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Habitual Physical Activity and Structured Exercise in Premenstrual Syndrome: A Narrative Review of Observational and Interventional Evidence

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Abstract

Background: Premenstrual syndrome (PMS) is a cyclic condition with physical, affective and behavioural symptoms that may impair functioning and quality of life. Habitual physical activity and structured exercise are distinct exposures.

Aim: To distinguish these exposures, synthesise observational and interventional evidence, and assess clinical implications and methodological limitations.

Material and Methods: This structured narrative review searched PubMed and Scopus, with Google Scholar supplementary, for English-language publications from January 2011 to 1 June

2026. Both evidence streams were synthesised separately, considering design, PMS ascertainment, programme characteristics, outcomes and methodological limitations.
Results: Observational evidence was mixed, with inverse, null and possible non-linear associations. Measurement and ascertainment differences, confounding, reverse causality and uncertain temporality limited causal interpretation. Interventional findings were broadly favourable but heterogeneous across aerobic, mind-body and strengthening programmes. Global PMS outcomes were not interchangeable with pain, stress or biomarkers. Confidence was limited by selected samples, varied comparators, inconsistent reporting and limited follow-up.
Conclusion: Habitual physical activity and structured exercise are not interchangeable, and observational evidence does not support a prevention claim. Evidence did not support modality ranking or a precise prescription. Structured exercise may be an individualised adjunct but should not replace diagnosis or established care; severe, persistent, functionally impairing or atypical symptoms require clinical assessment. Future studies need standardised PMS confirmation, syndrome-wide outcomes and transparent programme, safety and follow-up reporting.

Keywords
Premenstrual syndrome; habitual physical activity; structured exercise; aerobic exercise; yoga; progressive muscle relaxation; quality of life; women’s health

1. Introduction

Premenstrual syndrome (PMS) is a cyclic clinical condition characterised by recurrent affective, behavioural and somatic symptoms that emerge during the late luteal phase and resolve within several days after menstruation begins [1,2]. Although its presentation is heterogeneous, clinical identification depends on a recurring cycle-linked pattern and relative postmenstrual relief rather than isolated complaints [1–3]. Clinical relevance also depends on functional burden, because symptoms may disrupt daily routines, social activities and interpersonal relationships [1,3]. Assessment should therefore consider symptom timing, recurrence, severity and associated impairment.

Functional burden may not parallel the intensity of individual symptoms. In a prospective study of high-school students, fatigue was the most frequent somatic symptom and difficulty concentrating the most common affective symptom, although academic performance was not directly assessed [4]. The Daily Record of Severity of Problems used by Chang et al. assessed interference with work or daily routines, hobbies and social activities, and interpersonal relationships as distinct outcomes [3]. Considering these restrictions alongside symptom ratings provides a more clinically meaningful account of PMS burden and may help identify presentations requiring closer clinical assessment [1,3].

Habitual physical activity and structured exercise are related but non-equivalent exposures. Habitual physical activity comprises movement accumulated during everyday life, including walking, school-based activity and recreation, whereas exercise is a planned and repetitive subcategory [4–6]. Observational studies measure naturally occurring patterns through approaches such as walking, moderate-to-vigorous movement or recreational activity [5,6]. Intervention studies instead prescribe a programme with a defined modality and dose; for example, Maged et al. evaluated swimming for 30 minutes three times weekly over three months [2]. Observational associations and intervention effects therefore address different questions and require separate synthesis: neither can be transferred directly to the other exposure context.

