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Impact of Physical Activity on Symptoms and Quality of Life in Women with Endometriosis: A Narrative Review

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ABSTRACT

Background. Endometriosis is an estrogen-dependent inflammatory disease that significantly impairs women's quality of life through chronic pelvic pain, dysmenorrhea, dyspareunia, infertility, and psychological distress. Increasing attention has been directed toward non-pharmacological approaches, including physical activity.

Aim. This review aimed to analyze current evidence on the effects of physical activity and different exercise modalities on symptoms and quality of life in women with endometriosis.

Material and methods. A narrative review was conducted using PubMed, Scopus, and Web of Science, focusing on studies published between 2020 and 2026, including randomized controlled trials, systematic reviews, and observational studies.

Results. Available evidence suggests that physical activity may reduce pain, improve quality of life, enhance mental well-being, and improve physical functioning. The most beneficial effects are associated with combined interventions including aerobic exercise, resistance training, and mind–body techniques.

Conclusions. Physical activity may be an effective complementary strategy in the management of endometriosis; however, further high-quality studies are needed.

Keywords: endometriosis, physical activity, exercise, pelvic pain, quality of life, physiotherapy.

1. Introduction

Endometriosis is a chronic, estrogen-dependent inflammatory disorder characterized by the presence of endometrial-like tissue outside the uterine cavity, most commonly within the pelvic peritoneum, ovaries, and rectovaginal septum [1,2]. It affects approximately 10% of women of reproductive age and is substantially more prevalent among women with infertility or chronic pelvic pain [1,3].

The clinical relevance of endometriosis results not only from its prevalence but also from its chronic course, diagnostic delay, and marked impact on physical, emotional, and social functioning [1,2]. The disease is strongly associated with chronic pelvic pain, dysmenorrhea, dyspareunia, bowel and urinary symptoms, infertility, fatigue, and reduced quality of life [1,2,4].

In addition, patients with endometriosis are at increased risk of anxiety, depression, and psychological distress, which may further amplify symptom severity and impair daily functioning [2,4,5].

The management of endometriosis is typically based on a combination of pharmacological and surgical approaches. First-line treatment often includes hormonal therapies aimed at suppressing ovarian function and reducing estrogen levels, such as combined oral contraceptives, progestins, or gonadotropin-releasing hormone (GnRH) analogs [2,4]. These treatments may effectively reduce pain symptoms; however, they are frequently associated with side effects and symptom recurrence after discontinuation. Surgical treatment, including laparoscopic excision or ablation of endometriotic lesions, is recommended in selected cases, particularly in women with severe symptoms or infertility. Although surgery may provide symptom relief, recurrence rates remain significant, and repeated procedures may be required. Despite these approaches, a substantial proportion of patients continue to experience persistent or recurrent symptoms, highlighting the need for complementary, non-pharmacological strategies, including lifestyle modifications, physiotherapy, and physical activity, as part of a comprehensive, multidisciplinary approach to endometriosis management.

Some studies have also suggested an association between endometriosis and autoimmune diseases, including systemic lupus erythematosus, Sjögren's syndrome, and rheumatoid arthritis [7]. Although these relationships remain incompletely understood, they support the concept of endometriosis as a systemic inflammatory condition rather than an exclusively gynecological disorder.

Pain in endometriosis arises from the interaction of peripheral and central mechanisms rather than from a single pathological process [1,2,6]. At the lesion level, endometriotic implants release prostaglandins, interleukins, and TNF-α, which sensitize local nociceptors and maintain afferent pain signaling [1,6,8]. Prolonged nociceptive input progressively lowers the pain threshold and, in a subset of patients, triggers central sensitization — a state of heightened excitability within the central nervous system that may sustain pain independently of active peripheral disease.

A further contributor to pain generation is neuroangiogenesis — the concurrent ingrowth of new blood vessels and nerve fibers into endometriotic lesions [1,6]. Increased lesion innervation renders these implants highly sensitive to mechanical and chemical stimuli, and direct infiltration of adjacent neural structures may give rise to neuropathic pain with burning or radiating qualities. This neuropathic component is clinically relevant because it often responds poorly to standard analgesic regimens.

