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Barriers to Physical Activity Among Adolescent Girls During Menstruation: A Global Systematic Literature Review

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ABSTRACT

Purpose of the study: Menstruation is a critical yet often overlooked factor influencing physical activity (PA) participation among adolescent girls. This systematic review aimed to identify, synthesize, and critically evaluate the physiological, psychological, socio-cultural, environmental, and institutional barriers that hinder PA engagement during menstruation among girls aged 10–19 years.

Materials and methods: Following the PRISMA 2020 guidelines, a systematic search was conducted in Scopus, Web of Science, and PubMed for peer-reviewed studies published between January 2013 and December 2023. Search terms related to menstruation, physical activity, barriers, and adolescent girls were combined using Boolean operators. Studies were included if they involved girls aged 10–19 years, were published in English, and empirically examined barriers to PA during menstruation. After screening and quality assessment, 42 studies from 28 countries were included in the final review.

Results: Five major categories of barriers were identified: (1) physiological barriers, including dysmenorrhea, fatigue, and physical discomfort; (2) psychological barriers, such as menstrual stigma, body image concerns, and fear of leakage; (3) socio-cultural barriers, including cultural taboos, religious norms, and family restrictions; (4) institutional and environmental barriers, characterized by inadequate sanitation facilities, limited access to menstrual hygiene products, and unsupportive school policies; and (5) informational barriers, reflected in poor menstrual health literacy and insufficient teacher preparedness. Socio-cultural and environmental barriers were more pronounced in low- and middle-income countries, whereas psychological barriers were more prevalent in high-income settings. Socioeconomic status, race, and geographic context further shaped the severity and nature of these barriers.

Conclusions: Barriers to PA during menstruation are multifaceted and rooted in broader social and institutional contexts. Addressing them requires integrated, context-sensitive strategies involving menstrual health education, improved school infrastructure, and supportive policies. Reducing menstrual stigma and promoting equitable access to PA are essential for improving adolescent girls' health and well-being.

Keywords
physical activity barriers; adolescent girls; menstrual stigma; school physical education; menstrual health; dysmenorrhea; socio-cultural factors.

INTRODUCTION

Global Issue: Contextual Framework

Physical inactivity constitutes one of the most pressing public health crises of the twenty-first century, ranking among the top leading risk factors for global mortality (Shi et al., 2023, p. 177). Despite widespread recognition of the manifold benefits of regular physical activity (PA) — including cardiovascular health, mental well-being, cognitive development, and weight management — a substantial proportion of the world's adolescent population fails to meet WHO-recommended PA guidelines of at least 60 minutes of moderate-to-vigorous activity daily (Owen et al., 2017, p. 241). The situation is particularly alarming for adolescent girls: data from the WHO Global Action Plan on Physical Activity (2018–2030) reveal that 85% of adolescent girls globally are insufficiently physically active, compared to 78% of adolescent boys (Chaabène et al., 2024, p. 89; Sebire et al., 2018, p. 2). This persistent gender-based PA disparity is not merely a product of individual preferences, but is fundamentally shaped by intersecting structural, cultural, and biological determinants (Guthold et al., 2020).

Among these determinants, menstruation — a universal, recurring physiological event affecting approximately 1.8 billion menstruating individuals worldwide — has received disproportionately scant scholarly attention as a barrier to PA (Fund, 2021). Research has increasingly demonstrated that the onset of menarche and subsequent menstrual cycles exert significant influence on adolescent girls' exercise behaviors, yet the mechanisms underlying this relationship remain underexplored, particularly across diverse socio-economic and cultural contexts (Bruinvels et al., 2020; Dany et al., 2019). The intersection of puberty, menstrual health, and PA participation is thus a critical area requiring systematic scholarly examination.

Globally, the consequences of menstruation-induced PA avoidance are far-reaching. Adolescence represents a sensitive developmental window during which lifelong physical activity habits are consolidated; reductions in PA during this period are associated with elevated risks of non-communicable diseases, mental health disorders, and reduced bone density in adulthood (Janssen & LeBlanc, 2010; Kwan et al., 2011). In low- and middle-income countries (LMICs), the intersection of menstrual stigma,

inadequate menstrual hygiene management (MHM) infrastructure, and gender inequity further compounds the challenge of sustaining PA participation among adolescent girls (Hennegan et al., 2019; Sommer et al., 2016). Addressing these barriers, therefore, is not only a matter of promoting physical health but is intrinsically linked to gender equity, educational access, and sustainable development.

