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Systematic Review

Can Integrative Therapies Reduce Pain and Improve Quality of Life in Women with Endometriosis? A Systematic Review

Muji Sutrisno*

Resident Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Brawijaya/Dr. Saiful Anwar General Hospital, Malang, East Java, Indonesia

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CORRESPONDING AUTHOR*
Muji Sutrisno
mujisutrisno.dr@gmail.com
Resident Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Brawijaya/ Dr. Saiful Anwar General Hospital, Malang, East Java, Indonesia

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ABSTRACT

Introduction: Endometriosis is a chronic inflammatory condition affecting millions of women worldwide, often causing severe pain and reduced quality of life. Conventional treatments have limitations, leading to growing interest in integrative therapies. This systematic review aims to evaluate the effectiveness of these therapies in reducing pain and improving the quality of life in women with endometriosis.

Methods: A systematic literature search was conducted following PRISMA 2020 guidelines across PubMed, ScienceDirect, and Cochrane databases through August 2025. Studies involving women with endometriosis receiving integrative therapies (e.g., psychological interventions, physical therapy, yoga, electrotherapy, dietary modifications) were included. Data on pain scores and quality of life were extracted and synthesized qualitatively.

Results: Out of 1,477 identified records, 17 studies met the inclusion criteria. The evidence suggests that various integrative therapies are beneficial. Cognitive Behavioral Therapy (CBT) and relaxation techniques consistently improved emotional well-being and pain coping. Physical therapy demonstrated significant reductions in endometriosis-related chronic pain and enhancements in quality of life. Electrotherapies, besides reducing pain, additionally improve sexual function. Lastly, nutritional therapy showed positive effects on pain control and gastrointestinal symptoms.

Conclusion: Integrative therapies represent a valuable complementary approach for managing endometriosis-related pain and improving quality of life. The choice of adjunctive therapy should be guided by the patient's accompanying symptoms and individual clinical needs.

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INTRODUCTION

Endometriosis is a chronic gynecological disorder in which endometrium-like tissue implants outside the uterus, provoking pelvic inflammation and adhesions involving surrounding organs [1,2]. The World Health Organization (WHO) estimates that endometriosis affects approximately 10% of women of reproductive age worldwide, roughly 190 million individuals. According to the Global Burden of Disease (GBD) 2021 study, annual incident cases of endometriosis reached 3.45 million globally, with a total burden of 2.05 million DALYs (disability-adjusted life years) [3].

The cardinal clinical features of endometriosis are severe pelvic pain, particularly dysmenorrhea, dyspareunia, menstrual disturbances, and infertility. Persistent pain and a chronic cyclical inflammatory process commonly degrade patients' physical, emotional, and social quality of life [4,5]. WHO states that no definitive cure for endometriosis currently exists; contemporary conventional treatments focus on symptom control for pain and management of infertility [1,3].

The precise prevalence of endometriosis in Indonesia remains unknown due to a paucity of national epidemiological studies. Hospital records indicate that many patients present with dysmenorrhea, but an official, population-level prevalence estimate is lacking. The absence of comprehensive population data complicates efforts to determine the true burden of cases in Indonesia. Nevertheless, the substantial global disease burden and the severity of symptoms underline the need for targeted attention within the Indonesian healthcare context [6,7].

Conventional therapies, including nonsteroidal anti-inflammatory drugs (NSAIDs), hormonal treatments such as oral contraceptives, GnRH agonists/antagonists, and laparoscopic surgery, have important limitations [4,8]. These interventions typically provide symptomatic relief and are associated with adverse effects; many patients experience residual or recurrent pain after cessation of therapy, and surgical excision of lesions is often followed by high recurrence rates. Given that most standard treatments offer only partial benefit and carry side effects, there is increasing interest in exploring complementary and adjunctive approaches. Recent literature advocates for a multidisciplinary, holistic strategy to improve pain management in endometriosis [9,10].

Integrative therapies denote health approaches that combine conventional biomedical care with evidence-based complementary and/or traditional practices. WHO defines integrative medicine as the coordinated use of validated conventional medical care alongside proven traditional or complementary procedures. In endometriosis, integrative interventions encompass a range of nonpharmacological methods that may act synergistically with mainstream treatments, for example, physical therapy and exercise, manual therapies delivered by physiotherapists or osteopaths, relaxation and meditation techniques, and nutritional interventions [11,12].

Studies indicate that these non-medical approaches are commonly employed to reduce pain and improve quality of life, generally without serious adverse effects. However, despite the promise of many integrative interventions, supporting scientific evidence remains limited and inconclusive. Meta-analyses and systematic reviews have typically observed only non-significant trends toward symptom improvement for most complementary therapies [13]. In certain meta-analyses, only acupuncture demonstrated a statistically significant reduction in pain compared with placebo. Given the current limitations in evidence, there are no definitive recommendations for the routine use of acupuncture or other complementary therapies for endometriosis at this time [14,15]. Consequently, no definitive clinical recommendations for acupuncture or other complementary therapies in endometriosis have been established, and substantial knowledge gaps persist.

This study aims to perform a systematic review of the recent literature to evaluate the effectiveness of integrative therapies in reducing pain and improving quality of life among women with endometriosis. By synthesizing available evidence on complementary and adjunctive interventions, the review seeks to identify promising methods that could supplement standard care and to delineate research gaps requiring further investigation. The primary objective is to determine whether integrative therapies can produce statistically and clinically meaningful reductions in pain and enhancements in quality of life for women with endometriosis, thereby informing evidence-based clinical practice and future research priorities.