Current evidence does not support a uniform interpretation of the relationship between physical activity, exercise, and PMS. Using accelerometry, Shi et al. found that greater moderate and moderate-to-vigorous physical activity was associated with lower PMS scores [7]. By contrast, Kroll-Desrosiers et al. reported no association between recreational physical activity and either symptom severity or PMS prevalence after covariate adjustment [6]. Morino et al. described a potentially non-linear pattern, with PMS occurring more frequently among women reporting both low and high daily activity than among those with intermediate levels [8]. A meta-analysis of observational studies suggested an overall association but also identified substantial heterogeneity, a non-significant pooled estimate among adjusted studies, and poor stability in sensitivity analyses [9]. Intervention research presents a generally more favourable signal, yet its interpretation is constrained by small samples, variable PMS ascertainment, heterogeneous exercise programmes, differing outcome measures, and frequent risk of bias [10]. These contrasts justify separate appraisal of naturally occurring activity patterns and prescribed exercise interventions. Accordingly, this narrative review aims to critically evaluate and integrate observational evidence on habitual physical activity and interventional evidence on structured exercise in relation to PMS, with particular attention to diagnostic methods, exercise characteristics, clinical outcomes, and methodological limitations.

2. Materials and methods

PubMed and Scopus were searched for English-language publications issued from January 2011 to 1 June 2026 using terms related to PMS, physical activity and exercise. Google Scholar was used as a supplementary source. Additional modality-specific searches were adapted to each source, and reference lists of relevant primary studies, reviews and meta-analyses were screened for further publications.

Primary observational and interventional studies involving menstruating adolescents or women of reproductive age were eligible if they examined habitual physical activity or a structured exercise, movement- or relaxation-based programme and reported a PMS-related outcome, including occurrence, global or domain-specific severity, premenstrual symptoms, functional impairment or quality of life. Pain and other psychological or physiological outcomes were supplementary and insufficient without a PMS-related measure. Prospective and retrospective instruments were accepted, with ascertainment quality considered in interpretation. Exclusions included primary dysmenorrhoea alone, PMDD without separable PMS data, reports without relevant activity, exercise or PMS outcomes, inseparable multicomponent interventions, pre-2011 or non-English publications, conference abstracts, incomplete reports and duplicates without unique data.

Data extracted from primary reports covered study design and population, PMS ascertainment, activity or programme characteristics and dose, comparator, outcomes, principal findings and major limitations; precise numerical claims were verified in primary reports. Observational and interventional evidence was synthesised separately. Qualitative appraisal considered ascertainment, exposure or programme definition, comparators, outcomes, confounding and reverse causality, and relevant trial design and reporting limitations. No formal quality score, structured risk-of-bias instrument or GRADE assessment was applied. Heterogeneity precluded a new pooled estimate, so findings were synthesised narratively.

3. Premenstrual syndrome: definition, diagnosis and clinical relevance

Premenstrual syndrome (PMS) is a recurrent syndrome of affective, behavioural, and somatic symptoms that emerges during the luteal phase and resolves or diminishes within several days after menstruation begins [1]. The presence of one or several complaints before menses alone does not establish PMS; clinically meaningful classification requires a reproducible cyclical pattern across menstrual cycles, a relatively symptom-free follicular interval, and sufficient distress or functional interference [11]. Premenstrual dysphoric disorder

(PMDD) is a separately defined, severe premenstrual disorder with stricter symptom requirements, prominent affective manifestations, and marked impairment, and should therefore not be treated as a simple synonym for PMS [1]. Primary dysmenorrhoea is distinct because it is characterised primarily by cramping lower-abdominal pain during menstruation, in the absence of pelvic pathology, rather than by a multidomain syndrome centred on the premenstrual luteal phase [12]. Premenstrual exacerbation instead describes an underlying physical or psychological condition whose symptoms remain present at other times in the cycle but become more severe during the luteal phase [11]. Because retrospective descriptions may blur these entities, reliable differentiation depends on evaluating symptom timing, recurrence, postmenstrual remission, and variation across the entire menstrual cycle.