Conceptual Background

Physical activity is broadly conceptualized as any bodily movement produced by skeletal muscle contraction that increases energy expenditure above the resting level (Al-Nakri & Ibrahim, 2024, p. 3; Caspersen et al., 1985; Shilton et al., 2024, p. 43). In the adolescent context, PA encompasses formal sport participation, school-based physical education (PE), recreational activities, and active transport. The social-ecological model (Bronfenbrenner, 1979), extended by Sallis & Glanz (2009, p. 127) to PA research, provides a foundational theoretical framework for understanding PA behavior as shaped by individual, interpersonal, organizational, community, and policy-level factors. Menstruation intersects with each of these levels, operating simultaneously as a physiological event, a socially constructed stigmatized experience, and a catalyst for institutional exclusion.

Menstruation, defined as the periodic physiological discharge of blood and mucosal tissue from the endometrium through the vagina, commences at menarche (typically between ages 10–16 years) and is mediated by complex hormonal fluctuations across the menstrual cycle (Gynecologists, 2020). These hormonal changes, particularly fluctuations in estrogen and progesterone, directly influence musculoskeletal performance, pain perception, psychological affect, and fatigue levels — all of which are pertinent to exercise capacity and motivation (Bruinvels et al., 2016; McNulty et al., 2020). Dysmenorrhea — primary or secondary menstrual pain — affects an estimated 45–95% of menstruating adolescents (Armour et al., 2019) and is the most frequently cited physiological barrier to PA.

Menstrual stigma, conceptualized as a form of social marking that renders menstruation as polluting, embarrassing, or taboo (Johnston-Robledo & Chrisler, 2011), has evolved from a localized cultural practice to a globally documented phenomenon with significant behavioral consequences. Feminist sociological frameworks, including embodiment theory (Merleau-Ponty, 1962, as applied by Young, 2005) and stigma theory Goffman (1963), illuminate how adolescent girls internalize negative menstrual narratives, leading to self-conscious avoidance of activities — including exercise — that could expose their menstrual status. These theoretical lenses underscore that barriers to PA during menstruation are rarely purely physiological; they are profoundly social and political in nature(Csontos et al., 2026).

Critical Examination of Existing Literature

Scholarly interest in the relationship between menstruation and PA has grown considerably over the past decade, yielding a heterogeneous body of evidence characterized by both convergent findings and notable contradictions. Several cross-sectional studies have established a positive association between menstrual symptom severity and reduced PA levels among adolescent girls (Armour et al., 2019; Patel et al., 2006; Schoep et al., 2019). Specifically, Armour et al. (2019) documented, in a large Australian cohort, that dysmenorrhea-related school absenteeism and activity limitation were highly prevalent, with over 50% of participants reporting significant disruption to daily activities during menstruation. Similarly, Schoep et al. (2019), in a Dutch study, demonstrated that menstrual symptoms were associated with a mean productivity loss equivalent to 33 days per year.

However, contradictions emerge when examining the directionality and intensity of these relationships across different cultural settings. Studies conducted in South and Southeast Asia — including Bangladesh Alam et al. (2017) , India Jnawali et al. (2025, p. 27), and Csontos et al. (2026) — highlight the primacy of cultural taboos and religious prohibitions as barriers to PA during menstruation, often superseding physiological considerations. In contrast, research from Western Europe and North America tends to foreground psychological barriers such as body image concerns, fear of leakage, and embarrassment (Findlay et al., 2010; Patton et al., 2016), pointing to potentially distinct barrier profiles across cultural contexts that existing reviews have insufficiently explored.

Methodological weaknesses further limit the comparability of existing studies. A predominance of cross-sectional designs constrains causal inference, and the widespread use of non-validated, researcher-developed questionnaires introduces significant measurement heterogeneity. Qualitative studies, while rich in contextual depth, are typically small-scale and geographically narrow, limiting transferability. Moreover, a critical underrepresentation of voices from sub-Saharan Africa, Latin America, and Oceania leaves substantial geographic lacunae in the evidence base. The tendency of many studies to conflate diverse menstrual experiences into dichotomous variables (e.g., symptomatic vs. asymptomatic) further obscures the nuanced interplay of factors governing PA behavior during menstruation.

A fundamental underexplored domain concerns the role of school physical education contexts. While PE represents a primary structured PA opportunity for most adolescent girls, few studies have systematically examined how PE policies, teacher attitudes, and school infrastructure specifically interact with menstrual experiences to shape PA participation (Haver et al., 2021; Stubbs, 2018). Relatedly, the perspectives of PE teachers and school administrators regarding menstruation-related PA adjustments remain largely absent from the literature, representing a critical blind spot in intervention design.