METHODS

Protocol and Reporting Standards

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement, following the stages of identification, screening, eligibility assessment, and study inclusion. The review protocol was not prospectively registered in the International Prospective Register of Systematic Reviews (PROSPERO) because the review had commenced before registration was considered. However, the methodology was established before the literature screening and data extraction processes to ensure transparency and reproducibility.

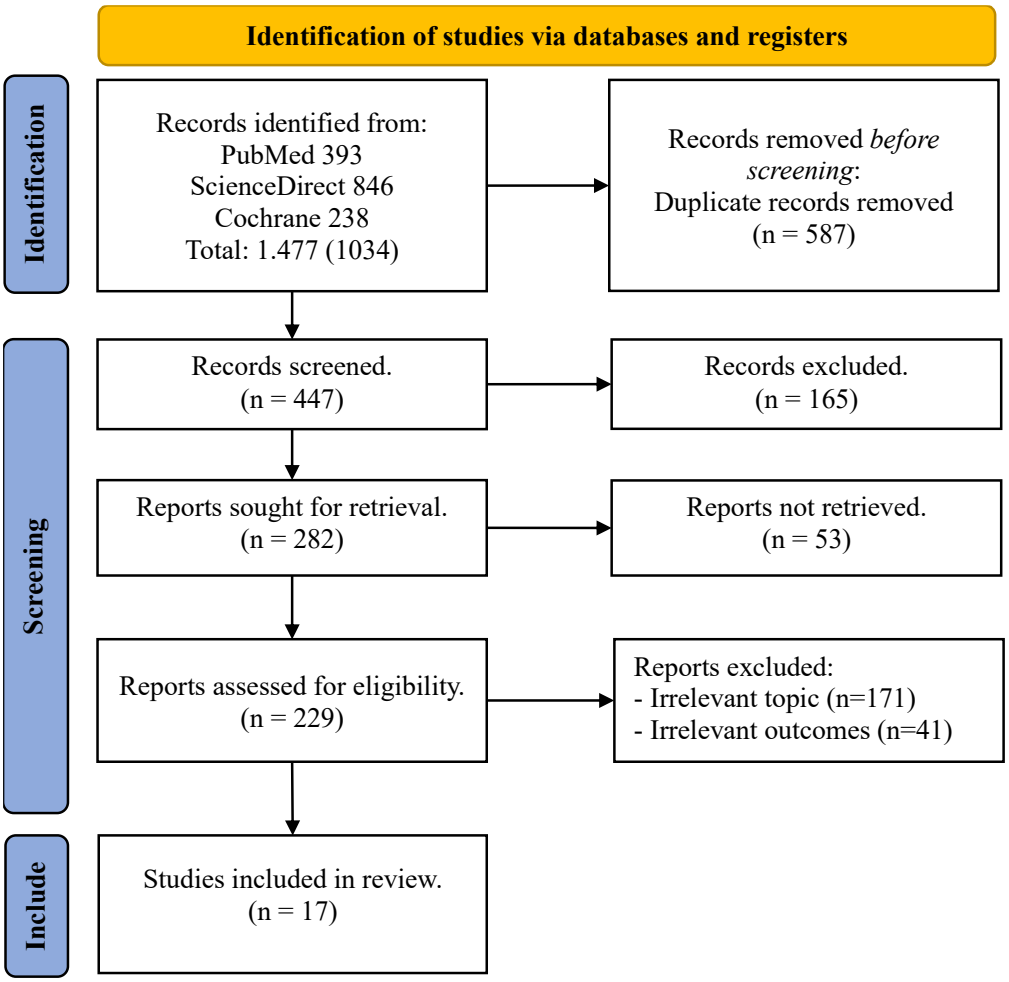


Figure 1. PRISMA Flowchart of the Study

Eligibility Criteria

Eligibility was defined using a Population, Intervention, Comparison, and Outcomes (PICO) framework:

- Population (P): Women diagnosed with endometriosis by clinical, radiological, or laparoscopic criteria.
- Intervention (I): Integrative therapies, including but not limited to physical therapy (e.g., yoga, acupuncture, manual/osteopathic therapy, physiotherapy, progressive muscle relaxation (PMR)) electrotherapies (e.g., transcutaneous electrical nerve stimulation [TENS], neuromuscular electrical stimulation [NMES]), psychological interventions (e.g., cognitive behavioral therapy, virtual reality), and dietary modification (Diet types and nutritional supplementation).
- Comparison (C): No intervention, standard conventional therapy (pharmacological or surgical), placebo/sham interventions, or other non-integrative comparators.
- Outcomes (O): The primary outcome was improvement in endometriosis-associated pain (dysmenorrhea, dyspareunia, chronic pelvic pain). Secondary outcomes included quality of life, sexual function, emotional status (anxiety, depression), bowel and urinary function, and analgesic use.

