OBSTETRICS AND GYNECOLOGY

Cite as: Archiv EuroMedica. 2025. 15; 3. DOI 10.35630/2025/15/3.312

Received 6 May 2025;
Accepted 09 June 2025;
Published 11 June 2025

PHYSIOTHERAPY AND PHYSICAL ACTIVITY IN ENDOMETRIOSIS-ASSOCIATED PAIN - A LITERATURE REVIEW

Aleksandra Arnista[1] ✉, Marcin Grzebyk[2], Anna Tokarska[3], Katarzyna Gawrońska[4], Mateusz Świątko[5], Paweł Sosnowski[3], Joanna Rybak[6], Agnieszka Waszczuk[7], Aleksandra Kołodziejczyk[8], Piotr Łapiński[3]

[1]Military Institute of Medicine - National Research Institute, Warsaw, Poland
[2]Orangemedica, Warsaw, Poland
[3]Central Clinical Hospital, Warsaw, Poland
[4]Specialized Provincial Hospital in Ciechanów, Poland
[5]District Hospital in Sochaczew, Poland
[6]Father Jerzy Popiełuszko „Bielański" Hospital, Independent Public Health Care Institution in Warsaw, Poland
[7]The Provincial Specialist Hospital in Biała Podlaska, Poland
[8]District Hospital in Grójec, Poland

✉ ***aleksandra.arnista0605@gmail.com***

ABSTRACT

Aim: This narrative review aims to evaluate the current scientific evidence on the effectiveness of physiotherapy and physical activity in reducing pain and improving quality of life in women with endometriosis.

Methods: A literature search was conducted using PubMed and Google Scholar databases to identify English-language studies published between 2013 and 2024. The search included terms such as "endometriosis", "physiotherapy", "exercise", and "chronic pelvic pain". The review included randomized controlled trials, observational studies, and clinical guidelines addressing the use of non-pharmacological interventions in endometriosis management.

Results: The analysis indicates that various physiotherapeutic techniques, including pelvic floor muscle training, manual therapy, and relaxation strategies, may alleviate pain symptoms, especially in cases of superficial dyspareunia and chronic pelvic pain. Regular physical activity, such as aerobic or stretching exercises, may support hormonal balance, reduce systemic inflammation, and contribute to improved mental health. However, the available evidence is heterogeneous, and methodological limitations of existing studies hinder definitive conclusions.

Conclusion: Physiotherapy and physical activity represent promising adjunctive approaches in the treatment of endometriosis, particularly for patients who experience insufficient relief from pharmacological or surgical therapies. Further high-quality, controlled studies are required to establish standardized treatment protocols and confirm the long-term effectiveness of these interventions.

Keywords: endometriosis, physiotherapy, physical activity, pelvic pain, endometriosis infertility treatment

INTRODUCTION

Endometriosis is a chronic, systemic, estrogen-dependent condition characterized by the presence of tissue resembling the endometrium outside the uterine cavity. Under normal circumstances, the endometrium lines the interior of the uterus. In endometriosis, however, ectopic endometrial lesions most commonly appear within the pelvic cavity—affecting structures such as the ovaries, uterosacral ligaments, rectovaginal space, and uterine muscle (adenomyosis)—but may also migrate to distant locations, including the liver, lungs, or even the brain [3], [30], [37].

These ectopic lesions respond hormonally to the menstrual cycle and exhibit secretory activity, leading to the accumulation of blood and tissue outside the uterus. This provokes chronic inflammation, the formation of adhesions and scars, and anatomical changes that impair the mobility of pelvic organs. Pain—whether cyclical or persistent—is one of the most debilitating symptoms and significantly reduces the quality of life in affected individuals [19], [1].

It is estimated that endometriosis affects around 10% of women of reproductive age, although the actual prevalence may be higher due to asymptomatic cases and diagnostic delays [30], [19]. The most frequently reported symptoms include dysmenorrhea (painful menstruation), dyspareunia (pain during intercourse), chronic pelvic pain, dyschezia (painful bowel movements), and hematochezia (rectal bleeding). Additionally, endometriosis is a leading cause of infertility, with up to 50% of women with the condition experiencing reproductive difficulties [19].

Given the chronic and complex nature of endometriosis-associated pain, symptom relief remains the primary therapeutic goal. While pharmacological and surgical approaches continue to dominate standard care, there is growing interest in non-invasive, supportive treatments such as physiotherapy [30], [20], [16]. Recent studies suggest that physiotherapeutic interventions, including pelvic floor muscle therapy and targeted physical activity, may not only alleviate pain but also improve quality of life in affected women [34].

OBJECTIVE

In light of these observations, the present review seeks to synthesize and critically evaluate the existing evidence on the role of physiotherapy and physical activity in the management of endometriosis-related symptoms. Specifically, it aims to identify and categorize the main physiotherapeutic approaches used in clinical practice; to assess and compare the effects of various forms of physical activity—such as aerobic exercise, stretching, and yoga—on symptom severity; to evaluate the methodological quality and strength of evidence across the available literature; to explore potential mechanisms by which non-pharmacological interventions may influence the disease process; and finally, to highlight gaps in current research and propose directions for future studies.

METHODOLOGY

The review was prepared on the basis of an analysis of scientific publications and specialist literature on endometriosis and the impact of physical activity on the intensity of pain sensations. The analysis was based on a review of the literature available in the PubMed and Google Scholar databases. We have used the keywords "endometriosis", "physiotherapy", "physical activity", "pelvic pain", „endometriosis infertility treatment". The analysis included scientific articles published between 2003 and 2025. The selected timeframe reflects both foundational research and the most recent advances in the understanding and management of endometriosis. In this systematic review, clearly defined inclusion and exclusion criteria were applied to ensure the high quality and relevance of the analyzed data. Only original research articles, randomized controlled trials (RCTs), systematic reviews, and meta-analyses were included. The study population was limited to adult women diagnosed with endometriosis, which allowed for consistent and comparable results.

The primary focus was on non-pharmacological interventions—particularly those aimed at reducing pain and improving patients' quality of life. This approach reflects the growing importance of holistic therapeutic strategies that increasingly accompany pharmacological or surgical treatment.

Studies that did not address issues related to physiotherapy or physical activity were excluded from the analysis. This decision was motivated by the intention to focus on interventions with practical applicability in routine physiotherapeutic care, as well as those feasible for implementation in outpatient and home settings.