PMS ascertainment ranged from prospective daily records to single retrospective scales. Daily ratings over at least two consecutive cycles can establish luteal timing, recurrence, postmenstrual improvement, and a relatively symptom-free follicular interval, providing stronger confirmation of cyclicity than a single retrospective assessment [4,11]. The Daily Record of Severity of Problems (DRSP) prospectively records symptoms and impairment in routine activities, social participation, and relationships [3]. Retrospective instruments remain useful for screening and quantifying severity, but their function should be distinguished from prospective diagnostic confirmation. The Premenstrual Symptoms Screening Tool (PSST) covers emotional, physical, and behavioural symptoms together with their impact on functioning and, in one yoga trial, was used for participant selection and outcome assessment [13]. The Premenstrual Syndrome Scale (PMSS) provides a retrospective score across several symptom domains; in one trial, its threshold defined eligibility and the same scale measured change [14]. A modified Premenstrual Syndrome Questionnaire (MSQ) assessed several PMS subscales but also included cramps and backache, illustrating that broader menstrual measures may complicate PMS-specific interpretation when they incorporate symptoms occurring during menstruation [15]. Another trial applied diagnostic criteria across three cycles but used a separate Daily Symptoms Report for outcomes [2]. Prospectively confirmed PMS, scale-defined or probable PMS, and self-reported premenstrual symptoms should therefore not be treated as interchangeable, and heterogeneity in instruments and thresholds limits direct comparison across studies.

The clinical relevance of PMS depends not only on whether symptoms are present or how intense they are, but also on the distress and functional disruption they produce. Symptoms may range from mild complaints to manifestations that interfere with occupational or educational activities, concentration and productivity, usual responsibilities, and participation in social and personal life [1,11]. Functional impairment is related to symptom severity but is not identical to it: individuals with similar symptom scores may experience different restrictions in functioning. Instruments that assess functioning therefore add information beyond symptom totals. In the DRSP, impairment is evaluated separately across work or routine, hobbies or social activities, and interpersonal relationships [3], whereas the PSST distinguishes emotional, physical, and behavioural symptoms from their impact on quality of life [13]. Quality of life is conceptually broader than functional impairment, and neither concept should be treated as synonymous with distress or symptom presence. A statistically significant reduction in a mean scale score does not by itself demonstrate remission, a clinically perceptible benefit, or recovery across the syndrome. Improvement in one domain may also coexist with difficulties elsewhere; in some trials, general psychological outcomes were measured separately from PMS severity [14]. Accordingly, subsequent evidence should be judged by both the magnitude of symptom change and its relevance to everyday functioning.

4. Potential mechanisms linking physical activity and exercise with PMS

Biological and psychosocial pathways may link activity or exercise with PMS, but direct mechanistic evidence is limited. Cross-sectional associations between habitual activity, perceived stress, mental state and PMS severity cannot establish directionality or mediation [16]. Structured exercise may influence stress, mood, pain sensitivity, coping, autonomic regulation, sleep and fatigue, but these processes are not specific to PMS. Trials also require separation of syndrome outcomes from related measures: DASS-21 changes in participants selected with the PSST do not demonstrate improvement in the full PMS syndrome [17], and PMSS and DASS-21 were analysed separately elsewhere [14]. A mechanism would require temporal evidence that an intervention changed a mediator that subsequently related to PMS improvement; co-occurring changes in pain, sleep or well-being are insufficient.

Laboratory measures provide mechanistic plausibility but not proof of mediation. In a trial of 30 young women, treadmill exercise plus vitamin B6 and calcium was compared with the same supplements alone, with luteal-phase hormonal assays and a complete blood count [15]. Several blood indices increased within the exercise group, but only haemoglobin differed significantly between groups; prolactin and progesterone showed post-treatment between-group differences, whereas oestradiol did not despite a within-group decrease [15]. The study reported no biomarker-symptom correlations or formal mediation analysis, and its small sample, multiple comparisons and shared supplementation background limit causal interpretation. Cramps and backache were also measured, so menstrual-pain changes cannot be equated with PMS improvement. These findings remain hypothesis-generating and should complement clinical PMS outcomes.

