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ENDOMETRIOSIS: A LITERATURE REVIEW OF PATHOGENESIS, DIAGNOSIS, MANAGEMENT, AND IMPACT ON QUALITY OF LIFE

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ABSTRACT

Endometriosis is a chronic, multifactorial pathological condition characterized by the presence of endometrium-like tissue outside the uterine cavity. This condition can lead to chronic pelvic pain, dysmenorrhea, dyspareunia, infertility, psychological distress, and a reduced quality of life. The complexity of clinical manifestations and the variability of responses to therapy make endometriosis a challenge regarding diagnosis and management. This literature review aims to analyze the evolution of scientific evidence concerning endometriosis, covering its pathogenesis, clinical manifestations, diagnosis, management, quality of life, mental health, and fertility. The methodology involved a review of 15 scientific articles, consisting of 11 primary studies, 3 systematic reviews/meta-analyses, and 1 evidence-based guideline. The literature is presented narratively, identifying similarities, differences, and trends in research findings. The synthesis indicates that endometriosis has a multidimensional impact on women's health. Hormonal therapy plays a role in symptom control, while non-pharmacological interventions—such as pelvic floor physiotherapy, electrotherapy, acupuncture, and psychological interventions—show potential for reducing pain and improving quality of life. Advances in transvaginal ultrasound also offer opportunities for improved non-invasive diagnosis. Furthermore, endometriosis is associated with an increased risk of anxiety and depression and can affect reproductive outcomes and the success rates of assisted reproductive technologies. Based on these findings, endometriosis management requires an individualized, multidisciplinary, and multimodal approach that considers the patient's clinical condition, quality of life, mental health, sexual function, and reproductive goals. Further research is needed regarding non-invasive diagnosis, personalized therapy, and long-term outcomes.

Keywords: Endometriosis; pelvic pain; infertility; quality of life; diagnosis.

INTRODUCTION

Endometriosis is a chronic gynecological disease commonly found in women of reproductive age and has a broad impact on physical, psychological, sexual, and reproductive health. This condition is characterized by the presence of endometrial-like tissue outside the uterine cavity, which can cause a chronic inflammatory response and various clinical manifestations. The most common symptoms include dysmenorrhea, chronic pelvic pain, painful intercourse, menstrual irregularities, and infertility. The variety of symptoms and severity makes endometriosis often difficult to recognize and requires a long time to reach a correct diagnosis. The complexity of endometriosis is related to its pathogenesis, which involves various factors, including hormonal, inflammatory, immunological, genetic, and epigenetic factors. Estrogen dominance and resistance to progesterone are known to play a role in maintaining an environment that supports the development and

persistence of endometriosis lesions. Furthermore, the interaction between the immune system and inflammatory processes can contribute to lesion development and chronic pain. This situation demonstrates that endometriosis is not a disease caused by a single mechanism, but rather the result of an interaction of various biological processes.

The impact of endometriosis extends beyond physical symptoms. Chronic pain can interfere with daily activities, education or work, social relationships, and sexual function. Research by Gete et al. (2023) showed that women with endometriosis have a lower quality of life compared to the population without the condition. Furthermore, a systematic review by Szypłowska et al. (2023) demonstrated a link between endometriosis and anxiety and depressive disorders. Therefore , psychological aspects need to be an important part of patient evaluation and management. Reproductive issues are also a major concern. Endometriosis can be associated with infertility through changes in pelvic anatomy, inflammatory processes, impaired ovarian function, and various other mechanisms. This condition can lead to patients requiring assisted reproductive technologies such as *in vitro fertilization* (IVF). However, the relationship between endometriosis and reproductive success is complex and influenced by various individual factors.