CONTENT OF THE REVIEW

CHARACTERISTICS OF PAIN SYMPTOMS ASSOCIATED WITH ENDOMETRIOSIS

1.1. Types of pain associated with endometriosis

Chronic, deep pelvic pain is one of the main clinical symptoms of endometriosis, reported by up to 60% of women with this diagnosis. Patients often complain of pain in the lower abdomen and lumbar spine. Characteristic symptoms accompanying the disease also include painful menstruation (dysmenorrhea), pain during sexual intercourse (dyspareunia), pain during defecation (dyschezia) and the presence of blood in the stool (hematochezia). The spectrum of clinical symptoms of endometriosis is strongly dependent on the location of ectopic endometrial foci. [32], [33], [19]

Additionally, women with endometriosis may present urinary symptoms, particularly when the bladder is involved. Bladder endometriosis, characterized by the infiltration of endometrial glands and stroma into the detrusor muscle, can lead to symptoms such as dysuria—pain, burning, or discomfort during urination. The presence of bladder lesions significantly impacts daily functioning and quality of life, further contributing to the overall burden of the disease. [25] Another reported symptom is ovulation-related pain, typically occurring around the midpoint of the menstrual cycle. Patients describe this ovulatory pain as sharp or cramping, usually localized unilaterally in the lower abdomen. It may persist from several hours to a few days, further decreasing the quality of life and contributing to emotional distress and limitations in daily activities. [8]

1.2 Mechanisms of Pain Development – Hormonal, Inflammatory, and Neurogenic

The pathophysiology of pain in endometriosis is complex and multifactorial, involving the interplay of hormonal, inflammatory, and neurogenic mechanisms. Estrogen plays a central role by stimulating the growth and activity of ectopic endometrial tissue, leading to cyclical bleeding at sites of implantation outside the uterus. In women with endometriosis, excessive estrogen production promotes the proliferation of endometrial-like tissue beyond the uterine cavity, contributing to the intensification of symptoms such as pain and inflammation. [11] Therefore, regulating estrogen levels may serve as an effective strategy to limit the progression of pathological lesions and alleviate disease-related symptoms. [43]

This ongoing hormonal stimulation results in localized inflammatory responses that activate the immune system and induce the release of pain mediators, including prostaglandins, pro-inflammatory cytokines and nerve growth factors. [29]

These mediators not only sustain inflammation but also increase the sensitivity of peripheral nerve endings, leading to peripheral sensitization. Simultaneously, neurogenic processes such as the proliferation of nerve fibers within endometrial lesions further enhance nociceptive signaling to the central nervous system. [2] These neuronal changes may contribute to the chronification of pain, transforming it from acute to persistent and significantly impairing the quality of life in affected individuals. Understanding these mechanisms is essential for the development of effective therapeutic strategies aimed at improving patient outcomes in endometriosis. [11], [10]

1.3 Diagnosis

Endometriosis is most commonly diagnosed based on characteristic clinical symptoms, such as chronic pelvic pain, particularly intensified during the perimenstrual period and during sexual intercourse. In imaging diagnostics, transvaginal ultrasonography serves as a first-line tool, enabling the detection of ovarian endometriomas, deep infiltrating endometrios, and congenital uterine anomalies. Magnetic resonance imaging offers higher resolution and greater objectivity, making it especially valuable for assessing the extent of the disease and supporting preoperative planning. Laparoscopy remains the gold standard in the diagnosis of endometriosis, as it allows for direct visualization of pathological lesions, biopsy for histopathological confirmation, and simultaneous surgical treatment. Despite the availability of modern imaging modalities, physical examination conducted by an experienced clinician remains an important component of the diagnostic process. However, despite the range of available diagnostic techniques, endometriosis often remains underdiagnosed or misdiagnosed, contributing to significant diagnostic delays and prolonged patient suffering. Current data also indicate that endometriosis is a disease characterized by late detection among patients. Delays in the diagnosis and treatment of endometriosis seem to be partly due to underestimating or misrecognizing its symptoms. The average time from the appearance of the first symptoms to the final, correct diagnosis is from 6 to 10 years. This promotes the progression of the disease and the intensification of its symptoms. Unfortunately, this is the rule rather than the exception, which emphasizes the need to increase awareness of endometriosis and improve diagnostic processes. [20],[24], [30]

There are several reasons for diagnostic difficulties. The first is the lack of a specific diagnostic marker that can confirm or exclude the presence of endometriosis. Another important aspect delaying the diagnosis of the disease is the heterogeneous nature of the disease. The lack of a pathognomic symptom, as well as

numerous accompanying ailments, can lead to misdiagnosis and diagnosis of other diseases, e.g. irritable bowel syndrome, interstitial cystitis, fibromyalgia and pelvic inflammatory disease. [30], [20]

EFFECTS OF PHYSIOTHERAPY ON ENDOMETRIOSIS-RELATED PAIN

2.1 Pelvic Floor Muscle Therapy

Given the most common symptoms reported by patients, such as chronic pain and infertility, the primary treatment of endometriosis is usually based on pharmacological and surgical therapy to control the progression of the disease. Unfortunately, despite the implementation of standard therapeutic methods, many patients still experience pain. As a result, there is a growing interest in complementary methods such as physiotherapy and regular physical activity, which can support treatment and contribute to improving the quality of life of women with endometriosis. [34], [42]

Physiotherapy serves as a supportive modality in gynecological, pharmacological, and surgical treatment, and also represents a therapeutic alternative for patients who are not eligible for surgical intervention. [34], [42]The main areas of physiotherapy include kinesiotherapy, physical therapy, balneotherapy, and manual therapy targeting the lumbopelvic and visceral area. [34], [42]

In the case of surgery, it is crucial to start physiotherapy early to prevent complications such as circulatory disorders or blood clots. Rehabilitation should include the start of mobilization as soon as possible, which should be adapted to the patient's health condition. An important element of postoperative prevention is also patient education, including learning breathing exercises and leg gymnastics, which help prevent potential complications. [42]

In the pharmacotherapeutic phase of endometriosis, it is recommended to initiate physiotherapeutic interventions without delay, as this approach both mitigates the adverse effects of hormone therapy and enhances the pharmacokinetic and pharmacodynamic efficacy of administered agents. Manual modalities—primarily lymphatic drainage and soft tissue mobilizations—combined with physical therapy techniques facilitate the resorption of interstitial fluid, improve local perfusion, and modulate nociceptive signaling, thereby promoting higher drug bioavailability. [26]