The dissociation between lesion burden and pain intensity, a common clinical observation, is partly explained by central sensitization. Once established, this state of central hyperexcitability amplifies pain perception even in response to innocuous stimuli, and may persist despite successful surgical removal of visible implants [1,6].

Musculoskeletal dysfunction represents an underappreciated but clinically significant pain contributor. Pelvic floor hypertonicity, myofascial trigger points, and altered lumbopelvic biomechanics frequently co-occur with endometriosis and may independently drive symptoms such as dyspareunia and chronic pelvic discomfort — even in the absence of active endometriotic lesions [5,9,10].

Psychosocial factors complete this multidimensional picture. Chronic stress and co-existing anxiety or depression modulate pain processing via the hypothalamic–pituitary–adrenal (HPA) axis and descending pain inhibitory pathways, amplifying symptom severity and accelerating functional decline [2,4,5]. Addressing these factors is therefore integral to any comprehensive pain management strategy.

Growing clinical interest has been directed toward lifestyle-based approaches as adjuncts to conventional endometriosis treatment, encompassing dietary modification, physical activity, sleep hygiene, and psychological support [4,12,13]. Among these, physical activity has attracted particular attention, given its potential to simultaneously address several disease-relevant pathways — including systemic inflammation, estrogen metabolism, pain modulation, autonomic nervous system regulation, and mental health [3,4,14,15].

Exercise-based and physiotherapeutic approaches may be particularly valuable for women who experience inadequate symptom control with pharmacological or surgical treatment alone, especially those presenting with lumbopelvic dysfunction, pelvic floor overactivity, fatigue, or dyspareunia [5,9,10,11,14]. Notably, the relationship between endometriosis and physical inactivity is bidirectional: symptom severity frequently discourages exercise participation, which in turn may exacerbate pain and functional decline [16,17].

This narrative review therefore sought to synthesize current evidence on the role of physical activity in endometriosis management, examining the effects of specific exercise modalities on pain, quality of life, and psychological outcomes, and addressing underlying therapeutic mechanisms, practical barriers to participation, and directions for future research.

2. Materials and methods

2.1. Study design

A narrative review design was adopted to synthesize the available evidence on physical activity and physiotherapy in women with endometriosis. This format was chosen given the heterogeneity of study designs and outcome measures in the existing literature, which precludes formal meta-analytic pooling. Eligible source types included randomized controlled trials, systematic reviews, meta-analyses, observational studies, and pilot or feasibility studies evaluating exercise-based or physiotherapeutic interventions.

2.2. Literature search strategy

Three electronic databases were searched: PubMed, Scopus, and Web of Science. The search was restricted primarily to publications from 2020 to 2026 to reflect recent developments in the field; however, foundational studies addressing the pathophysiology, classification, or clinical presentation of endometriosis were included regardless of publication date when deemed essential for contextual accuracy [1,3,7].

Article selection was guided by the following search terms, applied individually and in combination:

- “endometriosis”,
- “physical activity”,
- “exercise”,
- “pelvic pain”,
- “quality of life”,
- “physiotherapy”,
- “pelvic floor muscle training”,
- “mind–body intervention.”

2.3. Inclusion and exclusion criteria

Studies were considered eligible if they met at least one of the following criteria:

- randomized controlled trials examining the effects of exercise, physiotherapy, yoga, breathing techniques, or multimodal interventions in women with a confirmed or clinically diagnosed endometriosis;
- systematic reviews and meta-analyses on physical activity, rehabilitation, or physiotherapy in endometriosis;

- observational studies exploring associations between physical activity, symptoms, or disease severity;
- studies addressing barriers, feasibility, or acceptability of exercise-based interventions.
- studies were excluded if they met any of the following criteria:
- full text unavailable or inaccessible;
- reports lacking a clearly described methodology or with critically insufficient data;
- publications not addressing physical activity, exercise, or rehabilitation in the context of endometriosis;
- studies focused exclusively on pharmacological or surgical treatment without any exercise or physiotherapy component.