Advances in science have yielded a variety of diagnostic and therapeutic options. The systematic use of *transvaginal ultrasound* (TVUS) is increasingly being explored as a non-invasive approach to help detect endometriosis lesions. Furthermore, treatment options include not only hormonal therapy but also physiotherapy, electrotherapy, acupuncture, psychological interventions, and other multidisciplinary approaches. Evidence from primary research and systematic reviews suggests that a multimodal approach has the potential to provide more comprehensive benefits for patients. Despite numerous studies, there is still considerable variation in results regarding therapy effectiveness, disease progression, diagnostic methods, and their impact on fertility and quality of life. Furthermore, heterogeneity in patient characteristics leads to varying responses to interventions. This situation highlights the need to synthesize the available scientific evidence to gain a more comprehensive understanding of endometriosis.

Based on these issues, this literature review aims to analyze and synthesize scientific evidence regarding endometriosis, specifically regarding clinical manifestations, impact on quality of life and mental health, diagnostic developments, treatment options, and its impact on fertility . The results of this review are expected to provide a comprehensive overview of the development of endometriosis research and serve as a basis for promoting a more individualized, multidisciplinary, and patient-centered management approach.

MATERIALS AND METHODS

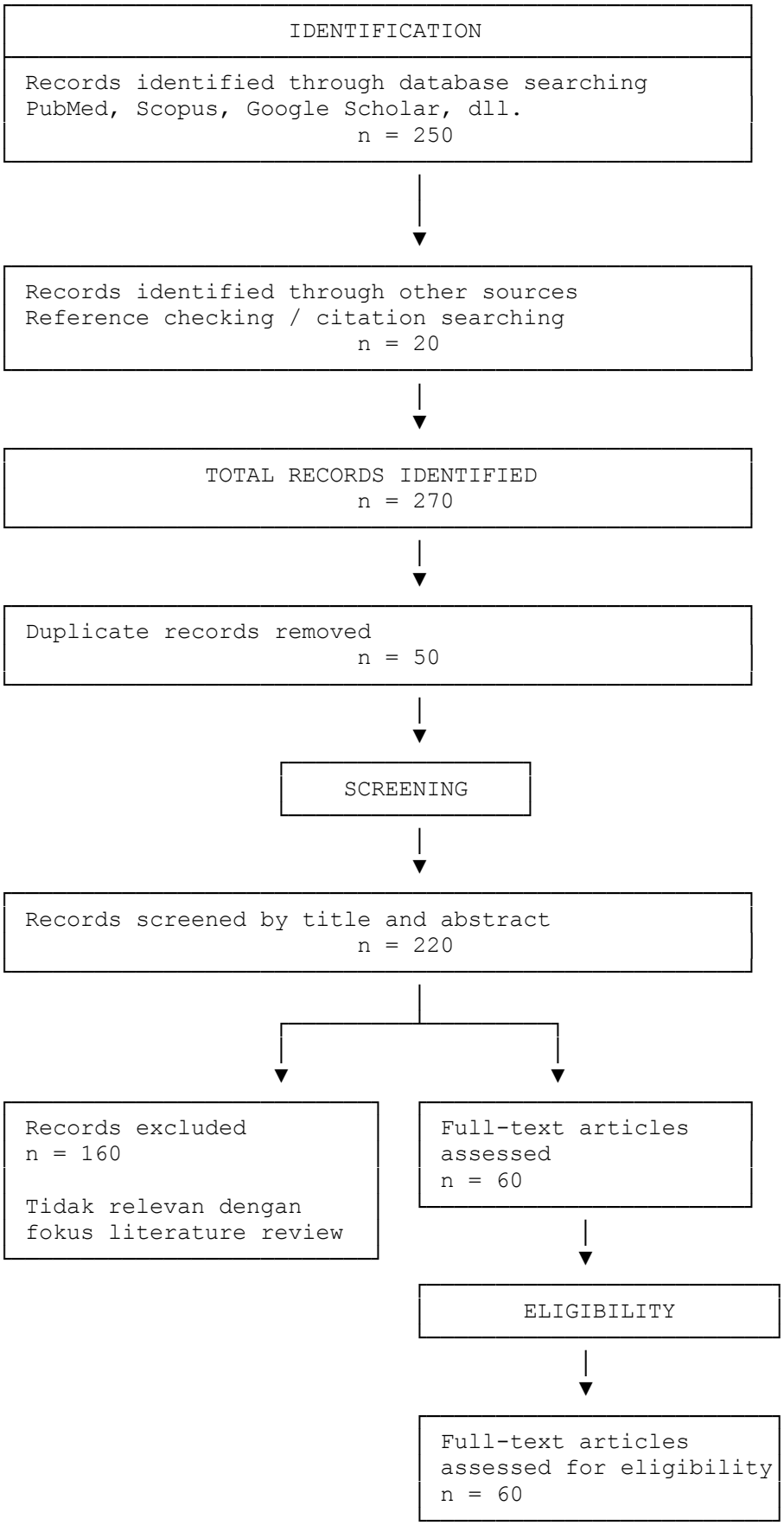
The research design uses a literature review method with a narrative/systematic literature review approach according to the research needs. Literature Search Strategy: Literature was obtained from scientific databases such as: PubMed, ScienceDirect, Google Scholar, Cochrane Library. Keywords used: ("Endometriosis") AND ("pelvic pain" OR dysmenorrhea OR dyspareunia) AND ("diagnosis" OR "transvaginal ultrasound" OR treatment OR physiotherapy OR "hormonal therapy" OR "quality of life" OR "mental health" OR infertility OR fertility OR IVF)

