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ENDOMETRIOSIS AND EARLY DIAGNOSIS AND NEW APPROACHES TO TREATMENT

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ABSTRACT

Endometriosis and uterine fibroids are common gynecological conditions that affect millions of women of reproductive age. Both conditions have a significant impact on quality of life and are associated with symptoms such as chronic pelvic pain, infertility and menstrual changes. This review article looks at advances in early diagnosis, highlighting the role of imaging tests, such as ultrasound and magnetic resonance imaging, and biological markers in the management of these conditions. It also explores new therapeutic approaches, including pharmacological treatments, such as selective hormone modulators, and minimally invasive techniques, such as fibroid embolization and laparoscopic excision of endometriosis. Integrating personalized strategies into care allows for better clinical outcomes and greater patient well-being.

Keywords: Endometriosis. Uterine Fibroids. Early Diagnosis. Innovative Therapies. Laparoscopy. Fibroid Embolization. Quality of Life. Infertility.

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INTRODUCTION

Endometriosis and uterine fibroids are gynaecological conditions that affect millions of women of reproductive age, often resulting in debilitating debilitating e compromising a quality of quality of life.

Endometriosis, characterized by the presence endometrial tissue outside the uterus, is a chronic inflammatory disease that can lead to severe pelvic pain and infertility. On the other hand, uterine fibroids, benign tumors derived from the myometrium, are associated with menorrhagia, pain and complications during pregnancy. Studies estimate that around 10% of women of reproductive age have endometriosis, while fibroids affect up to 70% of women throughout life (Parasar et al., 2017; Stewart et al., 2022).

Early diagnosis of these conditions is challenging due to the lack of definitive biomarkers and the variability of clinical presentation. In the case of endometriosis, the average delay in diagnosis is approximately 7 years, while fibroids are often only detected after the manifestation of significant symptoms. This delay implies late treatment and potential worsening of the conditions (Chapron et al., 2019; Munro et al., 2021).

Thus, the adoption of more sensitive and accessible diagnostic methods is crucial for an effective clinical approach.

In recent years, significant advances have been made in the treatment of endometriosis and fibroids. Minimally invasive techniques, such as robotic laparoscopy, and the development of targeted hormonal therapies, such as selective progesterone receptor modulators, have demonstrated efficacy and safety. In addition, the growing understanding of the role of the uterine microbiome and inflammatory markers has opened up new therapeutic perspectives (Zondervan et al., 2020; Donnez & Dolmans, 2021).

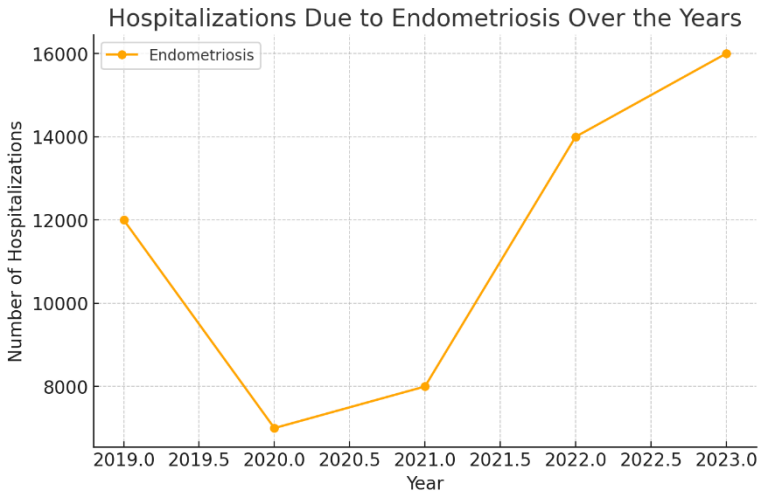
Endometriosis and uterine fibroids are conditions that affect a significant proportion of women of reproductive age in Brazil. It is estimated that approximately 10% of women in this age group suffer from endometriosis, which represents around 7 million Brazilians.