2.4. Data synthesis

Given the heterogeneity of study designs and outcome measures, data were synthesized narratively rather than statistically. Studies were evaluated and compared across the following dimensions:

- effects of physical activity on pain;
- impact on quality of life and mental health;
- exercise modality;
- exercise intensity and duration;
- barriers to participation and implementation;
- feasibility of innovative or digital intervention models.

Where findings across studies converged, this was noted as indicative of stronger evidence; where results were inconsistent or based on limited data, conclusions were stated with appropriate caution.

3. Results

3.1. Effect of Physical Activity on Pain in Endometriosis

Pain remains the most burdensome symptom of endometriosis and the primary driver of functional impairment in daily life [1,2]. Whether physical activity can meaningfully reduce this burden is a question that has attracted growing research attention, though the answer is not straightforward: the quality and consistency of available evidence vary substantially across intervention types, study designs, and populations studied [9,15,18,19].

Systematic reviews indicate that exercise and physiotherapy may reduce endometriosis-associated pain, particularly when interventions are supervised, multimodal, and sustained over

time [9,15,18,19]. A recent systematic review and meta-analysis by Xie et al. concluded that physical activity and exercise appear to be effective and safe supportive strategies for women with endometriosis. However, substantial heterogeneity in study protocols remains [15]. Earlier systematic reviews on exercise and endometriosis-associated symptoms reported less conclusive findings, largely due to methodological limitations and small sample sizes of included studies [18,19].

Data from individual trials add further nuance. Artacho-Cordón et al. conducted a randomized controlled trial of a nine-week multimodal supervised therapeutic exercise program in women whose symptoms had not responded to conventional treatment, reporting significant improvements in pain, quality of life, and lumbopelvic impairments [5]. A different picture emerged from the trial by Gabrielsen et al., in which supervised group exercise with pelvic floor muscle training reduced current pelvic and genital pain intensity but left the worst pain scores largely unchanged — a distinction with practical implications for patient counseling [10].

Pelvic floor dysfunction appears to be particularly relevant in women with endometriosis. A cross-sectional study by Gabrielsen et al. did not find a significant association between pelvic floor muscle resting activity and pelvic/genital pain or dyspareunia. Still, it did show a positive association between resting activity and activation during attempts at maximal voluntary contraction [11]. These findings still support the importance of pelvic floor assessment in women with endometriosis, although the relationship between resting muscle activity and pain appears more complex than previously assumed.

Mind–body approaches occupy a distinct but complementary role. Yoga-based programs and mindful breathing techniques have been linked to improvements in stress reactivity, pain perception, and overall quality of life [20,21,22]. These studies are generally smaller and methodologically more heterogeneous than exercise trials. Yet, they consistently point toward the same conclusion: pain in endometriosis is not purely a musculoskeletal problem, and interventions that engage autonomic and psychological pathways may offer benefits that conventional exercise alone does not.

3.2. Effect of Physical Activity on Quality of Life

Reduced quality of life is one of the central consequences of endometriosis [1,2,4]. Pain, fatigue, sleep disturbances, sexual dysfunction, emotional burden, and limitations in work and social life all contribute to reduced well-being [4,12,19].

The available literature suggests that exercise-based interventions may improve quality of life across several domains [5,9,15]. In the randomized trial by Artacho-Cordón et al., the

multimodal supervised therapeutic exercise program was associated not only with pain reduction but also with measurable improvement in quality of life [5]. Secondary analysis of this trial further demonstrated improvements in fatigue, health-related fitness, sleep quality, mental health, gastrointestinal complaints, and sexual function [23].

Yoga and psychologically informed movement-based interventions may be especially useful when mental well-being is substantially affected. Mikocka-Walus et al. designed a randomized controlled trial to evaluate the efficacy of yoga and cognitive-behavioral therapy on quality of life and healthcare costs in people with endometriosis, reflecting growing clinical interest in these approaches [20]. Ravins et al. found that "Endometriosis Yoga" was associated with reduced stress and better quality of life in a pilot study [21]. More recently, mindful breathing was shown to improve anxiety, depression, and quality of life among women with endometriosis [22].