Inclusion criteria for this literature review included articles that discussed endometriosis as the primary focus, involved women with endometriosis or populations related to the condition, were published between 2020 and 2026, were available in English or Indonesian, and had accessible *full-text* . *The types of publications considered included primary research such as randomized controlled trials* , *cohort studies* , *case-control studies* , *cross-sectional studies* , *diagnostic studies* , and observational studies, as well as *systematic reviews* , *meta-analyses* , and *evidence-based guidelines* . Articles must also have clear research methods and results relevant to the study objectives. Exclusion criteria included articles that did not address endometriosis as the primary focus, were irrelevant to the study objectives, were published outside the specified period, were not available in *full-text form* , and were editorials, letters to the editor, commentaries, research protocols, or conference abstracts without full articles. Duplicate articles found in multiple databases were also excluded so that each study was counted only once in the selection process.

The literature identification and selection process was conducted using *the Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) 2020 guidelines. Literature was identified through several databases, then duplicate articles were removed. The remaining articles were selected based on their titles and abstracts according to the inclusion and exclusion criteria. Articles that met the criteria were then reviewed in *full-text form* . After the eligibility assessment process, articles that met all criteria were included in the final synthesis, as follows:

Identification → Screening of titles and abstracts → Full-text assessment → Selection based on inclusion and exclusion criteria → Analysis and synthesis.