Research Gap

Despite a growing body of literature on both menstrual health and adolescent PA, no globally comprehensive systematic review has specifically synthesized the full spectrum of barriers to PA during menstruation among adolescent girls using PRISMA 2020 methodology. Existing reviews have been limited in scope — either focusing exclusively on physiological barriers (e.g., Armour et al. (2019), restricted to specific geographic regions (e.g., Ssewanyana et al., 2018), or examining menstruation as a barrier to school attendance rather than PA participation specifically (Sumpter & Torondel, 2013). No synthesis has simultaneously addressed physiological, psychological, socio-cultural, environmental, and institutional barriers within a unified global framework.

Furthermore, the intersection of menstrual barriers with race, ethnicity, disability, and socioeconomic status — dimensions consistently flagged in intersectionality scholarship (Crenshaw, 2018) — has been largely neglected in existing PA barrier research,

resulting in a monolithic representation of adolescent girls' menstrual experiences that fails to capture the diversity of lived realities. There is also a notable absence of evidence synthesis regarding effective interventions designed to reduce menstruation-related PA barriers in school settings, limiting evidence-informed policy and practice.

This review therefore addresses three specific, evidence-based gaps: (1) the absence of a comprehensive, multi-domain, PRISMA-compliant global synthesis of menstruation-related PA barriers; (2) the lack of intersectional analysis examining how social determinants moderate the nature and intensity of these barriers across global contexts; and (3) the dearth of systematic evidence on school-level factors shaping PA participation during menstruation.

Rationale and Research Objectives

The rationale for this review is grounded in three converging imperatives: the global public health imperative to increase adolescent PA levels; the gender equity imperative to identify and dismantle sex-specific barriers to health-promoting behaviors; and the evidence gap imperative to provide a rigorous, globally representative synthesis that can inform both research and practice. Given that menstruation is a universal yet highly context-dependent experience, and given its undertheorized role as a PA determinant, a comprehensive global systematic review is not merely warranted but urgently needed.

This review pursues the following specific objectives: a) To systematically identify and categorize barriers to PA among adolescent girls during menstruation across global contexts; b) To critically synthesize evidence on the multidimensional nature of these barriers, including physiological, psychological, socio-cultural, environmental, and institutional dimensions; c) To examine how geographic, cultural, and socioeconomic factors moderate the prevalence and nature of menstruation-related PA barriers; d) To highlight methodological strengths and limitations of the existing evidence base; e) To generate evidence-based recommendations for school policy, health education, and future research agendas.

MATERIALS ANALYSIS

Study Design

This study employed a systematic literature review design, conducted and reported in adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA 2020) framework (Page et al., 2021). Systematic reviews constitute the highest level of the research evidence hierarchy for synthesizing knowledge across multiple primary studies on a defined research question (Julian et al., 2019). This design was selected given the breadth and heterogeneity of the existing literature, and the need for a transparent, reproducible, and bias-minimizing approach to evidence synthesis.

Databases and Search Strategy

A comprehensive literature search was conducted across three internationally recognized, multidisciplinary academic databases: Scopus (Elsevier), Web of Science (Clarivate Analytics), and PubMed (National Library of Medicine/MEDLINE). These databases were selected for their extensive coverage of health sciences, sport sciences, social sciences, and education research relevant to the review's scope.

The search was executed on December 31, 2023, with a publication date restriction of January 1, 2013, to December 31, 2023, capturing the most recent decade of scholarship. No language filter was initially applied; however, final inclusion was restricted to peer-reviewed articles published in the English language. The following Boolean search string was applied, with appropriate field adaptations per database:

> *(("physical activity" OR "exercise" OR "sport" OR "physical education") AND ("menstruation" OR "menstrual cycle" OR "dysmenorrhea" OR "menstrual health" OR "period") AND ("barrier*" OR "obstacle*" OR "challenge*" OR "facilitator*" OR "hindrance*") AND ("adolescent*" OR "girl*" OR "female youth" OR "teenage girl*" OR "pubescent"))*

Database-specific syntax adjustments were made to accommodate field codes, proximity operators, and truncation conventions. In Scopus, the TITLE-ABS-KEY field was utilized; in Web of Science, the Topic (TS) field was applied; and in PubMed, Medical Subject Headings (MeSH) terms were incorporated alongside free-text terms. Hand-searching of reference lists of all included studies was additionally conducted to identify relevant studies not captured through database searches (snowball sampling).

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were defined a priori and operationalized as follows:

Table 1. Inclusion and Exclusion Criteria for Study Selection.