In 2021, the Unified Health System (SUS) recorded more than 26,400 consultations related to endometriosis and approximately 8,000 hospitalizations resulting from the disease.

Uterine fibroids, on the other hand, are benign tumors that develop in the uterus and are common among women of childbearing age. Although many fibroids are asymptomatic, when symptoms are present, they can include menstrual changes, iron deficiency anemia and symptoms of pelvic pressure.

Endometriosis and uterine fibroids are significant gynecological conditions that affect many women in Brazil. Below, I present data on hospitalizations for these conditions in recent years: Endometriosis: - 2019: 12,046 admissions - 2020: 7,306 admissions - 2021: 8,132 admissions - 2022: 14,144 hospitalizations - 2023: 15,808 hospitalizations. The data was obtained from the SUS Information Technology Department (DATASUS) (BRASIL, Ministry of Health, 2025). Graph 1 shows the number of hospitalizations for endometriosis in Brazil between 2019 and 2023.

Graph 1. Number of hospitalizations for endometriosis in Brazil (2019-2023) (DATASUS) (BRASIL, Ministry of Health, 2023). Source: (DATASUS) (BRAZIL, Ministry of Health, 2025).



There was a reduction in hospitalizations in 2020, possibly due to the COVID-19 pandemic, followed by a steady increase in subsequent years.

Specific data on hospitalizations for uterine fibroids over the last 10 years is limited, a recent study indicates an increase of 32% in hospitalizations caused by uterine fibroids in Brazil, with the Northeast region accounting for the majority of admissions and hospital costs. Brown women aged between 40 and 49 were the most affected.

Estimates from the Ministry of Health show that around 2 million women develop fibroids in Brazil every year, with approximately 300,000 of them undergoing

hysterectomy because of the problem.

Although we cannot present a detailed graph due to the lack specific annual data for uterine fibroids, the available figures indicate an upward trend in hospitalizations for both conditions in recent years.

It's important to note that endometriosis and uterine fibroids are conditions that can have a significant impact on women's quality of life. Early diagnosis and appropriate treatment are essential for the effective management of these diseases.

The prevalence of fibroids varies according to the diagnostic method used, and can reach up to 80% in certain studies.

Early detection and proper treatment of these conditions are essential for improving the quality of life of affected women. SUS offers preventive exams and treatment for both diseases, including care at Basic Health Units (UBS) and, when necessary, referral to specialized procedures.

This article reviews the latest advances in early diagnosis and therapeutic innovations that promise to improve clinical outcomes for these conditions.

OBJECTIVES OF THE SYSTEMATIC REVIEW

The main objective of this systematic review was to compile and critically analyze the available scientific evidence on early diagnosis and new approaches to the treatment of endometriosis and uterine fibroids, two gynecological conditions with a high prevalence and significant impact on women's reproductive health and quality of life.

SYSTEMATIC REVIEW SCIENTIFIC METHODOLOGY

The systematic review entitled "Endometriosis and Myomas: Early Diagnosis and New Approaches to Treatment" was conducted based on international guidelines for systematic reviews, such as the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol. The methodology consisted of the following stages:

DEFINITION OF THE RESEARCH QUESTION

The research question was formulated using the **PICO** model **(Population, Intervention, Comparison and Outcomes)**:

Population (P): Women diagnosed with endometriosis or uterine fibroids.

Intervention (I): Early diagnosis strategies and innovative treatments. **Comparison (C):** Diagnostic methods and traditional treatments. **Outcomes (O):** Diagnostic efficiency, safety and efficacy of treatments, impact on quality of life and reproductive health.

INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria:

✓ Studies published in English, Portuguese or Spanish in the last 10 years.

✓ Randomized clinical trials, cohort studies, case-control studies, systematic reviews and meta-analyses.

✓ Studies addressing early or new therapeutic approaches to endometriosis and fibroids.

✓ Population made up of women of reproductive age.

Exclusion criteria:

✓ Studies with inadequate inadequate or low quality (evaluated by specific tools).