Prism Diagram



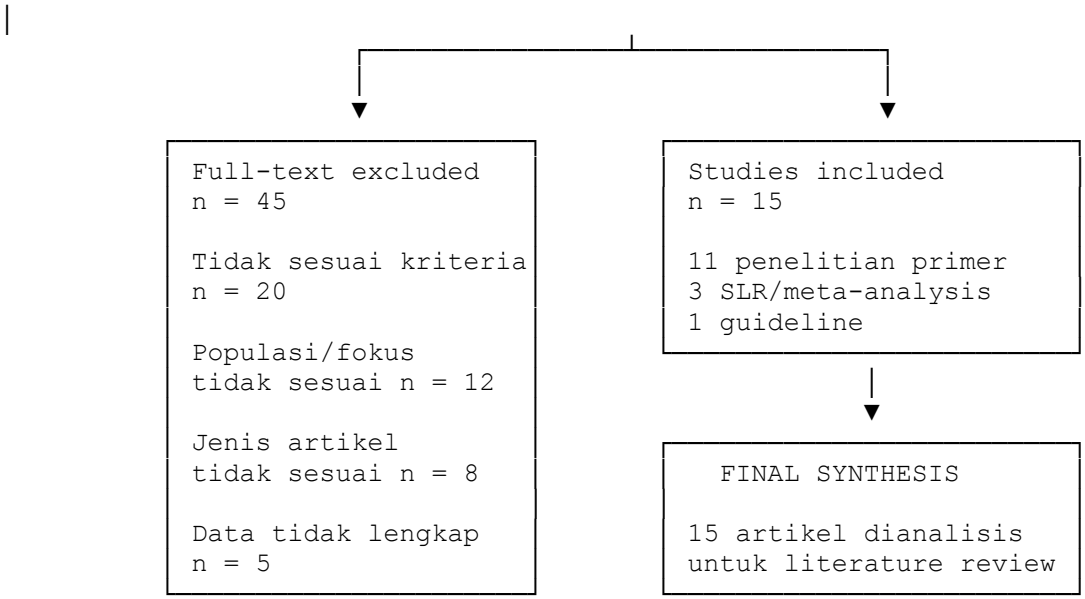


Figure 1 PRISMA Diagram

RESULTS AND DISCUSSION

A total of 15 primary articles were used in the synthesis. The literature consisted of RCTs, cohort studies, observational studies, diagnostic studies, prospective cohort studies, retrospective cohort studies, SLRs, and meta-analyses.

Table 1. Synthesis of 15 Primary Literatures

No.	Author & Year	Design	Focus	Main results
1	Mira et al., 2020	RCT	Pain & electrotherapy	The addition of electrotherapy to hormonal therapy provides improvement in chronic pelvic pain and sexual function.
2	Del Forno et al., 2021	RCT	Pelvic floor physiotherapy	Pelvic floor physiotherapy was studied in women with deep infiltrating endometriosis and dyspareunia.
3	Gete et al., 2023	Cohort	Quality of life	Endometriosis is associated with impacts on various aspects of quality of life.
4	Hansen et al., 2023	RCT	Psychological intervention	Evaluating psychological interventions in patients with chronic endometriosis-related pain.
5	Maiorana et al., 2023	Observational	Hormonal therapy	Evaluate changes in symptoms and quality of life during hormonal therapy.
6	Li et al., 2023	RCT	Acupuncture & pain	Evaluating the effectiveness of acupuncture on endometriosis-related pain.
7	Barra et al., 2024	Diagnostic study	ultrasound	Evaluating the ability of TVUS to detect parametrial endometriosis.
8	Chaggar et al., 2024	Prospective cohort	Deep endometriosis	Observe lesion development on follow-up.
9	Lewin et al., 2024	Prospective cohort	Surgery	Comparing clinical outcomes after different surgical approaches.
10	Zhou et al., 2022	Retrospective cohort	IVF & fertility	Analyzing the relationship between endometriosis and IVF success.

No.	Author & Year	Design	Focus	Main results
11	Abril-Coello et al., 2023	SLR + MA	Physiotherapy	Meta-analysis shows the benefits of non-pharmacological conservative therapy on pain and physical function.
12	Szypłowska et al., 2023	SLR	Mental health	Endometriosis is associated with depression, anxiety, and decreased quality of life.
13	Paffoni et al., 2024	SLR + MA	Fertility/ART	Analyzing *live birth* in IVF with oocyte donors in women with endometriosis.
14	Becker et al./ESHRE, 2022	Guidelines	Diagnosis & therapy	Provides evidence-based recommendations regarding diagnosis, pain, infertility, and therapy.
15	Zondervan, Becker & Missmer, 2020	Narrative review	Epidemiology & pathogenesis	Explaining endometriosis as a complex and multifactorial disease.

LITERATURE RESULTS SYNTHESIS

Data analysis

Data analysis in this literature review was conducted descriptively and narratively on 15 articles that met the inclusion criteria. Data from each article was extracted based on the author and year of publication, study design, sample characteristics, focus of the study, interventions or variables studied, main results, and conclusions. Furthermore, the results were grouped by main theme to facilitate synthesis and comparison between studies.