Information Sources and Search Strategy

Electronic searches were performed in PubMed, Science direct, and Cochrane. Search strategies combined Medical Subject Headings (MeSH) and free-text terms such as ("endometriosis" OR endometrioma) AND

("integrative therapy" OR "complementary" OR "alternative medicine" OR "yoga" OR "acupuncture" OR "manual therapy" OR "physiotherapy" OR "electrotherapy" OR "diet" OR "supplementation" OR "cognitive behavioral therapy") AND ("pain" OR "Quality of Life" OR "QoL" OR "NRS" OR "VAS" OR "ESSS"). We limit the search to Research articles and Clinical Trials. The search period extended from August 2005 to August 2025.

Data Extraction

After compiling the set of identified records, duplicate titles were removed. Titles and abstracts were independently screened for eligibility by two reviewers. Records judged potentially relevant from title/abstract screening were retained for full-text retrieval. Extracted data items included author and year, study design, participant characteristics (e.g., age, disease duration), details of the integrative intervention, comparator(s), intervention duration, assessment instruments, and measured outcomes. Full-text screening for eligibility was performed independently by two authors. The study selection process was documented and presented as a PRISMA flow diagram (Figure 1).

Outcomes of Interest

The principal outcome assessed was endometriosis-related pain, measured using instruments such as the Visual Analog Scale (VAS), Numeric Rating Scale (NRS), or Endometriosis Symptom Severity Scale (ESSS). Secondary outcomes included quality of life assessed with instruments such as the Endometriosis Health Profile (EHP-5/EHP-30) or Short Form-36 (SF-36); emotional status measured by tools like the Hospital Anxiety and Depression Scale (HADS); sexual function measured by the Female Sexual Function Index (FSFI); and additional clinical parameters including adhesions, bowel and urinary function, and dietary adherence. Searches of PubMed, Cochrane, and ScienceDirect retrieved 1,034 records. After conducting a thorough methodological search and screening, 17 studies met the eligibility criteria and were extracted.

RESULTS

Study Selection

The literature search identified a total of 1,477 records from PubMed, ScienceDirect, and Cochrane. After removal of 587 duplicate records, 447 records were screened based on titles and abstracts. A total of 165 records were excluded during the screening process. Subsequently, 282 reports were sought for retrieval, of which 53 reports could not be retrieved. Of the 229 reports assessed for eligibility, 171 were excluded because of irrelevant topics and 41 because of irrelevant outcomes. Finally, 17 studies met the inclusion criteria and were included in the systematic review.

Characteristics of Included Studies

A total of 17 studies were included in this systematic review. The included studies comprised randomized controlled trials, observational studies, retrospective studies, prospective studies, cross-sectional surveys, therapeutic protocol studies, and multiple case study designs. The studies evaluated various integrative therapies, including psychological and perceptual interventions, physical therapies, electrotherapy, and nutritional therapy. The characteristics of the included studies are presented in Table 1.

The studies were conducted in several countries, including France, Brazil, Saudi Arabia, China, Spain, Austria, Italy, Australia, the United States, and the Netherlands. The sample sizes varied substantially across studies, ranging from 5 participants in the multiple-case study by Hawkins and Hart to 778 participants in the observational survey by Mercier et al. The participants generally presented with endometriosis-associated symptoms, including dysmenorrhea, chronic pelvic pain, dyspareunia, dyschezia, dysuria, gastrointestinal symptoms, and fatigue [16-31].

Outcomes of Integrative Therapies

The principal outcome assessed was endometriosis-related pain, measured using instruments such as the Visual Analog Scale (VAS), Numeric Rating Scale (NRS), or Endometriosis Symptom Severity Scale (ESSS). Secondary outcomes included quality of life assessed with instruments such as the

Endometriosis Health Profile (EHP-5/EHP-30) or Short Form-36 (SF-36); emotional status measured by tools like the Hospital Anxiety and Depression Scale (HADS); sexual function measured by the Female Sexual Function Index (FSFI); and additional clinical parameters including adhesions, bowel and urinary function, and dietary adherence.

Psychological and Perception Therapy

Petrelluzzi et al. reported that physical therapy combined with cognitive behavioral therapy (CBT) reduced the mean intensity of perceived pain from 4.0 to 3.3, although the reduction did not reach statistical significance ($p>0.05$). The intervention significantly improved SF-36 vitality and physical functioning domains ($p<0.05$), normalized salivary cortisol levels, and reduced the Perceived Stress Index (PSQ) ($p<0.05$) [27].

Merlot et al. reported that a 3D therapeutic virtual reality (VR) intervention significantly reduced pain from 6.0 to 4.5 on an 11-point NRS, compared with a reduction from 5.7 to 5.0 in the 2D digital control group. The analgesic effect persisted for up to four hours after treatment. Three participants in the VR group reported mild headache and nausea related to motion sickness [26].

Physical Therapy

Mercier et al. reported that 58% of participants reduced their use of conventional analgesics when using complementary therapies. Satisfaction was highest for osteopathy and yoga, at 69%. The study also reported a high prevalence of dyspareunia and substantial work interruption among participants [16].

Gonçalves et al. reported a significant reduction in daily pain following Hatha yoga, with a mean VAS score of 3.7 ± 0.5 in the yoga group compared with 6.5 ± 0.5 in the control group ($p=0.0007$). The intervention also significantly improved several EHP-30 domains, including pain, control/powerlessness, emotional well-being, and self-image, as well as work and treatment domains [17].