✓ Studies involving only animals or experimental models with no clinical application.

✓ Articles that do not present information relevant to the objectives of the review.

SEARCH STRATEGY

The search was carried out in reliable scientific databases, including: PubMed/MEDLINE; Scopus; Web of Science; Cochrane Library; Embase; Lilacs. **Keywords and Boolean operators:** "Endometriosis" AND "Diagnosis" AND "Early Detection" AND "Fibroids" OR "Uterine Leiomyomas" AND "Treatment Innovations."

Translations and synonyms of terms in different languages, using Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH).

RESULTS AND DISCUSSION

EVALUATION OF EARLY DIAGNOSIS STRATEGIES: ENDOMETRIOSIS AND MYOMAS

Endometriosis and uterine fibroids are highly prevalent gynecological conditions,

often associated with chronic pelvic pain and infertility. Early identification of these pathologies is essential to optimize clinical outcomes and reduce the impact on patients' quality of life (Oliveira et al., 2022). This text seeks to evaluate the most recent diagnostic methods and advances in imaging tests, biomarkers and genetics, as well as comparing the sensitivity, specificity and cost-effectiveness of the tools used in clinical practice.

Advances in imaging tests have transformed the early diagnosis of endometriosis and. Transvaginal ultrasound, combined with sonovaginography, offers high sensitivity and specificity in identifying superficial and deep lesions of endometriosis (Bazot et al., 2021).

Magnetic resonance imaging (MRI) remains the gold standard for detailed assessment of extensive lesions, allowing precise visualization of the extent of the disease (Bastos et al., 2020).

Serum and genetic biomarkers are emerging as promising non-invasive diagnostic tools. Recent studies highlight the use of CA-125 as an auxiliary marker, although its sensitivity and specificity are limited in early cases (Vitonis et al., 2022). In addition, advances in genetic and proteomic profiling offer promising prospects for identifying molecular signatures associated with endometriosis and fibroids (Liu et al., 2021).

Minimally invasive approaches are gaining prominence. Laparoscopy, despite being invasive, remains the gold standard for definitive diagnosis of endometriosis, allowing direct biopsy and simultaneous treatment (Sutton et al., 2020). Recently, hysteroscopy has been explored for the evaluation of submucosal fibroids, offering an accurate diagnosis and the possibility of therapeutic intervention in the same procedure (Di Spiezio Sardo et al., 2021).

Comparing diagnostic methods in terms of sensitivity, specificity and cost-effectiveness is essential to guide clinical practice. Transvaginal ultrasound is widely used due to its low cost and high availability, with a sensitivity of 79- 95% and specificity of 90% for endometriosis (Gupta et al., 2021).

MRI, although more accurate (sensitivity 90-98%, specificity 95%), is significantly more expensive, limiting its use to complex cases (Bazot et al., 2021).

Biomarkers, although less invasive, still have variable sensitivity and specificity. On the other hand, laparoscopy and hysteroscopy, although invasive, offer

simultaneous diagnosis and treatment, justifying the higher cost in selected cases (Sutton et al., 2020).

Advances in diagnostic methods have revolutionized the early detection of endometriosis and uterine fibroids. The combination of imaging tests, biomarkers and minimally invasive tools allows for a more accurate and cost- effective diagnosis, reducing delays in the management of these diseases. conditions. Future studies should focus on integrating genetic and molecular data to develop even more accurate and accessible approaches.

RESEARCH INTO NEW THERAPEUTIC APPROACHES FOR ENDOMETRIOSIS AND MYOMAS

Endometriosis and uterine fibroids represent significant challenges in women's health due to the complexity of their clinical manifestations and the limitations of conventional treatments. Recent innovations in pharmacological, surgical and biological treatments promise to improve the efficacy and safety of therapeutic interventions. This study analyzes selective hormone receptor modulators, immunomodulatory therapies, advanced surgical techniques and interventions based on microbiome and inflammatory markers.

