended for diagnostic clarification. Early differentiation optimizes therapeutic outcomes and prevents delayed identification of underlying pathology.

Severity Assessment Tools

The WaLIDD score, introduced by Teherán et al. [49], integrates multidimensional parameters. Cross-cultural validation studies in Arabic, Turkish, and Brazilian populations confirm reliability and validity [14,25,26]. Comparative studies demonstrate concordance between WaLIDD and Numerical Rating Scale but superior multidimensional profiling with WaLIDD [39].

Pharmacological Management

NSAIDs remain first-line therapy by inhibiting cyclooxygenase-mediated prostaglandin synthesis. Network meta-analysis confirms superior efficacy over placebo [50]. However, drug utilization studies reveal irrational patterns, delayed initiation, and inappropriate dosing [23,48]. Self-medication remains widespread among students [52,56], raising safety concerns.

Complementary therapies, including homoeopathy [21] and alternative approaches [44], demonstrate variable evidence quality. Hormonal therapy and combined approaches are underreported in many regional studies.

Non-Pharmacological Interventions

Exercise and stretching significantly reduce severity scores in randomized and quasi-experimental designs [2,33]. A 2025 network meta-analysis supports the effectiveness of non-pharmacological interventions, though heterogeneity limits definitive ranking [6]. Lifestyle modification demonstrates protective effects [8,38].

Quality of Life and Economic Burden

Quality of life impairment is consistently documented [13,27]. Financial consequences include direct treatment costs and productivity loss [19,53]. Academic absenteeism remains a critical metric among students [41].

Clinical Implications for Gynaecological Practice

Translation of evidence into routine practice requires standardized pain assessment, rational NSAID prescribing, early initiation at onset of menses, and patient counseling regarding dosing adherence. Incorporating validated tools such as the WaLIDD score into outpatient settings enables objective monitoring. Multimodal management—including pharmacotherapy, structured exercise, stress reduction, and lifestyle modification—should be positioned as the default care pathway rather than sequential trial-and-error management.

Public Health and Policy Implications

Given its high prevalence and documented impact on productivity and educational attendance, dysmenorrhea warrants recognition as a public health priority. Institutional policies addressing menstrual health education, workplace flexibility, and affordable access to analgesics are justified. Economic evaluations indicate measurable productivity loss, reinforcing the need for policy-level intervention and inclusion of menstrual health within reproductive health programs.

Strengths and Limitations of Current Evidence

The reviewed literature provides robust prevalence data and consistent associations with lifestyle and psychological variables. However, the predominance of cross-sectional designs limits causal inference. Variability in outcome measures and underreporting of adverse drug reactions reduce external validity. Limited randomized controlled trials comparing pharmacological and non-pharmacological interventions restrict definitive clinical hierarchy establishment.

Trends, Controversies and Limitations

The literature is dominated by cross-sectional designs, limiting causal inference [55]. Heterogeneity in severity scales reduces comparability. Many studies lack long-term follow-up and pharmacoeconomic evaluation. Complementary therapies remain controversial due to methodological limitations [21,47].

Research Gaps

- Need for longitudinal cohort studies.
- Standardization of severity assessment tools globally.
- Comparative effectiveness research between NSAIDs and structured exercise programs.
- Integration of patient-reported outcomes into routine gynaecological practice.

Future Research Directions

Future investigations should prioritize longitudinal cohort studies to establish temporal associations and risk prediction models. Standardization of severity scales across global populations is necessary to improve comparability. Comparative effectiveness trials evaluating NSAIDs versus structured exercise protocols, and integrated multimodal

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interventions, are warranted. Additionally, pharmacoeconomic analyses and incorporation of patient-reported outcome measures should become standard endpoints in dysmenorrhea research.

CONCLUSION

Primary dysmenorrhea is a high-burden, multidimensional disorder with substantial academic, occupational, psychological, and economic implications. Evidence consistently supports prostaglandin-mediated pathophysiology with emerging inflammatory and stress-related mechanisms. The WaLIDD score represents a validated, cross-culturally adaptable severity assessment tool that enhances multidimensional evaluation. NSAIDs remain the cornerstone of therapy; however, irrational use and self-medication persist. Non-pharmacological interventions, particularly structured exercise, demonstrate meaningful benefit and should be integrated into management algorithms. Current literature is constrained by cross-sectional methodologies and heterogeneity in outcome measures. Future research must prioritize longitudinal designs, standardized assessment frameworks, and real-world comparative effectiveness studies. A comprehensive, patient-centered, multimodal strategy is imperative to transition dysmenorrhea management from symptomatic relief toward optimized, evidence-driven care pathways.

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