Muñoz-Gómez et al. reported a significant reduction in pain following manual therapy, with a post-intervention VAS of 3.76 in the manual therapy group compared with 5.05 in the placebo group. The improvement was maintained at the six-month follow-up. Lumbar mobility also significantly improved, while no significant effects were observed on depression or anxiety [20].

Zhao et al. reported that progressive muscle relaxation combined with GnRH agonist therapy significantly improved body pain compared with GnRH agonist therapy alone. The PMR group also showed significant improvements in state and trait anxiety and depression [21].

Daraï et al. reported a significant improvement in bodily pain measured using SF-36, with the mean score increasing from 37.1 to 62.9 ($p=0.004$). Improvements were also observed in both the physical and mental component summaries of SF-36 [23]. Rubi-Klein et al. reported a significant reduction in VAS from 7.6 to 2.2 ($p<0.0001$) following verum acupuncture. Significant improvements were observed in seven of eight SF-36 domains and in the Pain Disability Index. The proportion of patients not taking analgesics increased from 21% to 54% [24]. Del Forno et al. reported improvements in superficial dyspareunia and chronic pelvic pain following pelvic floor physiotherapy. However, no significant differences were observed between groups in sexual function, urinary function, or constipation scores, although a trend toward improvement in constipation was observed [32].

Electrotherapy Therapy

Thabet and Alshehri reported a significant reduction in pain following pulsed high-intensity laser therapy. The mean Present Pain Intensity score was 0.75 in the HILT group compared with 2.10 in the control group ($p<0.0001$). Adhesion scores also significantly decreased, while quality of life improved across all five EHP-5 domains, including walking, mood, and social support [18].

Bi and Xie reported a significant reduction in pain following neuromuscular electrical stimulation. The NRS change was -2.9 in the NMES group compared with -0.6 in the control group ($p=0.02$), while the ESSS change was -2.5 compared with -0.5 ($p=0.04$). Significant improvements were also observed in both the physical and mental component summaries of SF-36 ($p<0.01$), with no severe adverse events recorded [19].

Mira et al. reported that self-applied TENS combined with hormonal treatment significantly decreased chronic pelvic pain, with VAS decreasing from 7.11 to 4.55 ($p<0.001$). Deep dyspareunia also decreased from 2.02 to 1.36 ($p<0.001$). Significant improvements were

observed in quality of life and sexual function, while the TENS group required significantly fewer days of analgesic medication than the control group [22].

Hawkins and Hart reported that thermal biofeedback resulted in a reduction in pain severity in two of four participants. Life interference also decreased, while three of four participants demonstrated decreased affective distress and one participant showed increased life control [31].

Nutritional Therapy

Cirillo et al. reported significant reductions in dyspareunia at three months (p=0.04), dysuria at six months (p=0.04), and dyschezia at six months (p<0.001) following a Mediterranean diet. Nonmenstrual pelvic pain also decreased, although the reduction did not reach statistical significance (p=0.06). Bowel habits, including regularity and stool consistency, significantly improved in 35% of patients (p=0.002) [25].

Armour et al. reported that participants used various self-management strategies, including dietary choices, heat, meditation, cannabis, and hemp/CBD oil. Cannabis had the highest self-rated effectiveness, followed by heat and dietary choices. The Pelvic Pain Impact Questionnaire showed that energy levels and gastrointestinal function had the highest negative impact on daily life [28].

Nodler et al. reported that worst pain improved in the vitamin D and placebo groups, while the fish oil group showed a modest change. However, no significant differences were observed between the intervention groups and placebo. Quality of life also did not differ significantly between groups. A significant improvement in catastrophic thinking was observed only in the vitamin D group [29].

Van Haaps et al. reported that dietary interventions, including a low-FODMAP diet and an endometriosis diet, were associated with reduced deep dyspareunia compared with the control group. Reductions in dysuria, bloating, and tiredness were also observed compared with baseline. Gastrointestinal health improved, and dietary adherence was high, with satisfaction ranging from 80.6% to 81.8% [30].

DISCUSSION

This systematic review synthesizes evidence from 17 studies, indicating that integrative therapies can offer significant benefits in reducing pain and enhancing the quality of life for women with endometriosis. The findings underscore a paradigm shift towards a more holistic, patient-centered approach in managing this complex condition.

The evidence supporting psychological and perceptual interventions, such as CBT and VR, is particularly compelling. CBT has been shown to enhance coping strategies, alleviate symptoms of depression, stress, and anxiety, and modulate pain perception [27]. Similarly, VR may reduce patients' perception of pain, with the most pronounced effects observed during the first four hours following treatment [26].

Meanwhile, physical therapies were the most commonly identified adjuncts to conventional treatment. A wide range of modalities has been investigated, including yoga, osteopathic manipulative therapy, progressive muscle relaxation, Thiele massage, and acupuncture. Yoga may help divert attention away from pain while fostering mind–body integration, potentially reducing reliance on analgesic medications [317, 33]. In contrast, osteopathic manipulative therapy, progressive muscle relaxation, and acupuncture appear to target somatic dysfunctions and myofascial restrictions that are frequently associated with endometriosis [16,20,21,23,24]. Beyond alleviating physical pain, these interventions have also demonstrated beneficial effects on psychological well-being, contributing to a better quality of life. Specific treatments, such as PFP, result in better sexual function [32].