Structured exercise is not mechanistically homogeneous. Aerobic and aquatic programmes involve cardiorespiratory loading, yoga combines movement with breathing, attention and relaxation, progressive muscle relaxation uses cycles of muscle tension and release, resistance exercise applies progressive loading, and whole-body vibration delivers external mechanical stimulation [2,14,15,17,18]. These are intervention components rather than confirmed pathways. Effects of movement are difficult to separate from scheduling, supervision, social contact, expectancy, relaxation and adherence support when comparators do not control them. Similar outcomes across modalities do not establish a shared mechanism, while differences may reflect dose, delivery, adherence, comparator or outcome measurement. Mechanistic interpretations from supervised programmes should not be transferred automatically to multidomain habitual activity.

5. Habitual physical activity and PMS: observational evidence

5.1 Measurement of habitual physical activity

Observational studies measured activity occurring in everyday life rather than a controlled exercise dose. Recreational activity was estimated from self-reported named activities and converted to metabolic equivalent task hours [6], while broader questionnaires combined occupational, transport, household and recreational movement [8,16]. Regular-exercise or sport classifications captured recurring behaviour but often lacked comparable detail on frequency, intensity, duration and domain. School-based exposure included physical education, scheduled exercise and autonomous activity, reflecting attendance and opportunity as well as individual behaviour [4]. Accelerometry distinguished sedentary, light, moderate, vigorous and moderate-to-vigorous free-living activity [7]. These measures are not equivalent: sedentary behaviour is not simply the inverse of activity, and neither device-based intensity nor self-reported participation constitutes an exercise prescription. Interpretation therefore depends on the precision and domain of activity measurement as well as PMS ascertainment.

5.2 Observational findings

Observational findings were mixed rather than uniformly protective. In the study with the strongest PMS ascertainment, daily DRSP records over three months showed that students attending no more than one physical education class per week had higher odds of PMS than those attending two classes weekly (adjusted OR 4.43, 95% CI 1.18–16.60), although the confidence interval was wide and the exposure was school-specific [4]. Complementary evidence came from accelerometer monitoring: moderate and moderate-to-vigorous free-living activity were inversely associated with retrospectively classified PMS, whereas light activity and sedentary time were not, but the cross-sectional design could not establish directionality [7]. By contrast, self-reported recreational activity over the preceding month was unrelated to PMS case status or total, affective, and physical symptom scores after adjustment, providing an important null counterexample [6]. A further cross-sectional study of total daily activity found higher odds of PMS in both the low-activity group (OR 2.45, 95% CI 1.18–5.11) and the high-activity group (OR 2.13, 95% CI 1.01–4.50) relative to the middle group, a pattern compatible with possible non-linearity rather than a confirmed optimum [8]. Differences in symptom ascertainment, activity measurement, exposure domain, thresholds, and reference categories limit direct comparison. Overall, observational evidence supports possible associations in some settings but not a simple dose–response conclusion.

5.3 Confounding, reverse causality and temporal limitations

Confounding and reverse causality further limit observational interpretation. Perceived stress, mental state and BMI may relate to both activity and PMS severity, yet concurrent measurement cannot establish whether they are confounders, correlates, mediators or effect modifiers. An online survey assessed IPAQ-SF activity, stress, mental state, BMI and premenstrual symptoms together without formal mediation or interaction analyses [16]. Symptoms such as fatigue, pain or low mood may reduce movement or attendance, while some women may exercise for relief. Adjustment for treatment-related exercise did not alter a null recreational-activity association [6], and adjustment for age, sleep and health behaviours cannot remove residual confounding, measurement error or uncertain temporality [8]. Broad scores may represent occupational, household, transport, recreational, sport or school contexts with different implications; even prospective symptom tracking could not exclude PMS-related absence from physical education

[4]. Repeated, domain-specific measurement is needed, and habitual activity remains distinct from prescribed exercise.