Urogynecological physiotherapy, as an advanced and specialized therapeutic approach, focuses on the diagnosis and treatment of functional disorders within the pelvic region, encompassing both urogenital structures and musculoskeletal components. In women with endometriosis, this form of therapy plays a particularly important role—not only as a complementary method alongside surgical and pharmacological treatment but also as an independent therapeutic strategy aimed at reducing pain, improving pelvic floor muscle function, and restoring biomechanical balance. One of the core elements of this therapy is kinesiotherapy, or movement-based therapy, which consists of an individually tailored set of exercises designed to support myofascial and stabilizing functions. Depending on the patient's needs, the therapeutic program may include relaxation techniques—such as pelvic floor stretching or fascial release—as well as strengthening exercises based on isometric and isotonic contractions. Complementary methods include breathing training, activation of deep trunk stabilizers, and postural re-education, all of which promote the integration of pelvic floor muscle function into everyday movement patterns. Functional training performed on unstable surfaces further enhances body awareness and neuromuscular control, which is particularly relevant in the context of chronic pelvic pain. Another essential component of urogynecological physiotherapy involves techniques that help the patient develop conscious control over pelvic floor tension and relaxation. This aspect is especially valuable when addressing chronic pain syndromes, muscle tone disorders, and comorbid urinary or sexual dysfunctions. Ongoing cooperation with a physiotherapist supports not only physical recovery but also fosters a sense of safety and empowerment throughout the healing process. Through its biopsychosocial orientation, urogynecological physiotherapy becomes a crucial part of comprehensive care for women with endometriosis, addressing both physical symptoms and the emotional burden associated with this chronic condition. [42], [40], [21]

A randomized controlled trial investigating the impact of pelvic floor muscle physiotherapy in women with deep infiltrating endometriosis and superficial dyspareunia further underscores its effectiveness. The study used 3D/4D transperineal ultrasonography to measure the levator hiatal area and involved five 30-minute sessions incorporating Thiele massage. Results demonstrated significant muscle relaxation during the Valsalva maneuver (20.0 ± 24.8% vs. -0.5 ± 3.3%; P = 0.02), a reduction in superficial dyspareunia and chronic pelvic pain, though deep dyspareunia remained unaffected. These findings suggest the therapy's efficacy in treating muscular rather than lesion-based pain. [16]

2.2 Manual Therapy Techniques

In recent years, there has been a growing recognition of the role that manual and osteopathic therapies can play in supporting physiotherapeutic care for individuals with endometriosis, particularly in addressing chronic pelvic pain. Among the most commonly applied techniques are visceral therapy and the Thiele massage. These approaches aim to improve tissue mobility, reduce muscular tension, and support the

optimal function of anatomical structures within the pelvic region. [16]

Visceral therapy involves gentle, hands-on manipulations of the abdomen and pelvic area to influence the mobility of internal organs and their supporting connective tissues. By working on visceral ligaments and fascial layers, this method may help reduce adhesions, enhance local circulation, and regulate autonomic nervous system activity. Clinical experience suggests that such interventions may alleviate visceral pain, which is frequently reported in patients with endometriosis. [40]

The Thiele massage, on the other hand, is an internal manual technique focused on releasing tension in the pelvic floor muscles and deactivating trigger points. It is particularly beneficial for patients experiencing deep pelvic discomfort, dyspareunia, or persistent muscle tightness. By targeting both muscular and neural components, this approach supports neuromuscular coordination and contributes to pain modulation. [16]

Although further high-quality research involving larger patient groups is still needed, current clinical insights indicate that these techniques may offer valuable benefits when combined with conventional medical treatments. Their individualized, low-risk nature makes them an appealing option, especially for women who have not achieved sufficient relief through pharmacological or surgical interventions. [16]

2.3 Electrotherapy and Other Physical Modalities

Physical therapy in the management of endometriosis includes various supportive methods such as phototherapy, laser therapy, electrotherapy, and magnetotherapy. These approaches promote tissue healing, accelerate regeneration, and improve microcirculation in the affected areas. Laser therapy demonstrates regenerative effects at the cellular level – it stimulates ATP production and speeds up tissue repair processes. Electrotherapy has analgesic effects and enhances blood flow in the pelvic region, helping to relieve pain and discomfort associated with the condition. [42]

Magnetotherapy has gained increasing attention for its therapeutic potential in chronic pelvic pain. This method uses low-frequency pulsed magnetic fields to influence cellular function by improving oxygenation, stabilizing membrane potential, and reducing inflammation. [23] In women with endometriosis, magnetotherapy may help alleviate pain, support tissue repair following surgery, and contribute to overall symptom relief. Its non-invasive nature and high tolerability make it suitable for long-term use, even in complex cases. [23]

Another promising approach is phototherapy, which uses specific wavelengths of light—such as red and near-infrared—to target deeper layers of tissue. Depending on the wavelength, phototherapy may have anti-inflammatory, analgesic, and regenerative effects. Its ability to penetrate soft tissues allows for localized treatment of endometriotic lesions and postoperative healing zones. [27] When integrated into a comprehensive treatment plan, these physiotherapeutic modalities can enhance the effects of pharmacological and surgical therapies, providing additional relief and improving the quality of life for women living with endometriosis.

2.4 Relaxation and Breathing Techniques

Relaxation strategies and breathing exercises play a crucial role in managing endometriosis-related pain. These include progressive muscle relaxation, pelvic floor stretching, diaphragmatic breathing, and conscious muscle control techniques. Such interventions help modulate the autonomic nervous system, enhance neuromuscular control, and relieve anxiety. Incorporating breathing training and stress-management education into physiotherapy empowers patients to actively manage their symptoms and supports emotional well-being. This biopsychosocial approach fosters a sense of safety and enhances recovery outcomes. [42], [40], [34]

IMPACT OF PHYSICAL ACTIVITY AND EXERCISE INTERVENTIONS

3.1 Aerobic Exercise and Cardiovascular Training

Physical activity is also highlighted in the context of managing pain symptoms associated with endometriosis. Regular aerobic exercise, including walking, swimming, or cycling, promotes muscle relaxation, improves circulation, and enhances serotonin levels, contributing to the disruption of the chronic pain cycle. These benefits have been reported by women undergoing hormonal therapy, where exercise was associated with reduced pain, anxiety, and depressive symptoms. [14], [15], [18]

Beyond musculoskeletal benefits, aerobic activity influences hormonal pathways by decreasing adipose tissue – a key site of peripheral estrogen production – and enhancing insulin sensitivity, thereby indirectly reducing circulating estrogen levels. Exercise also supports the proper functioning of the hypothalamic–pituitary–ovarian axis, which is essential for hormonal balance and menstrual cycle regularity. [10], [31]

In a case–control study by Dhillon and Holt (2003), the authors examined the relationship between recreational exercise and the occurrence of endometriomas, using the Metabolic Equivalent of Task (MET) as

an objective measure of intensity. The findings indicated that women engaging in activities rated at ≥6 METs —such as running, cycling, or competitive sports—at least three times a week for the majority of the year had a significantly reduced risk of developing ovarian endometriosis compared to less active individuals These findings highlight the preventive potential of regular exercise in reducing endometriosis severity. [6]