Selective hormone receptor modulators, such as elagolix and relugolix, have emerged as promising alternatives in the management of endometriosis. These agents selectively block the action of gonadotrophin hormones, reducing pain symptoms with a superior safety profile compared to traditional hormonal therapies (Taylor et al., 2021). In addition, immunomodulatory therapies aimed at regulating the inflammatory response, such as TNF-α inhibitors, have shown potential in reducing inflammation associated with endometriosis (Dunselman et al., 2020).

In fibroids, agents such as ulipristal acetate, a selective progesterone receptor modulator, have demonstrated efficacy in reducing fibroid volume and bleeding symptoms, with limited adverse effects (Donnez et al., 2019). Advances in targeted therapies, including growth factor inhibitors, offer a personalized approach to the management of these pathologies (Williams et al., 2022).

Robotic laparoscopy represents a milestone in minimally invasive gynecological surgery. This technique allows for greater precision and better anatomical visualization, reducing postoperative complications and recovery time (Nezhat et al., 2021). In cases

of deep endometriosis, robotics has proven highly effective in removing complex lesions while preserving fertility (Mekaru et al., 2020).

For fibroids, robotic myomectomy is a valuable alternative, particularly for large tumors or challenging locations. Studies show that this approach offers comparable results to conventional laparoscopy, with a lower risk of conversion to laparotomy (Barakat et al., 2020).

The relationship between the uterine microbiome and the development of gynecological conditions is being widely investigated. Therapeutic interventions based on microbiome modulators, such as probiotics and fecal microbiota transplants, have the potential to reduce inflammation and improve symptoms (Chen et al., 2021).

Advances in the identification of inflammatory markers, such as interleukins and chemokines, have also paved the way for more targeted therapies. These biomarkers not only aid in early diagnosis, but also provide potential therapeutic targets to reduce inflammation and chronic pain (Herington et al., 2022).

Progress in pharmacological treatments, minimally invasive surgical interventions and microbiome-based therapies offers new opportunities for the management of endometriosis and uterine fibroids. These approaches have the potential to significantly improve patients' quality of life, with lower risk and greater personalization. Future studies should prioritize the integration of these therapies into widely accessible clinical protocols.

EXPLORING THE CLINICAL AND SOCIAL IMPACT OF EARLY DIAGNOSIS IN ENDOMETRIOSIS AND MYOMAS

Endometriosis and uterine fibroids have a major impact on women's reproductive health and quality of life. Early diagnosis of these conditions is essential for efficient management, reducing complications and promoting better clinical and social outcomes (Saridogan et al., 2021). This text addresses how early identification influences treatment, reproductive outcomes and quality of life, as well as exploring the barriers to early diagnosis.

Early diagnosis allows for more effective and less invasive interventions, reducing the progression of lesions associated endometriosis and the complications arising from uterine fibroids. Studies show that early detection is associated with higher fertility preservation rates, especially when combined with minimally invasive techniques

(Taylor et al., 2020). In addition, proper management in the early stages reduces the need for more aggressive treatments, such as hysterectomies, promoting better reproductive outcomes (Zondervan et al., 2018).

Conditions such as endometriosis and uterine fibroids have a significant impact on quality of life due to symptoms such as chronic pain, dysmenorrhea and abnormal uterine bleeding. Early diagnosis reduces suffering time, facilitating targeted and effective treatment. Studies show that patients diagnosed early report a substantial improvement in physical and emotional well-being (Facchin et al., 2021). In addition, reduced absenteeism from work and increased productivity are attributed to the proper management of these conditions in the early stages (Hickey et al., 2022).

Social, economic and cultural factors represent significant barriers to early diagnosis. The normalization of symptoms such as dysmenorrhea and the lack awareness about the seriousness of endometriosis and fibroids contribute to the delay in diagnosis (Nnoaham et al., 2019).

Inequalities in access to specialized care and diagnostic tests, especially in low-income regions, exacerbate the problem (Ballard et al., 2020). Cultural barriers, such as stigmas associated with women's reproductive health, also make it difficult to seek early medical attention (As-Sanie et al., 2019).