6. Structured exercise interventions and PMS: interventional evidence

Interventional studies evaluated structured exercise as a planned and dosed exposure, distinct from habitual physical activity. Designs ranged from a swimming RCT based on three-cycle symptom history and a no-exercise control [2] to a four-arm yoga and progressive muscle relaxation study using PMSS and DASS-21 [14]. Other trials added treadmill exercise to vitamin B6 and calcium and assessed symptoms, pain and laboratory variables [15], or used PSST for selection while following DASS-21 for two months [17]. Resistance exercise and whole-body vibration were compared on a common supplement background with PMS domains, cramps and backache as outcomes [18]. Across the evidence base, PMS ascertainment ranged from prospectively supported classification to retrospective scales and broader premenstrual symptoms. No-exercise, usual-coping, active, combined and supplement-only comparators estimated different contrasts, while outcomes ranged from global PMS scores to individual symptoms, psychological distress, pain and biomarkers. Variation in programme dose, progression, supervision, adherence and follow-up further limits direct comparison and requires modality- and outcome-specific interpretation.

6.1 Aerobic and aquatic exercise

Aerobic and aquatic trials generally reported symptom improvement, but the clinical meaning and comparability of these findings varied. Trials assessing broader PMS outcomes were directionally favourable: an eight-week supervised aerobic programme reduced overall, physical and psychological symptom scores versus non-exercise control [19], while three-month swimming improved multiple symptoms across psychological and physical domains relative to no swimming [2]. Swimming nevertheless combined cardiorespiratory loading with an aquatic context, and the study neither isolated the latter nor assessed persistence after cessation. More narrowly, an eight-week, 20-minute aerobic programme favoured exercise for selected physical symptoms, including headache and gastrointestinal or swelling-related complaints, without demonstrating syndrome-wide improvement [20]. A six-week intensity trial found greater improvement in several MSQ domains with moderate and high versus mild intensity, but lacked an inactive control and did not establish an optimal dose [21]. In a small treadmill trial, exercise added to vitamin B6 and calcium improved total and subscale scores and coincided with pain, haematological and hormonal changes; because both groups received supplements and mediation was untested, neither pure exercise efficacy nor a laboratory mechanism can be inferred [15]. A supervised jogging trial used PSST for eligibility but evaluated depression, anxiety and stress with DASS-21; between-group differences emerged at follow-up rather than immediately, and did not represent a post-treatment global PMS outcome [17]. Finally, an aerobic–yoga comparison reported improvement in both active groups, but no untreated arm [22]. Overall, findings are broadly favourable but heterogeneous across outcomes, comparators, intensity, supervision and duration, providing suggestive rather than definitive evidence and supporting separate appraisal of mind–body interventions.

6.2 Yoga and progressive muscle relaxation

Yoga and relaxation-based trials generally reported favourable changes, although their intervention content and outcome structure were heterogeneous. Ten weeks of supervised yoga improved PSST-derived emotional, physical and behavioural domains and life impact relative to a no-yoga group [13]. A three-arm trial also favoured yoga over control and acupressure for PMSS severity and several quality-of-life domains, although the active comparison addressed relative rather than absolute effects [23]. Yoga combined postural movement, stretching and balance with breathing, focused attention and relaxation, so findings cannot be attributed solely to physical loading. In the one-month aerobic–yoga comparison, both groups improved and yoga showed a larger PMS-score change, whereas pain changes did not differ; baseline imbalance and no inactive arm limit claims of superiority [22]. A four-arm trial compared yoga, PMR, their combination and usual coping. Yoga and yoga-plus-PMR produced lower post-treatment PMSS scores than control, while all active groups showed reductions in DASS-21 outcomes [14]. PMR used controlled breathing with sequential tension and release of muscle groups rather than comparable cardiorespiratory or resistance loading. The combined arm received both full schedules and therefore more contact time; without factorial interaction testing, it did not establish synergy or a shared mechanism. A separate single-blind RCT similarly reported lower PMSS scores after daily home-based PMR than routine coping [24]. Conversely, an uncontrolled workplace yoga study reported selected symptom, pain-related and

SF-36 improvements among completers, but could not separate intervention effects from self-selection or temporal change [25]. Overall, mind–body evidence is suggestive but constrained by varied PMS instruments, complex components, selective samples and sparse post-intervention follow-up.