Electrotherapy modalities, including laser therapy, transcutaneous electrical nerve stimulation (TENS), and neuromuscular electrical stimulation (NMES), appear to confer benefits beyond pain relief. Their mechanisms of action, likely involving [19] the gate-control theory of pain and modulation of central pain processing, provide a non-pharmacological approach to symptom management that complements conventional hormonal therapy [19]. The retrospective study by Bi and Xie is particularly noteworthy, as it highlights the importance of treatment duration; significant reductions in pain and improvements in quality of life were observed after 10 weeks of treatment but not after 5 weeks, suggesting that a minimum intervention period may be necessary to

achieve therapeutic efficacy [36]. This aspect of treatment protocol optimization is often overlooked. Furthermore, studies by Thabet et al. and Mira et al. reported additional benefits of electrotherapy, including improvements in sexual function and reductions in pelvic adhesions [22]. These findings may be clinically relevant when selecting adjunctive therapies for patients presenting with such specific indications.

Nutritional therapy has emerged as a promising self-management strategy for women with endometriosis. Dietary approaches such as the Mediterranean diet, low-FODMAP diet, and endometriosis-specific diets may help reduce systemic inflammation, thereby contributing to significant improvements in endometriosis-related pain [25,30]. In contrast, the evidence supporting nutritional supplementation, including vitamin D and ω-3 fatty acids, remains less consistent. As highlighted by Nodler et al, the interpretation of these findings is further complicated by substantial placebo effects, underscoring the need for future studies with rigorous methodological designs to better distinguish true therapeutic benefits from placebo responses [29].

This review is not without limitations. The evidence base is constrained by the prevalence of pilot studies, small sample sizes, and a reliance on self-reported outcomes in survey-based research. There is a notable scarcity of high-powered RCTs with long-term follow-up (>1 year) to assess the sustainability of benefits. Future research should prioritize such rigorous trials. Additionally, studies are needed to evaluate healthcare providers' knowledge and attitudes toward integrative medicine, as a lack of familiarity may be a significant barrier to referral. Finally, as highlighted by Nodler et al. (2020), more research is required to understand the potent placebo effects observed in pain studies and to disentangle them from the specific physiological effects of interventions.

CONCLUSION

These findings suggest that endometriosis-related pain is influenced not only by the underlying pathophysiology of the disease but also by the patient's baseline inflammatory status and pain perception. Therefore, efforts to reduce systemic inflammation, such as adherence to anti-inflammatory dietary patterns, should be encouraged as part of a comprehensive management strategy. Likewise, pain perception may be modulated through adjunctive interventions, including physical therapies (e.g., yoga, electrotherapy, and massage) as well as psychological approaches (e.g., cognitive behavioral therapy and virtual reality).

This review did not evaluate the comparative superiority of one adjunctive therapy over another. Consequently, the selection of adjunctive interventions should be individualized according to the patient's symptom profile, comorbidities, and specific clinical needs. In this multidisciplinary model of care, the Obstetrician–Gynecologist (OB-GYN) serves as the central coordinator responsible for definitive diagnosis, surgical management, and conventional medical treatment, including hormonal therapies and nonsteroidal anti-inflammatory drugs (NSAIDs). Furthermore, appropriate referral to other healthcare professionals, such as psychiatrists, physiotherapists, and dietitians, is essential to address the multifaceted nature of endometriosis and optimize patients' quality of life.

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CONFLICT OF INTEREST

The authors assert that there are no conflicts of interest pertaining to the publishing of this paper.

Availability of Data and Materials

The datasets were created and evaluated as part of the current study.

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Table 1. Baseline Characteristic of Included Studies