Based on the characteristics of the articles, there were 11 primary studies, 3 systematic reviews/meta-analyses, and 1 evidence-based guideline **.** Primary studies consisted of randomized controlled trials, cohort studies, observational studies, and diagnostic studies. Meanwhile, systematic reviews and meta-analyses were used as supporting evidence to see the consistency of the results from several previous studies. Guidelines were used to strengthen interpretations related to the diagnosis and management of endometriosis. The analysis was conducted by grouping the research results into several main themes, namely (1) pain and quality of life, (2) mental health, (3) diagnosis and disease progression, (4) pharmacological and non-pharmacological therapies, and (5) fertility and assisted reproductive technology **.**

Table 2. Data Analysis

Theme	Supporting Articles	Key Findings	Synthesis
Pain and quality of life	Mira et al., 2020; Del Forno et al., 2021; Gete et al., 2023; Abril-Coello et al., 2023	Hormonal interventions, electrotherapy, physiotherapy, and non-pharmacological approaches have shown potential to reduce pain and improve physical function.	Pain is one of the main factors that reduces the quality of life of patients.
Mental health	Hansen et al., 2023; Szypłowska et al., 2023	Endometriosis is associated with anxiety, depression, and impaired quality of life; psychological interventions have the potential to improve quality of life.	Management needs to pay attention to psychological aspects in addition to physical symptoms.
Diagnosis	Barra et al., 2023; Barra et al., 2024	TVUS shows good diagnostic ability for detecting some forms of deep endometriosis.	Non-invasive imaging examinations have the potential to speed up diagnosis.
Disease progression	Chaggar et al., 2024; Knez et al., 2024	The course of endometriosis lesions can vary between individuals, including lesions enlarging, shrinking, or remaining relatively stable.	Endometriosis has a heterogeneous disease course so monitoring needs to be done individually.

Theme	Supporting Articles	Key Findings	Synthesis
Therapy	Li et al., 2023; Maiorana et al., 2023; Del Forno et al., 2021; ESHRE, 2022	Hormonal therapy and some non-pharmacological therapies can help control symptoms.	A multimodal and individualized approach is more appropriate than one therapy for all patients.
Fertility	Paffoni et al., 2024; Zhou et al., 2022	Endometriosis may be associated with altered reproductive outcomes and ART results.	Infertility management must take into account the reproductive conditions and goals of each patient.

Synthesis of results

The analysis shows that pain is the most consistent theme across studies. Both pharmacological and nonpharmacological interventions have shown potential in reducing symptoms. Furthermore, the impact of endometriosis on quality of life stems not only from pain but also from sexual dysfunction, activity limitations, and psychological issues. In terms of diagnosis, research shows the growing use of transvaginal ultrasound as a non-invasive method. However, diagnostic results still depend on lesion location and examiner skills, necessitating standardization of examinations. In terms of therapy, research shows that no single intervention can be applied equally to all patients. Variations in symptoms, lesion location, age, reproductive status, and patient goals require individualized therapy selection. The analysis also indicates a link between endometriosis and fertility and mental health **.** Therefore, treatment success should be measured not only by the reduction of lesions or pain, but also by improvements in quality of life, psychological health, sexual function, and reproductive outcomes.

Discussion

Endometriosis is a chronic gynecological disease characterized by the presence of endometrial-like tissue outside the uterine cavity and can cause various clinical manifestations, particularly pelvic pain, dysmenorrhea, dyspareunia, infertility, and a reduced quality of life. Based on the synthesis of 15 articles in this literature review, endometriosis is not only an anatomical disorder but also a complex disease that impacts the physical, psychological, sexual, reproductive, and social aspects of patients. This complexity is also evident in the diverse research approaches that encompass diagnosis, therapy, physiotherapy, mental health, quality of life, and fertility.