6.3 Pilates and controlled-movement programmes

A quasi-experimental study of instructor-led mat Pilates over three months reported lower total PMSS and most domain scores than routine-habits control, although non-probability sampling and non-random allocation limited inference [26]. Pilates combined controlled movement, postural stabilisation, breathing and precision and should not be classified automatically as yoga or conventional resistance training. In a later home-based trial, video-guided Pilates twice weekly for eight weeks, with weekly telephone contact and progressive repetitions, reduced perceived stress and pain versus control but did not produce a statistically clear between-group difference in post-treatment PMSS [27]. Thus, reminders and contact supported adherence monitoring but may also have added attention and behavioural support.

6.4 Resistance exercise, whole-body vibration and stretching

Evidence for strengthening and vibration interventions was favourable in direction but methodologically limited and not interchangeable across modalities. In a three-arm RCT, adolescents receiving progressive resistance exercise or whole-body vibration for 12 weeks, alongside magnesium and vitamin B6, showed greater improvement than supplementation alone across PMSQ domains, cramps and backache, with no clear difference between active arms [18]. This addressed comparative effectiveness on a supplement background rather than a pure exercise-versus-no-treatment contrast; WBV involved platform-delivered oscillation, whereas resistance training required volitional force at 60–70% of one-repetition maximum. Finally, a small active-comparator trial reported that abdominal resistance exercises favoured cramp-related outcomes over stretching across three cycles, but reporting inconsistencies and the absence of a reported global PMS endpoint restrict this evidence to symptom-specific interpretation [28]. These studies broaden the range of potentially useful modalities, yet divergent mechanics, delivery, progression and outcomes remain insufficient to establish superiority or an optimal dose.

6.5 Overall interpretation of structured exercise evidence

Structured exercise evidence was broadly favourable but too heterogeneous for a modality ranking or precise prescription. Trials of aerobic and aquatic exercise, yoga, progressive muscle relaxation (PMR), Pilates, resistance exercise, whole-body vibration (WBV) and stretching often improved at least one outcome, but global PMS scores and validated domains provide different evidence from DASS-21, stress, pain, cramps, backache or biomarkers [14,15,19,27,28]. An eight-week PMR RCT reduced post-treatment PMSS and violence-tendency scores, although an inactive control and no delayed follow-up limited conclusions about attention-specific effects and persistence [29]. A non-randomised yoga pilot included functional impairment, mobility and acceptability but remained preliminary because of self-selection, a small sample and no significant between-group symptom difference [30]. No-exercise, usual-coping, supplement-background and active comparators estimate different contrasts; non-significant differences between active modalities do not establish equivalence [18]. Dose, progression, supervision and delivery varied, while adherence, attrition, safety and long-term follow-up were inconsistently reported. Current evidence supports cautious interest, not a universal or precisely dosed recommendation.

7. Discussion

The observational and interventional literatures address different exposures and causal questions. Naturally occurring activity showed inverse, null and possible non-linear associations [4,6–8], but domain misclassification, residual confounding, reverse causality and uncertain temporal ordering limit causal interpretation. Intervention studies assigned scheduled programmes with defined dose, monitoring, progression, supervision or adherence support, so their findings cannot be equated with spontaneous daily movement. Results were broadly favourable, yet some trials assessed psychological distress, pain or stress rather than syndrome-wide outcomes, and supplement-background or active-comparator designs estimated incremental or relative contrasts [14,18,27]. Inactive controls also leave attention, expectancy and contact less controlled than daily-life comparisons. These differences explain why a null habitual-activity association does not exclude benefit from a structured programme, while a favourable trial does not show that increasing daily activity prevents PMS. Randomisation improves temporal ordering but does not remove attrition, adherence, contamination or selective-outcome concerns. Together, the two evidence streams support cautious triangulation rather than causal certainty.