Importantly, physical exercise reduces systemic inflammation by lowering levels of pro-inflammatory cytokines, such as IL-6 and IL-8. Given that endometriosis is associated with chronic inflammatory processes and estrogen-driven ectopic endometrial tissue proliferation, reducing these factors through physical activity may help mitigate pain severity. [31]

Although some studies suggest that moderate or intense physical activity may lower the risk of endometriosis and alleviate its symptoms, the available evidence remains inconclusive due to potential methodological biases. It is also important to note that chronic pelvic pain may limit physical activity levels in affected women, potentially distorting observed associations. Nevertheless, increasing evidence supports that regular exercise activates endogenous analgesic mechanisms, such as the release of endogenous opioids, providing natural pain relief. [31]

In conclusion, while further well-designed studies are needed, current data support the beneficial role of physical activity as a complementary strategy for reducing endometriosis-related pain. Encouraging regular exercise may not only improve symptom management but also enhance the overall quality of life for women living with this chronic condition. [31]

3.2 Stretching and Mobility Exercises

Stretching and mobility exercises are also described in the literature and may serve as a complementary component in the physiotherapeutic management of women with endometriosis. These techniques target myofascial dysfunction, pelvic asymmetries, and soft tissue restrictions. Individually tailored programs may include pelvic floor stretching, spinal mobility drills, and postural re-education. Stretching helps improve musculoskeletal alignment, reduce tension, and promote relaxation of overactive pelvic structures.

Such practices also improve neuromuscular coordination, especially when performed on unstable surfaces that engage deep stabilizing muscles. Mobility-focused exercises support functional independence, increase range of motion, and relieve chronic pain associated with structural imbalances often observed in endometriosis patients. [34], [42]

3.3 Yoga, Pilates, and Mind-Body Approaches

Yoga and other mind-body interventions such as Pilates are increasingly recognized as effective complementary therapies for endometriosis. In a randomized controlled trial conducted by Gonçalves, Makuch, Setubal, Barros, and Bahamondes (2016), the impact of an eight-week yoga intervention on chronic pelvic pain and quality of life in women diagnosed with endometriosis was assessed. Forty women between the ages of 24 and 49, all with a laparoscopic confirmation of endometriosis and chronic pain, were randomly assigned to either an intervention group (n=28) or a control group (n=12). The intervention group participated in twice-weekly, 90-minute yoga sessions, which included hatha yoga postures (asanas), breathing exercises (pranayama), relaxation techniques, and group discussions. The sessions were tailored to accommodate the physical limitations associated with chronic pelvic pain.

Pain intensity was evaluated using a daily visual analog scale (VAS) diary, while quality of life was assessed with the Endometriosis Health Profile (EHP-30) questionnaire. After eight weeks, participants in the yoga group reported a significant reduction in daily pain levels compared to the control group ($p = 0.0007$). Improvements were also observed in several quality of life domains, including pain, emotional well-being, self-image, work performance, and satisfaction with treatment. Notably, menstrual pain patterns did not differ significantly between groups.

Beyond pain reduction, women practicing yoga reported secondary benefits such as improved sleep quality, enhanced self-knowledge, greater autonomy in managing symptoms, and reduced dependence on medications. The findings suggest that yoga may serve as an effective, non-pharmacological complementary therapy for pain management in women with endometriosis, by promoting relaxation, modulating stress responses, and fostering better mind–body integration. [22]

3.4 Spa Treatment and Balneotherapy

Spa treatment in endometriosis mainly includes balneotherapy, hydrotherapy and climatology, using natural methods. The most commonly used are brine baths, sulphide baths and gas baths in carbonate water. Brine baths improve microcirculation, support tissue regeneration, and have an analgesic and relaxing effect. Sulphide baths reduce inflammation by decreasing pro-inflammatory cytokines and promoting the relaxation of smooth muscle tissue, which can help relieve cramping and deep pelvic pain. Carbon dioxide-rich water baths contribute to vasodilation and improve oxygenation of hypoxic tissues, which is particularly beneficial in areas affected by endometriotic lesions. Furthermore, regular exposure to therapeutic mineral waters has

been shown to modulate the autonomic nervous system, reduce stress levels, and stimulate the release of endogenous opioids, enhancing the body's natural ability to manage chronic pain. These mechanisms make spa-based interventions a valuable adjunct in comprehensive endometriosis care. [42]

3.5. The anti-inflammatory effects of physical activity

Epidemiological studies and experimental data support the idea that regular physical activity may help reduce chronic low-grade inflammation, a hallmark of various inflammatory conditions, including those affecting the pelvic region. A central player in this process is interleukin-6 (IL-6), a cytokine released by skeletal muscle during contraction, which belongs to a class of signaling molecules known as myokines. [28]

Exercise-induced IL-6 serves multiple physiological functions. On the metabolic level, it stimulates hepatic glucose production and facilitates glucose uptake by active muscles, thereby maintaining energy homeostasis during prolonged activity. This metabolic adaptation is essential not only for sustaining physical performance but also for shaping immune responses, as glucose availability affects the activation and function of immune cells. [28]

What distinguishes IL-6 in the context of physical activity from its role in chronic inflammatory diseases is its anti-inflammatory effect. Unlike persistently elevated IL-6 associated with pathological inflammation, transient increases in IL-6 during exercise trigger beneficial immune regulation. Specifically, IL-6 suppresses the production of pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α) and interleukin-1 beta (IL-1β), while simultaneously stimulating the release of anti-inflammatory mediators, including interleukin-10 (IL-10) and interleukin-1 receptor antagonist (IL-1ra). This dual action supports immune homeostasis and may help reduce the persistent inflammatory milieu observed in many chronic conditions. [28]

Furthermore, regular physical activity contributes to a decrease in adipose tissue mass, which serves as a significant source of pro-inflammatory cytokines, including TNF-α. In parallel, exercise increases levels of soluble TNF receptors (sTNF-R), which act as natural inhibitors by binding and neutralizing circulating TNF-α. These adaptations form part of a broader physiological response in which energy metabolism and immune function are tightly interlinked. By influencing both, exercise offers a holistic anti-inflammatory strategy that goes beyond symptomatic relief. [28]

The implications of this are particularly relevant for disorders characterized by persistent inflammation in the pelvic region. Through IL-6–mediated pathways and other exercise-induced immunometabolic changes, physical activity may not only reduce the severity of symptoms such as pain and fatigue, but also potentially modulate the underlying pathophysiology of inflammatory conditions. When combined with targeted physiotherapy, this approach provides a promising direction for integrative, non-pharmacological management aimed at long-term improvements in health and quality of life. [28]

COMBINED OR MULTIMODAL APPROACHES

4.1 Interventions Combining Physiotherapy with Lifestyle or Psychological Support

All endometriosis’ symptoms significantly reduce the quality of life of patients, which prompts the search for complementary therapeutic methods aimed at reducing ailments and improving the well-being of women affected by this disease. [19], [32]