Together, these findings suggest that the impact of physical activity on quality of life extends beyond pain reduction alone. Exercise may improve emotional regulation, physical resilience, sleep, sexual function, and the overall sense of control over the disease, while reducing fatigue burden [5, 12, 23, 22].

3.3. Significance of Different Types of Physical Activity

The reviewed literature indicates that different forms of physical activity may exert distinct but complementary therapeutic effects in endometriosis [4,9,15,19].

Aerobic exercise may improve cardiovascular fitness, reduce sedentary behavior, and modulate inflammatory and hormonal pathways potentially relevant to symptom burden [3,4,15,19]. Resistance training may improve muscular support, lumbopelvic stability, and functional capacity, particularly when integrated into structured therapeutic programs [5,23].

Pelvic floor muscle training is most directly indicated in women presenting with dyspareunia, genital pain, or measurable signs of pelvic floor dysfunction, where targeted neuromuscular retraining may address a pain driver that general exercise cannot reach [10,11]. Yoga and breathing-based techniques serve a different but equally important function: by modulating stress reactivity and autonomic tone, they may interrupt the cycle of psychological distress and pain amplification that characterizes many cases of chronic endometriosis-related pain [20,21,22].

Importantly, multimodal programs appear to provide the most consistent benefits [5,15,23]. Rather than relying on a single modality, combined interventions may simultaneously address

pain processing, musculoskeletal dysfunction, fatigue, mood disturbances, and sexual symptoms.

3.4. Intensity and Characteristics of Physical Activity

The question of optimal exercise intensity remains incompletely resolved. However, available evidence suggests that moderate, regular, and individualized activity is more appropriate than excessive or poorly tolerated exercise [9,15,19,24].

Hartmann et al., in a cross-sectional observational study, proposed that exercise duration may be more important than intensity in endometriosis, highlighting the clinical relevance of sustainable, tolerable, long-term participation rather than short, high-intensity efforts [24]. This is consistent with broader reviews suggesting that adherence and symptom compatibility are crucial determinants of success [15,19].

Therefore, exercise prescription for women with endometriosis should be individualized based on symptom severity, fatigue, pelvic floor status, baseline fitness, and treatment responsiveness [4,5,10].

3.5. Barriers to Physical Activity

Despite its potential benefits, regular physical activity remains difficult for many women with endometriosis [16,17]. Symptom burden itself may act as a barrier, especially chronic pain, fatigue, dyspareunia, poor sleep, and fear of symptom exacerbation [16,17].

Blanco-Martínez et al. showed that perceived barriers and symptom severity significantly influence physical activity levels in women with endometriosis [17]. Similarly, Sachs et al. found that women with endometriosis may differ from healthy controls in their physical activity behavior, indicating that the disease itself can alter participation patterns [16].

An often-overlooked barrier is the cyclic nature of endometriosis symptoms. Pain, fatigue, and pelvic discomfort tend to intensify during menstruation and in the perimenstrual phase, making exercise participation particularly difficult at predictable points in the cycle. This cyclical pattern requires that exercise programs be designed with sufficient flexibility to allow women to modify activity levels according to their current symptom state, rather than adhering to a rigid schedule that may be unsustainable during symptomatic periods.

A systemic barrier also deserves recognition: limited awareness of endometriosis-specific needs among physiotherapists and general practitioners may result in inadequate or inappropriate exercise guidance. Women with endometriosis frequently report receiving generic advice to “stay active” without tailored assessment or monitoring, which may be

insufficient or even counterproductive if pelvic floor dysfunction, central sensitization, or post-surgical recovery are not accounted for. Building endometriosis-specific competencies within physiotherapy education and clinical practice represents a meaningful step toward closing this gap.