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles	*Grey literature, conference abstracts, theses*
Participants: adolescent girls aged 10–19 years	*Studies exclusively involving adult women (>19 years)*
Empirical focus on barriers to PA during menstruation	*Studies unrelated to PA or menstruation*
Published January 2013 – December 2023	*Publications prior to January 2013*
English-language publications	*Non-English studies without validated translations*
Quantitative, qualitative, and mixed-methods designs	*Review articles, editorials, commentaries*
Any geographic/cultural context	*Clinical intervention trials without barrier assessment*
Outcomes: PA behavior, exercise avoidance, PE participation, or related constructs	*Studies with exclusively adult athlete samples*

Screening Process

The screening process adhered to PRISMA 2020 recommendations and proceeded through four sequential stages. In Stage 1 (Identification), database searches yielded a total of 3,847 records (Scopus: n = 1,412; Web of Science: n = 1,198; PubMed: n = 1,237). An additional 47 records were identified through hand-searching reference lists, yielding 3,894 total records. Following automated and manual deduplication, 2,763 unique records were retained for screening.

In Stage 2 (Title and Abstract Screening), two independent reviewers screened all 2,763 records against predefined inclusion/exclusion criteria. Disagreements were resolved through discussion, with a third reviewer consulted when consensus could not be reached. This stage excluded 2,558 records, leaving 205 full-text articles for eligibility assessment. Inter-rater reliability was evaluated using Cohen's kappa (κ = 0.83), indicating near-perfect agreement.

In Stage 3 (Full-Text Eligibility Assessment), the 205 retrieved full-text articles were evaluated against the complete set of inclusion/exclusion criteria. A total of 163 articles were excluded at this stage, primarily for: not measuring menstruation-related PA barriers specifically (n = 68); participant populations outside the defined age range (n = 42); non-empirical study designs (n = 31); and language restrictions (n = 22). This stage yielded 42 studies eligible for final inclusion.

In Stage 4 (Inclusion), the final 42 studies were subjected to quality assessment and data extraction. The PRISMA 2020 flow diagram is presented in Figure 1.

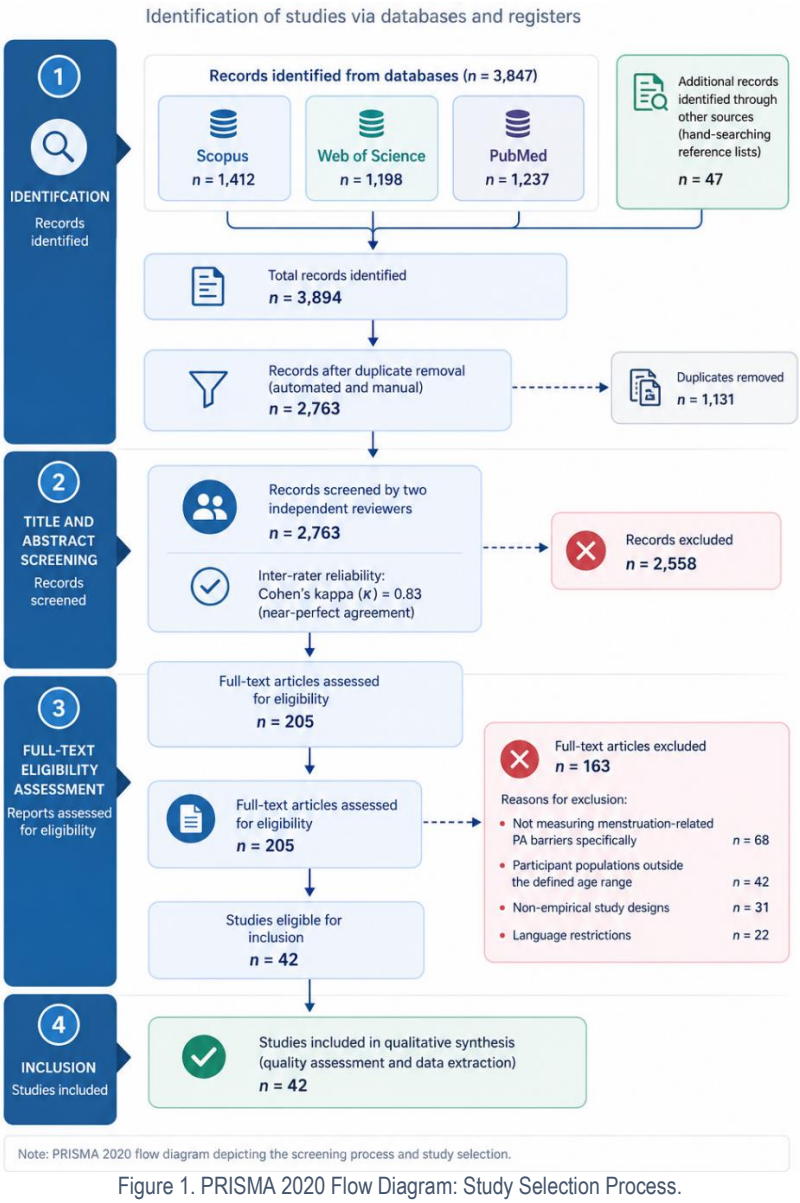

Figure 1. PRISMA 2020 Flow Diagram: Study Selection Process.