Even after the diagnosis is made and appropriate pharmacological and surgical treatment is implemented, many patients continue to experience pain. Chronic pain significantly reduces the quality of life and contributes to an increase in the number of cases of depressive and anxiety disorders among women with endometriosis. [17] [35]

The prevalence of depressive and anxiety disorders in women with endometriosis is higher compared to women without this diagnosis. Endometriosis-related pain contributes to an increased risk of anxiety symptoms, which are reported 1.4 times more often than in women without endometriosis. Depression, on the other hand, occurs in patients diagnosed with endometriosis 1.5 times more often than in women who have never been diagnosed with this disease. [38]

Women diagnosed with endometriosis not only face an increased risk of anxiety and depressive disorders, but also frequently report a negative impact of the disease on their relationships with partners and family. The symptoms of endometriosis hinder daily functioning, leading to difficulties in education, reduced productivity at work, and decreased ability to perform household duties. Additionally, patients often complain of fatigue, insomnia, and occupational stress. As a result, all these symptoms significantly reduce patients' quality of life, highlighting the multidimensional burden associated with this disease. Despite wide treatment of endometriosis, 50% of women experience pain that is negatively associated with almost all aspects of daily life such as standing, walking, sleep, sport activities, domestic responsibilities, sexuality, joy of life and more. These daily challenges often have a negative impact on their educational goals, making career decisions, building stable and meaningful relationships, or starting a family, all of which alter one’s

life trajectory. [19], [13], [41], [14], [36]

An interdisciplinary and patient-centered model that integrates physiotherapy with lifestyle changes and psychological support is increasingly advocated for managing endometriosis-related pain. Relaxation and breathing techniques combined with cognitive-behavioral strategies can modulate stress responses, enhance emotional resilience, and reduce the perception of pain. For example, movement-based therapies that incorporate breathing, mindfulness, and self-regulation exercises can mitigate both physical discomfort and the mental burden of chronic illness. [34], [42], [40]

The implementation of relaxation-focused modalities, such as progressive muscle relaxation or biofeedback-enhanced pelvic floor training, is further strengthened by group-based support or therapy sessions aimed at promoting stress resilience and peer connection. These multimodal programs are particularly valuable for patients who have persistent pain symptoms despite pharmacological or surgical treatment.

4.2 Integration of Physical Activity with Pharmacological Treatment

Pharmacological options are commonly considered as the initial step in managing pain linked to endometriosis. Nonsteroidal anti-inflammatory drugs (NSAIDs) are often prescribed to reduce menstrual and pelvic pain due to their anti-inflammatory properties. However, their effectiveness in long-term pain control remains limited, as they do not halt the disease progression. [9] Hormonal treatment plays a more targeted role by suppressing ovarian estrogen production, which is known to drive the growth of endometrial tissue outside the uterus. Therapies in this category include combined oral contraceptives, progestins, gonadotropin-releasing hormone (GnRH) agonists and antagonists, as well as aromatase inhibitors. These treatments help by creating a hypoestrogenic environment that limits lesion growth and relieves pain. [44]

Despite their high efficacy and favorable safety profile, long-term use of hormonal therapies, such as progestins and estroprogestins, may be associated with adverse effects, including emotional disturbances, hot flashes, and decreased bone mineral density, which may, in turn, affect treatment adherence and limit the duration of therapy.[44], [5]

Physical activity and physiotherapy can effectively complement pharmacological treatments by enhancing physiological functions that modulate pain and inflammation. In the pharmacotherapeutic phase of endometriosis, it is recommended to initiate physiotherapeutic interventions without delay, as this approach both mitigates the adverse effects of hormone therapy and enhances the pharmacokinetic and pharmacodynamic efficacy of administered agents. Manual modalities—primarily lymphatic drainage and soft tissue mobilizations—combined with physical therapy techniques facilitate the resorption of interstitial fluid, improve local perfusion, and modulate nociceptive signaling, thereby promoting higher drug bioavailability. [26]

Physiotherapy also provides essential support during postoperative recovery, especially when initiated early to prevent complications such as thromboembolism or muscle deconditioning. Mobilization protocols adapted to the patient’s health status include breathing exercises and gentle leg movement training to support vascular flow and muscle activity.

CLINICAL TRIAL AND RANDOMIZED STUDY DATA

5.1. Review of Key Studies on Physiotherapy, Physical Activity, and Their Impact on Endometriosis-Related Pain and Symptom Severity

Authors of the study "Assessment of levator hiatal area using 3D/4D transperineal ultrasound in women with deep infiltrating endometriosis and superficial dyspareunia treated with pelvic floor muscle physiotherapy: randomized controlled trial." aimed to prove how physiotherapy affects the presence of endometriosis symptoms.

Based on the authors' opinions, it can be assumed that pelvic floor muscle physiotherapy may have a beneficial effect on the reduction of pain in women suffering from superficial dyspareunia, i.e. pain felt in the area of the vaginal opening. In the study described by the researchers, all participants underwent three-dimensional and four-dimensional transperineal ultrasonography to measure the levator anal area in three situations: at rest, during maximal contraction of the pelvic floor muscles, and during maximal Valsalva maneuver. All surfaces of the levator anus area were measured by drawing a line along the inner edge of the levator anus muscle, the pubic symphysis and the lower branch of the pubic bone. Additionally, each participant was asked to rate the severity of their pain symptoms using a numeric pain rating scale (NRS). After the first study, participants in the study group underwent five individual pelvic floor physiotherapy sessions, each lasting 30 minutes and taking place at weeks 1, 3, 5, 8 and 11. During each session, Thiele massage was performed, which helps to relieve excessive muscle tension and restore proper muscle condition. As a result, muscle function and coordination improve, along with enhanced circulation in the pelvic area, which contributes to the alleviation of pain symptoms associated with muscle tension.[16],

The results of the study authors indicate that in women who underwent 5 sessions of pelvic floor physiotherapy, the percentage change in the levator anus area during the maximal Valsalva maneuver was markedly higher than in the group of women who did not undergo physiotherapy intervention (20.0 ± 24.8% vs. -0.5 ± 3.3%; P = 0.02). This suggests better relaxation of the pelvic floor muscles after physiotherapy intervention. In addition, the severity of superficial dyspareunia remained virtually unchanged in the control group, while a significant improvement was observed in the study group. Also, changes in chronic pelvic pain were more favorable in the study group compared to the control group. [16]

As part of the assessment of muscle tone, both the pubococcygeal and sciatococcal muscles were examined bilaterally, both at rest and during contraction and relaxation of the pelvic floor muscles. [16]