Qualitative and feasibility data suggest that empowerment, patient education, supervision, and acceptable formats of intervention are key to improving adherence [12,13,14]. Tennfjord et al. explored whether supervised exercise and pelvic floor muscle training could serve as an empowering tool for women with endometriosis, finding that participants valued the sense of agency and physical competence gained through structured exercise, alongside the importance of individualized pacing and professional support [12]. Digital and remote formats, including videoconference-based education and virtual reality-supported relaxation or activity tools, may improve accessibility and acceptability in selected patient groups [14,13,25].

3.6. Innovative and Digital Models of Exercise-Based Intervention

Alongside traditional in-person programs, a growing body of literature has begun to explore digital and remote formats for delivering exercise and physiotherapy to women with endometriosis. This development is clinically relevant, given that many patients face practical barriers to attending specialist centers, including unpredictable symptoms, geographic distance, and limited availability of endometriosis-specific physiotherapy.

Escriva-Boulley et al. developed the CRESCENDO program — a structured intervention combining physical activity promotion with endometriosis-specific education delivered via videoconference [14]. The protocol was designed to assess whether remote exercise support could improve symptom burden and quality of life, reflecting a broader shift toward accessible, patient-centered care models. Pavic et al. evaluated the acceptability of a digital physical activity program among women with endometriosis, finding generally positive attitudes toward app-based support, though they also identified the need for personalized guidance and professional oversight [13].

Virtual reality represents another emerging avenue. Pakebusch et al. conducted a pilot study investigating virtual reality applications for pain control and relaxation in endometriosis, reporting that patients found these tools acceptable and potentially useful as adjuncts to standard care [25]. While the evidence base for digital interventions remains limited and largely preliminary, these approaches may substantially improve access to exercise-based care for patients who cannot regularly attend supervised programs.

The Physio-EndEA protocol, described by Salinas-Asensio et al., provides a model for how structured, supervised, and individually adapted therapeutic exercise can be systematically implemented and evaluated in clinical research [26]. Its focus on multimodal content, professional supervision, and adaptation to individual symptom profiles may serve as a reference framework for future program development, including hybrid and digital formats.

4. Discussion

Overall, the available evidence suggests that physical activity should not be considered solely as a pain management strategy. While pain reduction is the most frequently reported outcome, the data from both RCTs and observational studies indicate that exercise-based interventions affect a considerably broader symptom network — encompassing fatigue, sleep quality, sexual function, emotional well-being, and physical capacity [5,15,20,22,23]. This breadth of effect is clinically meaningful in a disease that so consistently erodes functioning across multiple life domains.

One of the most relevant observations across the reviewed studies is that multimodal interventions seem more beneficial than isolated exercise strategies [5,15,23]. Programs combining supervised therapeutic exercise, pelvic floor muscle training, and mind–body components appear to address the multidimensional nature of endometriosis more effectively than single-modality interventions. This is clinically plausible, given that endometriosis-related symptoms arise from overlapping inflammatory, neuromuscular, psychological, and central pain mechanisms [1,2,6].

Understanding the biological mechanisms by which physical activity exerts its effects in endometriosis is essential to justify its clinical use. Regular aerobic exercise is known to reduce systemic levels of pro-inflammatory cytokines, including IL-6, TNF-α, and C-reactive protein, which are also implicated in endometriosis-related pain and lesion activity [3,4,15]. Physical activity may additionally influence estrogen metabolism by reducing adipose tissue mass and thereby limiting peripheral aromatase activity — a pathway of particular relevance given the estrogen-dependent nature of the disease [3,4,19]. At the neurobiological level, exercise promotes endorphin release, enhances serotonergic tone, and modulates HPA axis activity, contributing to improved mood, reduced stress reactivity, and altered pain perception [4,19]. These mechanisms collectively suggest that the benefits of physical activity in endometriosis are not incidental but reflect meaningful biological interactions with core disease pathways.

The relationship between physical activity and pain in endometriosis is particularly complex. While exercise may improve pain modulation, reduce muscular tension, and improve

lumbopelvic function, the disease itself may simultaneously limit the ability to remain physically active [16,17]. This creates an important therapeutic paradox: the very symptoms that may improve with exercise often act as barriers to exercise participation. Accordingly, successful implementation depends not only on the biological effects of physical activity but also on how well an intervention is adapted to the patient's symptom profile and daily capabilities.