Early diagnosis of endometriosis and uterine fibroids plays an essential role in improving patients' clinical, reproductive and quality of life outcomes. Overcoming social, economic and cultural barriers is crucial to ensuring equitable access to effective diagnosis and treatment. Public health policies that promote education and awareness can contribute to the early detection and effective management of these conditions.

RECOMMENDATIONS FOR CLINICAL PRACTICE AND FUTURE RESEARCH IN ENDOMETRIOSIS AND MYOMAS

Endometriosis and uterine fibroids remain significant challenges in gynecology due to their high prevalence and impact on women's quality of life. Despite therapeutic and diagnostic advances, knowledge gaps still limit the optimization of clinical outcomes. This text proposes evidence-based recommendations for clinical practice and identifies priorities for future research.

One of main challenges understanding the mechanisms underlying endometriosis and fibroids. Recent studies highlight the need for investigations into the role of the

uterine microbiome, chronic inflammation and genetic factors in the progression of these conditions (Aghajanova et al., 2021).

In addition, it is crucial to develop accurate biomarkers that allow for non-invasive diagnoses, reducing the dependence surgical procedures for diagnostic confirmation (Zondervan et al., 2020). In the therapeutic field, there is an urgent need for randomized clinical trials evaluating new pharmacological treatments, such as selectiveinhibitors hormone immunomodulatory immunomodulatory therapies, to determine their long-term efficacy and impact on fertility (Taylor et al., 2021).

The integration of personalized approaches based on genomics and proteomics should be prioritized to create treatments adapted to individual characteristics of the patients (Guo et al., 2022).

For health professionals, it is essential to adopt a multidisciplinary approach to the management of endometriosis and fibroids. This includes gynecologists, radiologists, immunologists and psychologists, ensuring a comprehensive assessment of the patient (Saridogan et al., 2020). The use of evidence-based protocols, such as initial treatment with hormonal modulators and the careful indication of surgical interventions, should be emphasized (Vercellini et al., 2018).

The guidelines should also encourage the inclusion of advanced diagnostic tools, such as magnetic resonance imaging and high-resolution ultrasound, in specialized centers. These technologies help to accurately map the extent of lesions and guide therapeutic decisions (Bazot et al., 2021). In addition, it is essential to make patients aware of the importance of early diagnosis and regular follow-up.

Translational research should focus on creating experimental models that reflect the complexity of endometriosis and fibroids. This includes the development of in vitro systems using patient-derived cells and improved animal models to study the response to new treatments (Simitsidellis et al., 2020). Multicenter clinical trials and cohort studies are also needed to assess the impact of innovative therapies on different populations.

Finally, research should prioritize assessing the socioeconomic impact of these conditions, providing data to support public health policies aimed at improving access to effective diagnoses and treatments (Ballard et al., 2021).

Implementing evidence-based recommendations and prioritizing innovative research can transform the management of endometriosis and uterine fibroids. A focus on personalized approaches, non-invasive diagnostics and interdisciplinary

collaboration is essential to improve clinical outcomes and patients' quality of life.

CONCLUSION

Endometriosis and uterine fibroids represent significant challenges for gynecological health, directly impacting women's quality of life in many ways. Early diagnosis is essential to avoid complications and offer more effective therapeutic options, reducing the physical and emotional impact of these conditions.

Recent advances in diagnostic imaging, such as magnetic resonance imaging and specialized ultrasound, combined with innovative therapeutic approaches, including personalized drug treatments and minimally invasive surgical techniques, have transformed the way these diseases are managed. In addition, the integration of multidisciplinary strategies, such as psychological support and changes, has proved essential for more holistic and humanized care.

Investments in research and awareness campaigns are essential to promote early detection and reduce the stigmas associated with these conditions. In this way, it is possible not only to improve clinical outcomes, but also to empower women by giving them access to information and cutting-edge treatments that respect their needs and expectations.

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