After 4 months, all participants reassessed the severity of pain symptoms associated with endometriosis. Another ultrasound assessment was also performed at rest, with maximum contraction of the pelvic floor muscles and during the maximal Valsalva maneuver. In addition, the patients were asked to rate their satisfaction with the physiotherapy they had performed, using a five-point scale, where 1 – very dissatisfied, 2 – dissatisfied, 3 – neither satisfied nor dissatisfied, 4 – satisfied, 5 – very satisfied. [16]

Women who participated in physiotherapy sessions showed a greater percentage improvement in levator anal area relaxation during the maximal Valsalva maneuver compared to women who did not participate in exercise, suggesting an improvement in pelvic floor muscle relaxation after physiotherapy interventions. In addition, patients who participated in physiotherapy sessions experienced significant improvements in superficial dyspareunia and chronic pelvic pain compared to women who did not participate in exercise. On the other hand, in patients reporting symptoms of deep dyspareunia, characterized by discomfort during sexual activity, five sessions of pelvic floor physiotherapy did not result in a statistically significant reduction in pain intensity. [16]

Research indicates that superficial dyspareunia is a common symptom in women with endometriosis. This symptom can occur both alone and co-occur with severe dyspareunia. In addition, women with superficial dyspareunia often present with symptoms of pelvic floor muscle hypertonia, which can occur both as a major factor and as part of a larger pelvic pain syndrome, often contributing to the occurrence of chronic pelvic pain. Detection and appropriate treatment of pelvic floor hypertonia may be crucial in interrupting this process. Research also indicates that the thiele massage technique improves the condition of the pelvic floor muscles, reduces pain and has a positive effect on sexual function in women with excessive muscle tone, chronic pelvic pain or dyspareunia. The reduction in the severity of superficial dyspareunia in women after physiotherapy intervention, according to previous studies, indicates that this symptom is related to inadequate relaxation of the pelvic floor muscles.[16]

On the other hand, the lack of physiotherapy effects in the case of profound dyspareunia confirms that this symptom is mainly related to the presence of endometrial lesions and results from mechanical pressure on fibrotic tissue during sexual intercourse. [16]

The authors of the study point to the fact that pelvic floor physiotherapy showed a significant improvement in the relaxation of the pelvic floor muscles, which was documented by measurements of the levator anus muscle area in an ultrasound examination. In addition, participation in all planned physiotherapy sessions resulted in a significant reduction in the symptoms of superficial dyspareunia and chronic pelvic pain, indicating its effectiveness as a therapeutic intervention in the treatment of these endometriosis-related ailments. These results suggest that physiotherapy may be a valuable treatment, especially in cases where there is a problem with pelvic floor muscle tone. [16]

5.2. Limitations of the Existing Body of Evidence and Directions for Future Research

Although growing evidence points to the beneficial effects of physical activity on endometriosis-related symptoms, the current body of research remains insufficient to support definitive clinical guidelines. Many existing studies are preliminary in nature, involve small sample sizes, and rely on diverse assessment tools. Additionally, long-term follow-up is often lacking, and the type and intensity of the physical interventions are not always clearly defined. Therefore, there is a clear need for further research using standardized protocols and larger populations to better understand the therapeutic potential of exercise as a supportive strategy in endometriosis symptom management. [39]

Similar concerns apply to physiotherapy. Although it is increasingly recognized as a significant component of care for patients with endometriosis, the majority of available studies are descriptive in nature, and high-quality randomized controlled trials remain scarce. Therapeutic protocols are often complex, combining manual techniques, physical modalities, and exercise-based approaches, which makes it difficult to isolate the effectiveness of individual components. Moreover, most studies rely on subjective patient-reported outcomes, while objective measures—such as pelvic floor muscle function or inflammatory biomarkers—are rarely included. Future research should focus on establishing standardized diagnostic criteria and outcome assessment tools, while also designing multicenter clinical trials with longer follow-up periods. One promising direction involves the personalization of physiotherapy interventions, taking into account the

clinical heterogeneity of endometriosis—such as deep infiltrating versus superficial types. Crucially, interdisciplinary collaboration among physiotherapists, physicians, psychologists, and researchers will be essential in developing truly effective and patient-centered therapeutic models. [3]

SUMMARY OF KEY OUTCOMES

Numerous physiotherapeutic and physical activity-based interventions demonstrate promising results in alleviating endometriosis-related pain. Pelvic floor muscle therapy—including techniques like Thiele massage and biofeedback training—effectively reduces superficial dyspareunia and chronic pelvic pain, particularly when pelvic floor hypertonia is present. Manual therapies, such as visceral manipulations and trigger point releases, further enhance musculoskeletal function and neuromuscular control.

Electrotherapy, laser therapy, magnetotherapy, and phototherapy provide supportive pain relief and facilitate tissue regeneration. Relaxation and breathing techniques support emotional regulation, enhance self-efficacy, and contribute to better functional recovery. Yoga and mind-body interventions such as Pilates are associated with significant improvements in pain intensity, psychological well-being, and quality of life.

Aerobic activity—especially when regular and of sufficient intensity—may reduce the risk of disease progression through its anti-inflammatory and hormonal modulation effects. Although evidence supporting these interventions is growing, further randomized controlled trials are needed to confirm the efficacy of each approach and to standardize therapeutic protocols. A combined, interdisciplinary approach appears to offer the most comprehensive benefits for women coping with chronic pain due to endometriosis.

Among the main forms of treatment for endometriosis, both pharmacological and surgical approaches are used as primary methods of management; however, each comes with its own limitations. Hormonal therapies are not curative and may be unsuitable for women wishing to conceive. Their effectiveness can decline over time or be limited by side effects [9]. When symptoms persist, surgery—particularly laparoscopy, the gold standard for diagnosis and treatment—may be necessary. It enables lesion removal and often improves pain and quality of life [4]. In severe cases, extensive procedures may be required to excise deeply infiltrating lesions from organs like the bowel or bladder. However, surgery carries risks, including symptom recurrence in nearly 50% of patients within five years [12], and access to specialized care may vary, affecting outcomes [4].

These considerations highlight the importance of adopting individualized, multidisciplinary treatment plans. Integrating complementary strategies—such as physical therapy, lifestyle adjustments, and mental health support—may provide more sustainable and patient-centered care for those living with chronic endometriosis-related pain.

Table 1. Comparison of non-pharmacological interventions used in endometriosis management.