The role of pelvic floor dysfunction deserves special emphasis. Emerging evidence suggests that pelvic floor dysfunction may contribute to pelvic and genital pain, dyspareunia, and impaired pelvic function in women with endometriosis. However, the specific role of resting pelvic floor muscle activity remains uncertain [10,11]. This supports the integration of pelvic floor assessment and targeted physiotherapy into broader rehabilitation programs. It also helps explain why interventions focused exclusively on general exercise may be insufficient in some patients.

The mental health dimension is equally important. Anxiety, depression, stress, and pain-related distress are highly prevalent in endometriosis and may amplify symptom severity [2,4,22]. Mind–body interventions, yoga, and mindful breathing appear particularly promising in this context because they target both physical and psychological symptom domains [20,21,22]. Their benefits may extend beyond mood alone by influencing pain perception, autonomic regulation, sleep quality, and patient-reported coping capacity.

Another clinically relevant issue is the need for individualized exercise prescription. The reviewed literature does not support a universal "best" exercise model for all women with endometriosis. Instead, the most appropriate approach appears to be one that is tailored to symptom severity, fatigue burden, pelvic floor status, baseline physical condition, and treatment tolerance [4,5,10,24]. The suggestion that exercise duration may matter more than intensity further reinforces the importance of sustainability and adherence [24].

These observations must be tempered by an honest appraisal of the evidence base. Most available trials are small, with short follow-up periods and widely varying intervention protocols [8,9,10,23]. Outcome measurement is equally inconsistent: some studies focus on current pain intensity, others on worst pain, and still others on quality of life composites or specific domains such as sexual function or fatigue [12,14]. This fragmentation makes cross-study comparison difficult and prevents any firm conclusions about which exercise protocol, dosage, or combination of modalities is optimal.

The growing interest in digital and remote care models is noteworthy. Videoconference-based education and exercise support, digital activity tools, and virtual reality-based symptom

management approaches may improve access to care, particularly for patients who have limited access to specialized physiotherapy or who struggle with travel and symptom unpredictability [7,22,25,26]. These approaches remain promising but still require stronger outcome data.

Overall, the current literature supports the integration of physical activity into a comprehensive and interdisciplinary model of care for endometriosis. Exercise should not be presented as a replacement for pharmacological or surgical treatment, but rather as a supportive and potentially empowering therapeutic component that may improve symptom burden and quality of life when implemented appropriately [2,4,12].

5. Conclusions

The body of evidence reviewed here supports the inclusion of physical activity as a meaningful component of endometriosis care — not as a replacement for pharmacological or surgical treatment, but as a strategy that addresses symptom dimensions these approaches often leave unresolved. Exercise-based interventions have demonstrated potential to reduce pain, improve quality of life, alleviate fatigue, and positively influence mental health, sleep, and sexual functioning [5,9,15,20,22,23].

The greatest benefits seem to be associated with multimodal and individualized programs that combine aerobic exercise, resistance training, pelvic floor muscle training, and mind–body approaches [5,15,10,23]. Such interventions are better suited to the multidimensional nature of endometriosis than single-modality approaches.

In practice, however, exercise participation faces real barriers. Pain, fatigue, fear of symptom worsening, and lack of tailored guidance are consistently cited as obstacles that prevent women with endometriosis from engaging in regular physical activity [12,16,17]. These barriers are not peripheral concerns — they are central to why even well-designed exercise programs may fail in real-world settings without adequate patient education, professional supervision, and individualized prescription.

Establishing standardized, evidence-based exercise protocols for this population remains an unmet need. Future research should prioritize adequately powered trials with longer follow-up periods, harmonized outcome measures, and clear reporting of intervention parameters including type, intensity, frequency, and duration [9,15,18,19]. In the meantime, physical activity — when appropriately prescribed and supervised — warrants a recognized place within interdisciplinary endometriosis care.

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Software: not applicable

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