The impact of endometriosis on pain and quality of life: Pain is one of the most dominant manifestations of endometriosis and is a significant factor affecting daily activities and quality of life. Research by Mira et al. (2020) showed that administering electrotherapy in addition to hormonal therapy can significantly reduce chronic pelvic pain. These results suggest that endometriosis pain management does not always have to rely on hormonal therapy but can be combined with non-pharmacological approaches. These findings are supported by research by Del Forno et al. (2021), which showed that pelvic-floor physiotherapy can improve pelvic floor muscle function and superficial dyspareunia. This is important because pain from endometriosis can cause pelvic floor muscle tension and further exacerbate pain during intercourse. Therefore, physiotherapy interventions can be a component of a multidisciplinary approach.

The results of a systematic review and meta-analysis by Abril-Coello et al. (2023) also support the benefits of physiotherapy interventions and non-pharmacological conservative therapies in reducing pain and improving physical function. The consistency between primary research and the systematic review suggests that non-pharmacological approaches have potential as complementary therapies for endometriosis patients.

Beyond physical pain, endometriosis has a significant impact on quality of life. A prospective cohort study of 3,728 women (2023) found that endometriosis was associated with a poorer quality of life, with bodily pain being one of the most impacted aspects. This suggests that the success of endometriosis therapy should not only be assessed based on the reduction of lesions, but also on the patient's ability to carry out daily activities and improve quality of life.

Psychological aspects of endometriosis patients. Endometriosis is also closely linked to mental health. Chronic pain, uncertainty about the disease, impaired activity, sexual problems, and concerns about fertility can cause significant psychological burden. Hansen et al. (2023) showed that psychological interventions can improve quality of life in women with endometriosis, although pain does not always disappear completely. These findings suggest that quality of life is determined not only by pain intensity but also by an individual's

ability to cope with and manage the impact of the disease. This is in line with a systematic review by Szypłowska et al. (2023), which showed a link between endometriosis and symptoms of depression, anxiety, and reduced quality of life. Therefore, psychological aspects need to be included in endometriosis management. An approach that focuses solely on lesions or pain without considering the patient's psychological condition has the potential to result in suboptimal management.

Development of non-invasive diagnostics; diagnosing endometriosis is a major challenge because its symptoms can vary and resemble those of other gynecological diseases. Advances in imaging technology, particularly transvaginal ultrasound (TVUS), have been a key development in diagnostics. Barra et al. (2023) demonstrated that certain characteristics of ultrasound examination can be used to predict parametrial involvement in deep endometriosis. Furthermore, research by Barra et al. (2024) demonstrated that TVUS has a sensitivity of 77.1% and a specificity of 99.1% in detecting parametrial endometriosis. This high specificity indicates that TVUS has great potential as a non-invasive diagnostic method.

These findings indicate a paradigm shift in endometriosis diagnosis, from a reliance on invasive procedures to a more systematic use of imaging. However, diagnostic ability remains influenced by examiner expertise, lesion characteristics, and disease location. Therefore, standardization of examinations and improvement of healthcare professional competency are still needed.

Disease progression and heterogeneity: Endometriosis has highly heterogeneous characteristics. Lesions can be found in various locations and have varying degrees of severity. Research by Chaggar et al. (2024) demonstrated the importance of monitoring the progression of deep pelvic endometriosis through ultrasound examination. Meanwhile, Knez et al. (2024) showed that the natural history of ovarian endometriomas varies from patient to patient; some shrink, some enlarge, and some remain relatively stable. These findings reinforce the understanding that the course of endometriosis is individualized. Therefore, decisions about intervention should not be based solely on lesion size but should also consider symptoms, location, age, reproductive goals, risk of complications, and patient preferences.