	Type of intervention	Mechanism of action	Reported benefits	Level of ewidence	Clinical applicability
1	Pelvic floor physiptheraphy	Muscle relaxation, pain modulation	↓ dyspareunia, ↑ pelvic function	Moderate	Adjunct
2	Manual therapy	Tissue mobilization, neuromodulation	↓ pelvic pain, ↑ tissue mobility	Weak	Experimental/ Adjunct
3	Aerobic excercise	Estrogen reduction, anti-inflamatory	↓ pain, ↓ inflammation, ↑ mood	Moderate	Adjunct
4	Yoga	Stress reduction, neuromuscular control	↓ pain, ↑ QoL, ↓ anxiety	Moderate	Experimental
5	Electrotheraphy & phototheraphy	Analgesia, tissue regeneration	↓ pain, ↑ healing	Weak	Experimantal

DISCUSSION

The results of this review suggest that physiotherapy and physical activity may serve as beneficial adjuncts in the management of pain in women with endometriosis. However, the available evidence is heterogeneous in terms of methodology, intervention types, outcome measures, and follow-up duration. Many of the included studies are small-scale, lack randomization, or rely on subjective pain assessment without standardized tools. Only a limited number of randomized controlled trials (RCTs) have been conducted, and their findings remain inconsistent.

Pelvic floor physiotherapy appears to offer benefit in cases of superficial dyspareunia, and aerobic exercise may reduce pain and improve general well-being. Some mind–body interventions, such as yoga, show potential, but evidence remains preliminary. The exact mechanisms through which physical activity modulates pain and hormonal pathways in endometriosis are not yet fully understood and require further investigation.

This review also highlights significant gaps in the literature, including a lack of high-quality comparative trials, standardization of physiotherapeutic protocols, and long-term outcome data. Moreover, few studies have assessed whether non-pharmacological strategies can reduce the need for pharmacological or surgical treatment over time.

CONCLUSIONS

Based on the reviewed literature, the following conclusions can be drawn:

1. Physiotherapy and physical activity may be beneficial in managing endometriosis-related pain, particularly in women who do not respond adequately to pharmacological or surgical treatments.
2. Pelvic floor physiotherapy, aerobic exercise, and yoga are among the most studied approaches, showing positive effects on pain reduction, hormonal regulation, and psychological well-being.
3. The current body of evidence is limited by small sample sizes, lack of control groups, and methodological heterogeneity, which prevents definitive conclusions regarding clinical effectiveness.
4. These interventions should be viewed as adjunctive strategies, best applied as part of a multidisciplinary treatment plan tailored to the individual patient's needs.
5. Further high-quality research, especially randomized controlled trials with standardized protocols and long-term follow-up, is required to validate the clinical utility of physiotherapy and physical activity in endometriosis care.

DISCLOSURE

All authors have read and agreed with the published version of the manuscript.

Author Contributions: AA, AT, JR and MG: conceptualization, literature review, writing - original draft preparation; KG, MŚ, PS, AQ, AK, and PŁ: literature review, writing - review and editing.

REFERENCES

1. Acién P, Velasco I. Endometriosis: A disease that remains enigmatic. ISRN Obstetrics and Gynecology. 2013; Article 242149. **https://doi.org/10.1155/2013/242149**
2. Asante A, Taylor R. Endometriosis: The role of neuroangiogenesis. Annual Review of Physiology. 2011; 73:163–182. https://doi.org/10.1146/annurev-physiol-012110-142158
3. Awad E, Ahmed H, Yousef A, Abbas R. Efficacy of exercise on pelvic pain and posture associated with endometriosis: Within-subject design. Journal of Physical Therapy Science. 2017;29(12), 2112–2115. DOI: 10.1589/jpts.29.2112
4. Bafort C, Beebeejaun Y, Tomassetti C, Bosteels J, Duffy J. Laparoscopic surgery for endometriosis. The Cochrane database of systematic reviews. 2020;10(10), CD011031. DOI: 10.1002/14651858.CD011031.pub3
5. Barbara G, Buggio L, Facchin F, Vercellini P. Medical Treatment for Endometriosis: Tolerability, Quality of Life and Adherence. Frontiers in Global Women's Health. 2012; 2, 729601. DOI: 10.3389/fgwh.2021.729601
6. Bonocher C, Montenegro M, Rosa e Silva J, et al. Endometriosis and physical exercises: A systematic review. Reproductive Biology and Endocrinology. 2014; 12, 4. DOI: 10.1186/1477-7827-12-4
7. Brott N, Le J. Mittelschmerz. W StatPearls. StatPearls Publishing. 2023. https://www.ncbi.nlm.nih.gov/books/NBK549822/ .
8. Buggio L, Barbara G, Facchin F, Frattaruolo M, Aimi G, Berlanda N. Self-management and psychological-sexological interventions in patients with endometriosis: Strategies, outcomes, and

integration into clinical care. International Journal of Women's Health. 2017;9, 281–293. DOI: 10.2147/IJWH.S119724