Future research should standardise PMS ascertainment and distinguish habitual activity from prescribed exercise. Prospective daily ratings across at least two cycles should confirm luteal timing, postmenstrual improvement and functional impairment, while observational studies should repeat symptom and activity assessment across cycles. Combining accelerometry with domain-specific self-report would help distinguish occupational, household, transport, recreational, school-based and sport activity and examine sedentary behaviour separately [4,6,7,14]. Structured exercise trials require adequately powered multicentre samples, prospective registration, transparent randomisation and allocation concealment, and a prespecified syndrome-wide primary outcome. Comparator choice should match the question and avoid interpreting null differences between active interventions as equivalence [15,18]. Reports should provide modality-specific frequency, intensity, time and type, together with fidelity, progression, supervision, home practice and co-interventions. A common minimum outcome framework should prioritise global PMS severity, validated domains, functional impairment and quality of life, with pain, DASS-21, stress and biomarkers treated as secondary measures. Adherence, contamination, attrition, acceptability, adverse events and follow-up across subsequent cycles should be reported by arm. These improvements would clarify who benefits, from which programme, at what dose and for how long.

Structured exercise may be considered as a potential adjunct for PMS, whereas habitual physical activity remains important for general health rather than an established PMS treatment. Observational findings do not justify a prevention claim [6]. Programme choice should reflect dominant symptoms, functional impact, current activity, preferences, physical limitations, access and available supervision, recognising that group-level improvement does not ensure individual benefit. Supervised or facility-based programmes can provide instruction and accountability but may increase resource and access demands, while home-based options offer flexibility but place greater responsibility on participants for fidelity and adherence [2,27]. Lower-impact or relaxation-focused approaches may suit some preferences, although movement, breathing, attention and contact components differ across yoga and progressive muscle relaxation [14,24]. Interpretation should also account for nonspecific support, co-interventions and comparator design: active comparisons estimate relative effects, and supplement-background trials do not isolate exercise alone. Safety surveillance and post-programme follow-up were limited, so programme progression requires individual judgement. Severe, persistent, functionally impairing or atypical symptoms warrant clinical assessment rather than self-directed exercise alone. Exercise may form part of individualised, preference-sensitive management, but should not replace diagnosis or established care.

8. Conclusion

Habitual physical activity and structured exercise should not be treated as interchangeable exposures in relation to PMS because they address different research questions and support different levels of inference. Observational evidence was mixed, with inverse, null and possible non-linear associations across activity domains and measurement approaches [4,6,8]. Confounding, reverse causality and uncertain temporal ordering prevent these findings from supporting a prevention claim or a prescribed exercise dose. Interventional evidence was broadly favourable but heterogeneous, and did not support ranking modalities or defining a precise prescription. Global PMS severity and validated symptom domains must be distinguished from pain, stress, DASS-21 outcomes and biomarkers; favourable secondary outcomes did not consistently indicate syndrome-wide improvement [14,27]. Interpretation is further limited by inconsistent PMS ascertainment, selected samples, heterogeneous programmes, varied comparators and co-interventions, incomplete adherence and safety reporting, and short or absent follow-up.

Habitual activity may remain part of a healthy lifestyle, while structured exercise may be considered as an individualised, preference-sensitive adjunct. Programme choice should reflect dominant symptoms, functional impairment, preferences, physical limitations, access and available supervision. Exercise should not replace diagnosis or established care, and severe, persistent, functionally impairing or atypical symptoms, including suspected PMDD, require clinical assessment. Future research should use prospective cycle-based PMS confirmation, adequately powered comparative designs, prespecified syndrome-wide primary outcomes, modality-specific frequency, intensity, time and type with fidelity reporting, and transparent reporting of adherence, adverse events and subsequent-cycle follow-up.

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