No.	Author, Year	Country	Study Design	Study Participants (N, [Mean/Median Age])	Endometriosis Characteristics (N, %)
1.	Mercier et al., 2025 [16]	France	Observational Survey	Total: 778 (35,3 y)	Pain (WHO level): 59% Level 1, 43% Level 2, 9% Level 3 Diagnosis duration: N/A Symptoms: Dyspareunia (79%), IBS-like symptoms (39%),
2.	Gonçalves et al., 2016 [17]	Brazil	Randomized Controlled Trial	Intervention (Yoga group): 28 Control (Non-yoga) 12 Age: 34.88 ± 6.7 y	Pain (VAS Mean): 5.2 ± 0.5. Diagnosis duration: Mean 58.4 ± 9.9 months. Symptoms: Chronic pelvic pain and dyspareunia (>60% of cases)
3.	Thabet & Alshehri, 2018 [18]	Saudi Arabia	Randomized Controlled Trial	Intervention (HILT group): 20 Control (Sham group): 20 Age Range: 24–32 y	Pain (PPI): Intervention group: 50% severe, 40% unbearable; Control group: 45% severe, 45% unbearable Diagnosis duration: N/A Symptoms: Severe pelvic pain
4.	Bi & Xie, 2018 [19]	China	Retrospective study	Case (NMES group): 83 (31.6 ±3.6y) Control: n = 71 (32.2 ± 4.1y)	Pain (NRS Mean): 6.1 ± 1.4 (Case); 6.0 ± 1.7 (Control) Pain (ESSS): 5.6 ± 0.3 (Case); 5.5 ± 0.4 (Control) Diagnosis duration: Mean 3.9 ± 1.2 years (Case); 4.1 ± 1.4 years (Control) Symptoms: Dysmenorrhea, nonmenstrual pelvic pain, and dyspareunia
5.	Muñoz-Gómez et al., 2023 [20]	Spain	Randomized Controlled Trial	Intervention (Manual therapy): 21 Control (Placebo): 20 Mean Age: 36.10 ± 6.97 y	Pain (VAS Mean): 5.43 ± 1.78 (Intervention); 5.10 ± 1.92 (Control). Diagnosis duration: 38.86 ± 43.53 months (Intervention); 74.18 ± 88.02 months (Control). Symptoms: Abdominal swelling (80.5%), menstrual pain (63%), non-menstrual pelvic pain (73%), and fatigue (61%)
6.	Zhao et al., 2012 [21]	China	Controlled, randomized, open-label study	Intervention (PMR + GnRH agonist): 50 persons (35.7% aged >30) Control (GnRH agonist only): 50 persons (31.1% aged >30)	Pain (SF-36 BP) : 35.52 ± 19.95 (Intervention);32.74 ± 20.76 (Control) Diagnosis duration: Mean 16.8 months (Intervention); 17.2 months (Control). Symptoms: Endometriosis Stage III or IV; 100% reported dysmenorrhea, dyspareunia, and/or pelvic pain
7.	Mira et al., 2020 [22]	Brazil	Multicenter randomized clinical trial	Intervention (Hormonal+TENS): 53 (35.06 ± 6.17y) Control (Hormonal only) 48 (37.21 ± 6.51y)	Pain (VAS Mean): 7.11 ± 2.40 (Intervention); 7.33 ± 2.09 (Control) Pain (Mean DDS): 2.02 ± 0.54 (Intervention); 1.95 ± 0.86 (Control) Diagnosis Duration: 3 to 5 years from symptom onset to diagnosis. Symptoms: chronic pelvic pain, dyspareunia, dyschezia, and dysuria
8.	Daraï et al., 2015 [23]	France	Prospective pilot study	Intervention (OMT): 20 (Median age: 30.4) Control: N/A (Single-arm pilot study)	Pain (SF-36 BP): 37.1 ± 21.7 Diagnosis Duration: NA Symptoms: dysmenorrhea (100%), chronic pelvic pain (80%), deep dyspareunia (80%), pain on defecation (75%)
9.	Rubi-Klein et al., 2010 [24]	Austria	Randomized controlled cross-over trial	Intervention (Verum-acupuncture): 101 total randomized (Mean age: 33.64) Control (Non-specific acupuncture): Part of the cross-over design	Pain (VAS Mean): 7.6 (intervention); 7.2 (control) Diagnosis Duration: Mean 7.12 years. Symptoms: Stage II–IV endometriosis; chronic pain (100%), dysmenorrhea, infertility, and dyspareunia

No.	Author, Year	Country	Study Design	Study Participants (N, [Mean/Median Age])	Endometriosis Characteristics (N, %)
10.	Cirillo et al., 2023 [25]	Italy	Prospective study	Total (Mediterranean Diet): 35 women.	Pain (VAS Mean) Dyspareunia (5.5), Dyschezia (4 .7), Dysuria (2.0). Diagnosis Duration: N/A Symptoms: Chronic pain, evacuation 51.4% reported evacuation difficulties with altered stool consistency
11.	Merlot et al., 2022 [26]	France	Randomized Controlled Trial	Intervention (VR): 23 Control (2D Digital): 22 Mean Age: 32.7 y	Pain (NRS): 6.0 (Intervention) and 5.7 (Control). Diagnosis Duration: Mean 45.2 months since diagnosis Symptoms: Chronic pelvic pain (91.1%), Dysmenorrhea (53.3%), Dyspareunia (64.4%), Dysuria (31.1%), Dyschezia (2.2%)
12.	Petrelluzzi et al., 2012 [27]	Brazil	Therapeutic protocol study	Total: 26 (32.2±1.3y)	Pain (VAS): Mean 4.0 (moderate pain). Diagnosis Duration: ≥ 7 years Symptoms: chronic pelvic pain (100%)
13.	Armour et al., 2019 [28]	Australia	Cross-sectional online survey	Total: 484 Self-management users: 371	Pain: N/A Diagnosis Duration: ≤ 5 years Symptoms: Stomach/GI discomfort (65%), Poor energy levels (65%)
14.	Nodler et al., 2020 [29]	USA	Randomized Controlled Trial	Intervention 1 (Vitamin D3): 27 (20.0 ± 2.7y) Intervention 2 (Fish oil): 20 (18.9 ± 3.1y) Control (Placebo): 22 (20.1 ± 3.5y)	Pain (VAS Mean): Vit D (7.0 ± 2.2), Fish Oil (5.9 ± 2.9), Placebo (6.0 ± 1.9). Diagnosis Duration: Range 6 months – 3 years. Symptoms: 100% chronic pelvic pain
15.	van Haaps et al., 2023 [30]	The Netherlands	Prospective one-center pilot study	Intervention (Low FODMAP): 22 (36.9 ± 5.9y) Intervention (Endometriosis diet): 21 (39.1y) Control (No diet): 19 (37.6 ± 8.5y)	Pain (Median VAS): Dysmenorrhea 5.0 (Intervention); Dysmenorrhea 4.0 (Intervention) Diagnosis Duration: Mean 9.3–10.3 years since diagnosis. Symptoms: Dysmenorrhea, deep dyspareunia, chronic pelvic pain, dysuria, bloating, tiredness
16.	Hawkins & Hart, 2003 [31]	USA	Multiple case study design	Case (Thermal biofeedback): 5 (Avg. 18.2y of education)	Pain (WHYMPI): 39.0 Diagnosis Duration: Mean 17 Symptoms: 96.2% reported dysmenorrhea or pain throughout cycle
17.	Del Forno et al., 2024 [32]	Italy	Randomized Controlled Trial	Intervention (Pelvic floor physiotherapy): 17 (32.5 ± 7.6y) Control (No intervention): 13 (32.8 ± 6.7y)	Pain (NRS): 8 (Intervention); 8 (control) Diagnosis Duration: N/A Symptoms: Superficial dyspareunia