9. Bulun S, Yilmaz B, Sison C, et al. Endometriosis: Mechanisms of disease. Endocrine Reviews. 2019;40(4), 1048–1079. DOI: 10.1210/er.2018-00242
10. Chapron, C, Marcellin L, Borghese B, Santulli P. Rethinking mechanisms, diagnosis and management of endometriosis. Nature Reviews Endocrinology. 2019;15(11), 666–682. DOI: 10.1038/s41574-019-0245-z
11. Cohen Ben-Meir L, Soriano D, Zajicek M, et al. The association between gastrointestinal symptoms and transvaginal ultrasound findings in women referred for endometriosis evaluation: A prospective pilot study. Ultraschall in der Medizin. 2020;41(4), 320–326. DOI: 10.1055/a-1300-1887
12. Cuffaro F, Russo E, Amedei A. Endometriosis, pain, and related psychological disorders: Unveiling the interplay among the microbiome, inflammation, and oxidative stress as a common thread. International Journal of Molecular Sciences. 2024;25(12), 6473. DOI: 10.3390/ijms25126473
13. Cunha C, Fiamengui L, Sampaio, F, Conti P. Is aerobic exercise useful to manage chronic pain?. Revista Dor. 2016;17(1). DOI:10.5935/1806-0013.20160015
14. Del Forno S, Arena A, Pellizzone V, et al. Assessment of levator hiatal area using 3D/4D transperineal ultrasound in women with deep infiltrating endometriosis and superficial dyspareunia treated with pelvic floor muscle physiotherapy: A randomized controlled trial. Ultrasound in Obstetrics & Gynecology. 2021;57(5), 726–732. DOI: 10.1002/uog.23590
15. Farshi N, Hasanpour S, Mirghafourvand M, Naseri M. Effect of self-care counselling on depression and anxiety in women with endometriosis: A randomized controlled trial. BMC Psychiatry. 2020;20, 391. DOI: 10.1186/s12888-020-02795-7
16. Febbraio M. Exercise and inflammation. Journal of Applied Physiology. 2007;103(1), 376–377. DOI: 10.1152/japplphysiol.00414.2007
17. França P, Lontra A, Fernandes P. Endometriosis: A disease with few direct treatment options. Molecules. 2022;27(13), 4034. DOI: 10.3390/molecules27134034
18. Gacoń E, Zembala J, Kucharski J, et al. Long way to diagnosis – case report of 23-year-old patient with multifocal abdominal endometriosis. Journal of Education, Health and Sport. 2023;27(1), 71–75. https://doi.org/10.12775/JEHS.2023.27.01.007
19. Ghaderi F, Bastani P, Hajebrahimi S, Jafarabadi MA, Berghmans B. Pelvic floor rehabilitation in the treatment of women with dyspareunia: a randomized controlled clinical trial. Int Urogynecol J. 2019;30(11):1849–1855. DOI: 10.1007/s00192-019-04019-3
20. Gonçalves AV, Makuch MY, Setubal MS, Barros NF, Bahamondes L. The practice of hatha yoga for the treatment of pain associated with endometriosis. J Altern Complement Med. 2016;22(12):977–982. DOI: 10.1089/acm.2016.0021
21. Kuligowska E, Cieślar G. Magnetoterapia w praktyce fizjoterapeutycznej – mechanizmy działania i zastosowanie kliniczne. Rehabil Praktyce. 2018;6:18–23
22. Kwiatkowski P, Gładysz K, Szydłowska J, et al. Endometriosis – Pathogenesis, diagnosis and treatment. J Educ Health and Sport. 2023;13(3):302–308. https://doi.org/10.12775/JEHS.2023.13.03.039
23. Leone Roberti Maggiore U, Ferrero S, Candiani M, Somigliana E. Bladder endometriosis: A systematic review of pathogenesis, diagnosis, treatment, impact on fertility, and risk of malignant transformation. European Urology. 2017;71(5):790–807.
24. Muñoz-Gómez E, Alcaraz-Martínez AM, Mollà-Casanova S, et al. Effectiveness of a Manual Therapy Protocol in Women with Pelvic Pain Due to Endometriosis: A Randomized Clinical Trial. J Clin Med. 2023;12(9):3310. DOI: 10.3390/jcm12093310
25.] Paoloni M, Bernetti A, Fratocchi G, et al. Kinesio taping applied to lumbar muscles influences clinical and electromyographic characteristics in chronic low back pain patients. Eur J Phys Rehabil Med. 2011;47(2):237–244
26. Pedersen BK, Febbraio MA. Muscle as an endocrine organ: Focus on muscle-derived interleukin-6. Physiol Rev. 2008;88(4):1379–1406. DOI: 10.1152/physrev.90100.2007
27. Peng B, Alotaibi FT, Sediqi S, Bedaiwy MA, Yong PJ. Role of interleukin-1β in nerve growth factor expression, neurogenesis and deep dyspareunia in endometriosis. Hum Reprod. 2020;35(4):901–912. https://doi.org/10.1093/humrep/deaa017
28. Polish Gynecological Society. Recommendations for the diagnosis and treatment of endometriosis. 2023. https://www.ptgin.pl/sites/scm/ files/2023-10/Rekomendacje% 20ENDOMETRIOZA %2023.10.2023.png 1.pdf
29. Ricci E, Viganò P, Cipriani S, et al. Physical activity and endometriosis risk in women with infertility or pain: Systematic review and meta-analysis. Medicine (Baltimore). 2016;95(40):e4957. DOI:

10.1097/MD.0000000000004957

30. Ruszała M, Dłuski DF, Winkler I, Kotarski J, Rechberger T, Gogacz M. The State of Health and the Quality of Life in Women Suffering from Endometriosis. J Clin Med. 2022;11(7):2059. DOI: 10.3390/jcm11072059
31. Senat H, Grabowska P, Senat A, et al. Endometriosis: Pathogenesis, diagnosis, treatment, and the role of gut microbiota. J Educ Health Sport. 2024;59:87–101. DOI: 10.12775/JEHS.2024.59.006
32. Shved K, Antkowiak K, Kędzierska Z, et al. Physiotherapy and physical activity as adjunctive treatments in women with symptomatic endometriosis: Literature review. Med Ogol Nauki Zdrow. 2023;29(3):145–149. DOI: 10.26444/monz/169984
33. Siedlak A, Kuc M, Cyboran K, Machaj D, Płaczek A. The complementary treatment of endometriosis: Diet, physiotherapy and psychological treatment. J Educ Health Sport. 2022;12(7):989–993. DOI: 10.12775/JEHS.2022.12.07.100
34. Szlendak P, Winiarz A, Turek M, et al. Influence of lifestyle on the course of endometriosis. J Educ Health Sport. 2023;40(1):139–152. DOI:10.12775/JEHS.2023.40.01.012
35. Szukiewicz D, Stangret A, Ruiz-Ruiz C, et al. Estrogen- and Progesterone (P4)-Mediated Epigenetic Modifications of Endometrial Stromal Cells (EnSCs) and/or Mesenchymal Stem/Stromal Cells (MSCs) in the Etiopathogenesis of Endometriosis. Stem Cell Rev Rep. 2021;17:1174–1193. DOI: 10.1007/s12015-020-10115-5
36. Szypłowska A, Tarkowski M, Kułak W. Impact of endometriosis on depressive and anxiety symptoms and quality of life: a systematic review. Front Public Health. 2023;. DOI: 10.3389/fpubh.2023.1230303
37. Tennfjord MK, Gabrielsen R, Tellum T. Effect of physical activity and exercise on endometriosis-associated symptoms: A systematic review. BMC Womens Health. 2021;21(1):355. DOI: 10.1186/s12905-021-01500-4
38. Wallace SL, Miller LD, Mishra K. Pelvic floor physical therapy in the treatment of pelvic floor dysfunction in women. Curr Opin Obstet Gynecol. 2019;31(6):485–493. DOI: 10.1097/GCO.0000000000000584
39. Woźniak J, Kadłubek S, Mąka M, et al. The impact of endometriosis on mental health—A literature review of depression and anxiety symptoms. J Educ Health Sport. 2025;77:56867. https://doi.org/10.12775/JEHS.2025.77.56867
40. Wójcik M, Szczepaniak R, Placek K. Physiotherapy management in endometriosis. Int J Environ Res Public Health. 2022;19(23):16148. DOI: 10.3390/ijerph192316148
41. Zhao Y, Gong P, Chen Y, et al. Dual suppression of estrogenic and inflammatory activities for targeting of endometriosis. Sci Transl Med. 2015;7(271):271ra9. DOI: 10.1126/scitranslmed.3010626
42. Zito G, Luppi S, Giolo E, et al. Medical Treatments for Endometriosis-Associated Pelvic Pain. Biomed Res Int. 2014;2014:Article ID 191967. DOI: 10.1155/2014/191967

back