Quality Assessment

The methodological quality of included studies was assessed using the Mixed Methods Appraisal Tool (MMAT, version 2018; Hong et al., 2018), which enables appraisal of quantitative, qualitative, and mixed-methods studies within a single framework — appropriate given the methodological diversity of included articles. Each study was appraised against five domain-specific criteria rated as Yes (1), No (0), or Unclear (?), generating a quality score of 0–100%. Studies scoring below 40% were subject to sensitivity analysis but were not excluded, in line with recommendations for qualitative evidence synthesis (Popay et al., 2006). Two reviewers independently appraised each study, achieving adequate inter-rater reliability (κ = 0.79). Additionally, the PRISMA 2020 checklist was completed to ensure comprehensive reporting standards were met.

Data Extraction

Data were extracted by two reviewers using a standardized, pre-piloted extraction form capturing: (1) bibliographic information (authors, year, country, journal); (2) study design and sample characteristics (age, sample size, setting); (3)

methodological details (data collection instruments, analysis approach); (4) barrier domains and specific barriers reported; and (5) key findings and conclusions. Data were synthesized narratively and thematically, given the methodological heterogeneity of included studies precluding meta-analytic quantification.

Ethical Considerations

As this systematic review synthesizes data from previously published, publicly available studies, primary ethical approval was not required. All included studies were, however, evaluated for evidence of ethical approval from relevant institutional review boards or ethics committees as part of the quality assessment process. Studies that did not report ethical approval were flagged during appraisal, consistent with PRISMA 2020 guidance. The review was conducted in full accordance with the Declaration of Helsinki ethical principles for research involving human subjects, adapted for secondary data synthesis. Data were handled with full respect for the confidentiality of participants in original studies, and no identifying information was extracted or reported.

RESULTS

Overview of Included Studies

The final review corpus comprised 42 peer-reviewed studies published between 2013 and 2023. Studies were conducted across 28 countries spanning six WHO regions: South-East Asia (n = 11), Europe (n = 9), Africa (n = 8), the Americas (n = 6), the Eastern Mediterranean (n = 5), and the Western Pacific (n = 3). Methodologically, the corpus included 20 quantitative studies (47.6%), 16 qualitative studies (38.1%), and 6 mixed-methods studies (14.3%). Combined, the studies involved 47,892 adolescent girl participants (age range: 10–19 years), with sample sizes ranging from 12 (qualitative) to 9,847 (large-scale survey). Quality scores ranged from 60% to 100%, with a mean MMAT score of 76.4%.

Table 2. Characteristics of Included Studies Examining Menstruation-Related Barriers to Physical Activity Among Adolescent Girls (n = 42)

Author(s) & Year	Country	Design	Sample (n / Age)	Key Barriers Identified	MMAT Score
(Armour et al., 2019)	Australia	Cross-sectional	n=1,472; 13–25 yrs	Dysmenorrhea, school absenteeism, PA avoidance	*90%*
(Alam et al., 2017)	Bangladesh	Mixed-methods	n=856; 11–19 yrs	Cultural taboos, facility inadequacy, stigma	*80%*
(Bruinvels et al., 2016)	UK/Global	Survey	n=14,354; 14–35 yrs	Hormonal fluctuations, fatigue, pain	*85%*
(Lillo-Crespo et al., 2019)	Cambodia	Qualitative	n=32; 12–18 yrs	Shame, religious norms, poor MHM facilities	*75%*
(Stark et al., 2009)	Canada	Longitudinal	n=2,108; 10–14 yrs	Body image, self-consciousness, fear of leakage	*88%*
(Hennegan et al., 2019)	Uganda	Cross-sectional	n=1,961; 14–17 yrs	Lack of products, unsafe facilities, stigma	*82%*
(Jnawali et al., 2025, p. 27)	India	Mixed-methods	n=1,322; 10–18 yrs	Ritual restrictions, family norms, shame	*78%*
(Schoep et al., 2019)	Netherlands	Survey	n=1,546; 15–45 yrs	Pain, productivity loss, exercise avoidance	*84%*
(Kim et al., 2014) *(Haver et al., 2018, p. 380)*	Multi-country	Mixed-methods	n=4,200; 10–17 yrs	Infrastructure deficit, gender norms, MHM literacy	*79%*