WHO: World Health Organization; N/A: Not applicable; PPI: Present Pain Intensity; HILT: Pulsed high-intensity laser therapy; VAS: Visual analog scale; NRS: Numeric Rating Scale; DDS: Deep dyspareunia; OMT: Osteopathic manipulative therapy; DASS-21 (*Depression, Anxiety, Stress Scale-21*); SF-36 BP: Short Form-36 (SF-36) Bodily Pain; PPIQ: Pelvic Pain Impact Questionnaire; WHYMPI: West Haven-Yale Multidimensional Pain Inventory (WHYMPI); PFP: Pelvic Floor Physiotherapy.

Table 2. Studies Outcome

No.	Author, Year	Intervention Group (duration of treatment)	Control Group	Pain Assessment After Intervention	Other Highlighted Finding
Psychological and Perception Therapy					
1.	Petrelluzzi et al., 2012 [27]	Physical therapy + psychological intervention (CBT). Duration: 2.5-hour session per week for 10 weeks	None (Study on volunteers who met the inclusion criteria).	Reduce of mean intensity of perceived pain (VAS 0-10) (pre-treatment: 4.0 vs. post-treatment: 3.3, $p>0.05$).	Significant improvement in SF-36 vitality and physical functioning domains ($p<0.05$). Treatment normalized salivary cortisol levels (significant increase in morning levels, $p<0.05$) and significantly reduced Perceived Stress Index (PSQ) ($p<0.05$)
2.	Merlot et al., 2022 [26]	3D therapeutic VR combining visual and auditory stimuli. Duration: Single 20-minute use.	2D digital control displayed on a tablet with nature sounds but no VR or binaural beats.	Significant reduction of pain from 6.0 to 4.5 (11-point NRS) vs 5.7 to 5.0. The analgesic effect persisted up to 4 hours post-treatment.	3 participants in the VR group reported mild headache and nausea related to motion sickness
Physical Therapy					
3.	Mercier et al., 2025 [16]	Various Complementary and Alternative Medicines (CAM), including osteopathy, anti-inflammatory diet, yoga, and sophrology. (Duration: User-led/ongoing)	None (Observational Survey)	58% reports reducing conventional analgesics when using complementary therapy	Satisfaction: Highest for osteopathy and yoga (69%); Clinical: High prevalence of dyspareunia (79%) and rectosigmoidal locations (39%); Impact: 69% reported work interruptions
4.	Gonçalves et al., 2016 [17]	Hatha Yoga: 90-minute sessions twice a week for 8 weeks	Medication and/or one individual physical therapy session a week	Significant reduction in daily pain Mean VAS score: 3.7 ± 0.5 (Yoga) vs. 6.5 ± 0.5 (Control); $p = 0.0007$	QoL (EHP-30): Significant improvement in pain, control/powerlessness, emotional well-being, and self-image domains; Modular domains: Improvement in work and treatment domains
5.	Muñoz-Gómez et al., 2023 [20]	Manual Therapy Protocol: 30-minute sessions every 15 days for 8 weeks (articulatory and soft tissue techniques).	Placebo group: Hands-on contact with light pressure and no intention to treat.	Significant pain reduction (VAS): Post-intervention (T1) mean 3.76 (MTG) vs. 5.05 (PG). Results maintained at 6-month follow-up (T3).	Lumbar mobility: Significant improvement in Schober Test scores compared to placebo at T1, T2, and T3. Emotional: No significant effect on depression (BDI-II) or anxiety (STAI).
6.	Zhao et al., 2012 [21]	Progressive Muscle Relaxation (PMR) +GnRH agonist (depot leuprolide) for 12 weeks.	GnRH agonist therapy only.	Significant Body Pain (SF-36) improvement in the PMR group (34.34) versus control (16.64) ($p < 0.001$).	PMR group showed significant improvements in state/trait anxiety (STAI) and depression (HADS-D).
7.	Daraï et al., 2015 [23]	Osteopathic manipulative therapy (OMT) involving uterine + colon mobilization (24 days)	Pre-intervention values of the same patients (prospective pilot study).	Significant improvement in Bodily Pain (SF-36) item from a mean of 37.1 to 62.9 ($p = 0.004$).	Significant improvement in both Physical (PCS) and Mental (MCS) component summaries of the SF-36. Noted high success rate in short-term QoL improvement
8.	Rubi-Klein et al., 2010 [24]	Verum-acupuncture on specific TCM points for 5 weeks (10 sessions).	Non-specific acupuncture on points unrelated to endometriosis.	Significant reduction in VAS score from 7.6 to 2.2 ($p < 0.0001$).	Significant improvement in 7 of 8 SF-36 items. Highly significant improvement in Pain Disability Index (PDI). Patients not taking analgesics increased from 21% to 54%