Hormonal and non-pharmacological management; hormonal therapy is an important approach to managing endometriosis symptoms. Maiorana et al. (2023) demonstrated improvements in symptoms and some aspects of quality of life during the use of hormonal therapy, including dienogest. This supports the role of hormonal therapy in controlling symptoms and suppressing disease activity. However, research on physiotherapy and acupuncture suggests that non-pharmacological approaches may also be beneficial. Li et al. (2023), through a randomized controlled trial, demonstrated that acupuncture can help reduce endometriosis-related pain. Therefore, optimal management can utilize a multimodal approach, combining pharmacological therapy with non-pharmacological interventions according to the patient's condition. The ESHRE guidelines also emphasize the importance of decision-making that considers the patient's symptoms, treatment goals, and individual needs. Therefore, no single type of therapy can be considered most appropriate for all endometriosis patients.

Endometriosis and infertility: In addition to pain, infertility is a significant concern for endometriosis patients. This disease can impact reproductive function through changes in pelvic anatomy, inflammation, ovarian dysfunction, and other factors related to the reproductive environment.

Research on assisted reproductive technology suggests that endometriosis may be associated with different reproductive outcomes compared to women without endometriosis. Paffoni et al. (2024) in a systematic review and meta-analysis on IVF with oocyte donors demonstrated that the relationship between endometriosis and reproductive success is complex. These findings suggest that fertility decisions should be made individually, taking into account age, ovarian reserve, disease stage, treatment history, and reproductive goals. Therefore, infertility management in patients with endometriosis requires collaboration between obstetricians, fertility specialists, and related healthcare professionals. The focus of therapy should not only be on removing the lesions but also on maintaining or optimizing the patient's reproductive potential.

The importance of a multidisciplinary approach; overall, the results of the synthesis of 15 articles demonstrate that endometriosis is a disease with multidimensional impacts. Pain can impact quality of life and mental health, while the disease can also affect sexual function and fertility. At the same time, diagnosis requires an increasingly accurate and less invasive approach.

Consistency between primary research, systematic reviews/meta-analyses, and guidelines reinforces the importance of a multidisciplinary approach. Ideal therapy should be tailored to disease characteristics and patient needs, taking into account pain control, quality of life, mental health, sexual function, and reproductive goals.

Thus, the paradigm for endometriosis management needs to shift from a lesion-only approach to a patient-centered and multimodal approach **.** This approach allows patients to receive more comprehensive therapy tailored to the impact of their disease.

Research Gap

Based on this synthesis, the most prominent research gap is the suboptimal personalized and multidimensional approach to diagnosis and management **.** Most research still focuses on a single aspect of the disease, such as pain, lesions, diagnosis, or fertility, separately. Yet, endometriosis has interconnected impacts on physical, psychological, sexual, and reproductive health. Furthermore, while TVUS and imaging technology show potential as non-invasive diagnostic methods, standardization of examinations and validation in a broader population are still needed. Research on artificial intelligence in endometriosis diagnosis also requires clinical validation before it can be widely implemented.

In terms of therapy, evidence regarding physiotherapy, acupuncture, electrotherapy, and psychological interventions shows promising results, but studies with large sample sizes and long-term follow-up are still limited. This opens up opportunities for research testing multimodal therapies , rather than just a single intervention.

CONCLUSION

Based on the articles analyzed, endometriosis is a chronic, multifactorial disease that has a broad impact on pain, quality of life, mental health, sexual function, diagnosis, and fertility. Research evidence suggests that hormonal therapy remains important, but non-pharmacological approaches such as physiotherapy, electrotherapy, psychological interventions, and acupuncture also have the potential to be beneficial. Endometriosis management should be individualized, multidisciplinary, and multimodal, focusing on the patient's quality of life **,** not solely on lesion control.

Recommendation

Recommendations for innovation that can be offered in further research can be directed at "Developing a personalized, multidisciplinary, and multimodal approach in the diagnosis and management of endometriosis by considering pain, quality of life, mental health, sexual function, and reproductive goals of patients." This approach can be the basis for filling research gaps while producing a more comprehensive and patient-oriented endometriosis management model.

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