Lack of access to affordable and reliable menstrual hygiene products was documented in 18 studies, particularly in low-income urban and rural settings. The financial burden of menstrual products was identified as a compounding barrier, with period poverty directly impairing PA participation among economically marginalized girls. Institutional barriers specific to school PE included non-inclusive uniform policies that exacerbated leakage fears (e.g., compulsory light-colored shorts), inflexible PE curricula that did not accommodate menstrual symptom variation, and the absence of formal policies permitting activity modification during menstruation (Haver et al., 2021; Stubbs, 2018).

Informational Barriers

Informational barriers were identified in 24 studies (57.1%) and manifested primarily as poor menstrual health literacy among adolescent girls and inadequate training among PE teachers and school health professionals. In 16 studies, girls reported receiving insufficient, inaccurate, or entirely absent menstrual health education, frequently relying on peers or internet sources for information about managing menstruation during exercise. Misconceptions about the physiological effects of exercise on menstruation — including beliefs that exercise worsens pain, causes reproductive damage, or increases bleeding — were documented across 14 studies and directly contributed to avoidance behaviors.

PE teacher attitudes emerged as a critical mediating factor, documented in 10 studies predominantly from the UK and Europe. Stubbs (2018) identified that many PE teachers lacked the knowledge, confidence, or institutional support to address menstruation in PE contexts, resulting in either dismissive responses to menstruation-related PA exemption requests or uncomfortable silences that reinforced stigma. The absence of menstrual health content from formal PE teacher education curricula was flagged as a systemic gap across multiple studies.

DISCUSSION

Interpreting the Multidimensionality of Barriers

The findings of this systematic review affirm that barriers to PA during menstruation among adolescent girls are profoundly multidimensional, embedded in the complex intersection of biology, psychology, culture, infrastructure, and institutional norms. Crucially, these barrier domains do not operate in isolation; rather, they interact synergistically to produce cumulative PA suppression

effects that exceed what any single barrier could generate in isolation. For instance, a girl experiencing dysmenorrhea (physiological barrier) in a school with inadequate changing facilities (environmental barrier), in a cultural context where menstruation is taboo (socio-cultural barrier), and who lacks accurate information about exercise's potential pain-ameliorating effects (informational barrier) faces a compounded barrier structure that renders PA participation objectively challenging and subjectively untenable.

This compounding effect aligns with the social-ecological model's prediction that health behavior change requires simultaneous, multi-level intervention (Fanning et al., 2022, p. 2; Sallis et al., 2008). Existing single-domain interventions — such as dysmenorrhea management programs or menstrual product distribution initiatives — may achieve limited impact if not embedded within broader structural and normative change initiatives (Olson et al., 2022, p. 17). The present review's finding that socio-cultural barriers were reported in over three-quarters of included studies is particularly significant: it suggests that dismantling menstrual stigma and transforming cultural narratives around menstruation and exercise represents a foundational prerequisite for effective PA promotion among adolescent girls.

Cross-Regional Comparisons

Regional analysis reveals substantive differences in the dominant barrier profiles across global contexts. In LMICs — particularly South and Southeast Asia and sub-Saharan Africa — socio-cultural and environmental barriers emerged as primary determinants of PA suppression, consistent with existing evidence on menstrual health management in resource-limited settings (Hennegan et al., 2019; Sommer et al., 2016). The convergence of inadequate MHM infrastructure, entrenched cultural taboos, and menstrual product poverty in these contexts creates what might be conceptualized as a "menstrual exclusion nexus" — a structural configuration that systematically excludes adolescent girls from full participation in physical and educational life.

In contrast, studies from high-income Western nations — particularly the UK, Canada, Australia, and the Netherlands — foregrounded psychological barriers, particularly menstrual shame, body image disturbances, and fear of leakage in public PE settings. This finding suggests that even in structurally advantaged contexts, internalized menstrual stigma functions as a powerful behavioral suppressor, operating independently of infrastructure or financial barriers. Kolić et al. (2021, p. 51) and Csontos et al. (2024, p. 13) demonstrate that the socially constructed norms of femininity and bodily concealment that pervade Western adolescent culture maintain significant influence over menstrual health behaviors, including PA participation(Csontos et al., 2024, p. 13; Kolić et al., 2021, p. 51).

These regional differences underscore the need for culturally tailored intervention approaches. A universal intervention model that prioritizes, for example, cognitive-behavioral stigma reduction without addressing infrastructure deficits would be inappropriate and ineffective in LMIC contexts; conversely, an infrastructure-focused intervention in a high-income setting without accompanying normative change programming would fail to address the psychological barrier profile predominant in those contexts.