No.	Author, Year	Intervention Group (duration of treatment)	Control Group	Pain Assessment After Intervention	Other Highlighted Finding
9.	Del Forno et al., 2020 [32]	Pelvic floor muscle physiotherapy (PFP), including Thiele massage (5 sessions over 11 weeks).	No intervention (standard of care).	NRS (0-10): Previous data on this cohort showed improvement in superficial dyspareunia and chronic pelvic pain.	Sexual Function (FSFI): No significant difference between groups. Bowel/Urinary: No significant differences in urinary (BFLUTS) or constipation (KESS) scores vs. control, though a trend toward improved RED constipation was noted
Electrotherapy Therapy					
10.	Thabet & Alshehri, 2018 [18]	Pulsed High-Intensity Laser Therapy (HILT): 3 times/week for 8 weeks plus hormonal treatment.	Sham laser treatment plus the usual regimen of hormonal treatment.	Significant pain reduction. PPi mean: 0.75 (HILT) vs. 2.10 (Control); $p < 0.0001$	Adhesions: Significant reduction in adhesion scores ($p < 0.0001$) via laparoscopy; QoL (EHP-5): Better scores in all five domains, including walking, mood, and social support.
11.	Bi & Xie, 2018 [36]	Neuromuscular Electrical Stimulation (NMES): 30 mins/session, 3 sessions/week for 10 weeks.	Waiting list (No NMES therapy).	Significant pain reduction NRS change: -2.9 (NMES) vs. -0.6 (Control), $p = 0.02$. ESSS change: -2.5 vs. -0.5, $p = 0.04$.	QoL (SF-36): Significant improvement in both Physical Component Summary (PCS) and Mental Component Summary (MCS) ($p < 0.01$). No severe adverse events recorded.
12.	Mira et al., 2020 [22]	Self-applied TENS associated + hormonal treatment for 8 weeks.	Hormonal treatment only.	Significant decrease of Chronic Pelvic Pain (VAS) from 7.11 to 4.55 ($p < 0.001$). Deep dyspareunia (DDS) decreased from 2.02 to 1.36 ($p < 0.001$).	Significant improvement in QoL (EHP-30) and sexual function (FSFI) total score. TENS group required significantly fewer days of analgesic medication (7 days) compared to the control (18 days)
13.	Hawkins & Hart, 2003 [31]	Thermal biofeedback twice weekly plus daily home relaxation practice (2 months).	Multiple case study design (N=5); no control sample.	Significant reduction of Pain severity in 2 out of 4 participants.	Significant reduction in Life Interference. Psychological: 3/4 had decreased Affective Distress; 1/4 had increased Life Control. 80% successfully mastered hand temperature control
Nutritional Therapy					
14.	Cirillo et al., 2023 [25]	Mediterranean Diet (MD) for 6 months.	None	Significant reduction in VAS (0-10) at 3 months for dyspareunia ($p=0.04$) and VAS at 6 months for dysuria ($p=0.04$), and dyschezia ($p<0.001$). Decrease in nonmenstrual pelvic pain decrease ($p=0.06$)	Statistically significant improvement in bowel habits (regularity and stool consistency) for 35% of patients ($p=0.002$).
15.	Armour et al., 2019 [28]	Various self-management strategies, including cannabis, heat, hemp/CBD oil, dietary choices, and meditation. Duration: Evaluated over 6 months.	None (Cross-sectional online survey).	Cannabis had the highest self-rated effectiveness (mean 7.6 on a 0-10 scale), followed by heat (6.5) and dietary choices (6.4). Physical interventions like yoga (4.5) were rated less effective.	56% of cannabis users reported reducing medication by more than 50%. Pelvic Pain Impact Questionnaire (PPIQ) showed energy levels and GI function had the highest negative impact on lives. Adverse events were common for alcohol (53.8%) and exercise (34.2%)

No.	Author, Year	Intervention Group (duration of treatment)	Control Group	Pain Assessment After Intervention	Other Highlighted Finding
16.	Nodler et al., 2020 [29]	2000 IU Vitamin D3 or 1000 mg fish oil (720 mg ω-3) daily (6 months).	Placebo tablet daily (6 months).	VAS (0-10): Worst pain improved in Vitamin D (7.0 to 5.5) and Placebo (6.0 to 4.4) arms; fish oil showed modest change (5.9 to 5.2). No significant differences between intervention arms and placebo.	QoL (SF-12): No significant difference between groups in physical or mental components. Emotional Status: Significant improvement in "Catastrophic thinking" only in the Vitamin D arm. No significant change in non-narcotic pain tablet usage
17.	van Haaps et al., 2023 [30]	Low FODMAP diet or Endometriosis diet with a dietitian's guidance (6 months).	No diet (control group) (6 months).	Diet groups reported a significant reduction in deep dyspareunia compared to the control.	Significant reduction in dysuria, bloating, and tiredness vs. baseline. Clinical: Improved gastro-intestinal health (GIQLI); high dietary adherence (80.6%-81.8% satisfaction)