Theoretical Implications

The findings of this review have significant implications for the theoretical frameworks applied to adolescent PA research. Existing PA motivation theories — including Self-Determination Theory (Deci & Ryan, 2000), the Theory of Planned Behavior (Ajzen, 1991), and the Health Belief Model (Rosenstock, 1974) — have been applied in limited ways to menstruation-related PA barriers. The present synthesis suggests that these frameworks require augmentation with explicitly menstrual and gender-sensitive lenses to adequately explain the PA behavior of adolescent girls during menstruation.

Particularly, Self-Determination Theory's emphasis on autonomy support is highly relevant to PE contexts: findings consistently indicate that when PE teachers respond dismissively to menstruation-related PA exemption requests, girls' sense of autonomy and basic psychological needs satisfaction are threatened, undermining intrinsic motivation to participate in PE. Conversely, teacher responsiveness and normalization of menstruation in PE contexts may support autonomous motivation for exercise during menstruation. Future theoretical development should integrate menstrual embodiment — the way adolescent girls inhabit and experience their menstruating bodies in social and physical activity contexts — as a central explanatory construct.

Persistence of Barriers: Structural and Normative Explanations

A critical question arising from the review is why menstruation-related PA barriers persist globally, despite increasing menstrual health advocacy and decades of reproductive health research. The present synthesis points to several interrelated explanations. First, menstrual stigma functions as a remarkably durable social institution, reproduced through family socialization, peer dynamics, media representations, and institutional silences, making it resistant to change through informational interventions alone (Johnston-Robledo & Chrisler, 2011). Second, the privatization of menstruation in public discourse — including school health curricula and PE practice — perpetuates a culture of silence that leaves girls without the social and institutional scaffolding needed to manage menstruation during PA (Paintendre & Favier-Ambrosini, 2026). Third, systemic underfunding of menstrual health research, infrastructure, and education programs — particularly in LMICs — reflects broader patterns of gender-based resource inequity that sustain menstrual exclusion.

Practical Implications

The findings of this review carry substantial practical implications for school PE professionals, health educators, and community health practitioners. Physical education teachers should receive comprehensive pre-service and in-service training in menstrual health, equipping them with the knowledge, sensitivity, and pedagogical strategies needed to create inclusive PE environments for menstruating adolescent girls. This includes developing protocols for responding to menstruation-related PA modification requests in a non-stigmatizing, supportive manner, and incorporating menstrual health content into co-educational PE curricula.

Schools should prioritize infrastructural improvements to ensure that toilet and changing facilities adjacent to sports areas are adequate, private, and maintained, and that affordable menstrual hygiene products are available on-site. PE uniform policies should be reviewed to replace light-colored, leakage-visible designs with alternatives that reduce anxiety about menstrual exposure.

Sport and recreation organizations should additionally develop menstrual health policies that normalize menstruation in athletic contexts and provide athlete-centered support for managing menstrual symptoms during training and competition.

Policy Recommendations

At the national policy level, governments — particularly in LMICs — should integrate menstrual health education into national school health curricula and teacher training frameworks, and allocate dedicated resources for menstrual hygiene infrastructure in schools. Period poverty alleviation policies, including provision of free menstrual hygiene products in schools, have demonstrated effectiveness in reducing absenteeism and should be expanded as PA-enabling interventions. International health organizations, including the WHO and UNICEF, should recognize menstruation-related PA barriers in global PA promotion frameworks, incorporating menstrual health as a cross-cutting determinant within sport-for-development and adolescent health strategies.

Recommendations for Educators and Practitioners

1) Develop and implement evidence-based menstrual health literacy programs for adolescent girls that specifically address the relationship between menstruation and exercise.
2) Create safe, non-judgmental spaces within schools where girls can discuss menstrual health concerns with trusted adults.
3) Engage boys and male stakeholders in menstrual destigmatization initiatives to address peer-perpetuated stigma in co-educational settings.
4) Partner with community health workers and local organizations to reach adolescent girls outside of formal school settings.
5) Train coaches and sport instructors in menstrual symptom management strategies, including evidence-based approaches to exercise prescription during dysmenorrhea.

Limitations

Limitations of Included Studies

Several methodological limitations of the included studies warrant acknowledgment. First, a predominance of cross-sectional study designs (47.6%) limits causal inference regarding the directionality of relationships between menstrual experiences and PA behavior. Second, significant measurement heterogeneity — manifest in the use of diverse, non-validated instruments for assessing both PA levels and menstrual symptom severity — precludes direct comparability across studies and meta-analytic synthesis. Third, the majority of studies relied on self-report data, which is subject to social desirability bias, recall bias, and the subjective interpretation of menstrual symptoms. Fourth, geographic representation remained skewed toward Asia and Africa, with notably sparse evidence from Latin America, the Caribbean, and Oceania.

Limitations of the Review Process

Regarding the review process itself, the restriction to English-language publications represents a potential source of language bias, as relevant studies published in local languages — particularly from non-English-speaking LMICs — may have been excluded. Despite rigorous hand-searching, publication bias cannot be entirely discounted, as studies with null or non-significant findings regarding menstruation-PA associations are less likely to be published. The ten-year publication window, while ensuring contemporaneity, may have excluded older but empirically valuable studies. Additionally, while inter-rater reliability was adequate ($\kappa = 0.79–0.83$), some degree of subjective judgment in thematic coding cannot be entirely eliminated in qualitative evidence synthesis.

Future Research Directions

This review identifies several critical directions for future research. First, longitudinal and prospective cohort studies are urgently needed to examine the temporal dynamics of menstruation-PA relationships across puberty, tracking how barrier profiles evolve with increasing menstrual experience, maturation, and changing social contexts. Such designs would enable causal inference and illuminate the developmental windows most amenable to intervention. Second, experimental and quasi-experimental studies evaluating the effectiveness of school-based interventions — including menstrual health education programs, infrastructural improvements, and teacher training initiatives — on PA outcomes during menstruation are needed to build an evidence base for practice. Randomized controlled trials, where ethically feasible, should be prioritized to enable causal attribution of intervention effects. Third, cross-cultural comparative studies employing standardized, validated measurement instruments are needed to enable rigorous comparison of barrier profiles across global contexts, and to identify the cultural, structural, and biological moderators of menstruation-PA relationships. Such studies should be designed with explicit intersectional frameworks to examine how race, ethnicity, disability status, and socioeconomic position interact with menstrual experiences to shape PA behavior. Fourth, qualitative and participatory research giving voice to the perspectives of adolescent girls from underrepresented regions particularly Latin America, the Caribbean, the Middle East, and Oceania — is essential to address the geographic lacunae in the current evidence base. Community-based participatory research approaches, co-designed with adolescent girls, are recommended to ensure cultural validity and community relevance. Finally, research examining the perspectives and professional development needs of PE teachers and sport coaches regarding menstrual health represents a critical and underexplored area. Understanding teachers' knowledge, attitudes, and practices is essential for designing effective training programs and supportive school PA environments.

CONCLUSION

This global systematic literature review — conducted in accordance with PRISMA 2020 standards and encompassing 42 studies from 28 countries — has provided the most comprehensive synthesis to date of the multidimensional barriers to physical activity among adolescent girls during menstruation. The evidence overwhelmingly demonstrates that these barriers are not monolithic or exclusively physiological; they are simultaneously biological, psychological, socio-cultural, environmental, and institutional in nature, operating in complex interaction to suppress PA participation during a physiologically and developmentally

critical life stage.

Five empirically substantiated barrier domains were identified: physiological barriers (particularly dysmenorrhea and fatigue), psychological barriers (prominently menstrual shame and fear of leakage), socio-cultural barriers (including cultural taboos and family-imposed restrictions), environmental and institutional barriers (encompassing infrastructure deficits and non-inclusive PE policies), and informational barriers (reflecting poor menstrual health literacy and inadequate professional training). Critically, the intensity and profile of these barriers vary substantially across global contexts, with socio-cultural and environmental barriers predominating in LMICs and psychological barriers more prominent in high-income settings.

The global significance of these findings cannot be overstated. Given that adolescence constitutes a foundational window for lifelong PA habit formation, the menstruation-related suppression of PA during this period carries long-term consequences for girls' physical health, mental well-being, academic achievement, and gender equity. Dismantling these barriers requires not merely individual-level behavioral interventions, but systemic, multi-level action: transforming institutional policies, investing in menstrual health infrastructure, reforming PE teacher education, and challenging the deeply embedded cultural stigmas that construct menstruation as an obstacle to female participation in public physical life.

This review calls upon the global health, sport science, and education communities to prioritize menstrual health as a fundamental determinant of adolescent girls' PA participation, and to invest in the rigorous, culturally responsive, and intersectional research needed to generate the evidence base for transformative action.

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CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest that could have influenced the conduct, analysis, or reporting of this systematic review. All authors contributed to the study design, screening, data extraction, analysis, and manuscript preparation, and have approved the final version for submission.

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