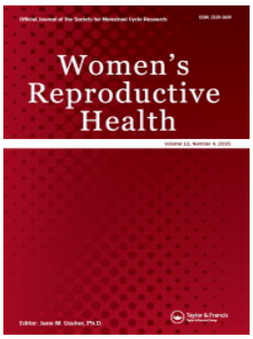

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Pain Perceptions, Body Image, and Quality of Life in Women with Endometriosis

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ABSTRACT

Introduction: Endometriosis is a chronic gynecological condition characterized by significant pain leading to a diminished quality of life (QoL). This study investigated the extent to which body image mediates the relationship between pain perception and QoL.

Methods: A total of 106 women (mean age = 33.54 years, *SD* = 7.43) participated in this cross-sectional study.

Results: The results indicated that both pain perception and body image significantly influenced QoL. Mediation analysis revealed that higher pain perception was associated with increased body dissatisfaction, which, in turn, contributed to poorer QoL.

Discussion: These findings highlight the importance of a multidisciplinary approach to endometriosis management.

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Endometriosis; body image; pain; quality of life; women health

Introduction

Endometriosis is a chronic neuroinflammatory condition characterized by the presence of endometrial-like tissue outside the uterus, affecting approximately 10% of women of reproductive age (Becker et al., 2020; Koninckx et al., 2021; Saunders & Horne, 2021). While the precise pathophysiology remains incompletely understood, proposed mechanisms include retrograde menstruation, coelomic metaplasia, and lymphatic or vascular spread (Saunders & Horne, 2021). Regardless of the underlying mechanisms, the resulting inflammatory processes and formation of endometriotic lesions contribute to key symptoms, such as chronic pain (pelvic pain, painful periods, painful sex, pain during urination/defecation), infertility, and other debilitating complaints (e.g., fatigue), that can limit daily functioning and contribute to significant suffering (Becker et al., 2020; Hunsche et al., 2023; Rush & Misajon, 2018; Saunders & Horne, 2021). A notable challenge in endometriosis management is the often-lengthy interval between symptom onset and diagnostic confirmation—an average delay of five to seven years—exacerbating psychological suffering (Becker et al., 2020; Maulenkul et al., 2024) and uncertainty (Lunsford et al., 2025). Consequently, many women find their contacts with healthcare professionals challenging, noting that their concerns are sometimes dismissed, access to secondary care is postponed, and awareness of endometriosis among providers remains limited (Harris et al., 2025). These experiences align with feminist analyses showing that women with endometriosis often encounter gendered assumptions in healthcare, including the tendency to normalize or psychologize their symptoms, which may contribute to delays in diagnosis and greater emotional distress (Young et al., 2019).

Beyond and due to these physical manifestations, endometriosis has a substantial impact on women's emotional well-being and quality of life (QoL) (As-Sanie et al., 2024; Szypłowska et al., 2023; Wang et al., 2021). Women with endometriosis consistently report lower overall QoL scores compared to population norms, especially in terms of physical and social functioning (Ruszała et al., 2022; Van

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Niekerk et al., 2022). This happens because symptoms of endometriosis usually lead to interruptions in daily activities, impaired work productivity, poor sexual health, and feelings of isolation and disconnection (As-Sanie et al., 2024; Hunsche et al., 2023; Peterson et al., 2023; Zhu et al., 2023). Furthermore, women with endometriosis frequently report heightened anxiety and depression, each of which amplifies disease burden (Szypłowska et al., 2023). The lack of validation from significant others and the lack of understanding are also challenges faced by women with endometriosis (Brania et al., 2025). Experiences of being dismissed or not believed in healthcare settings may further contribute to poorer emotional well-being and reduced QoL (Young et al., 2020).

One critical yet often overlooked aspect of endometriosis is its impact on body image. Body image is a multidimensional construct encompassing individuals' perceptions, cognitions, and emotional attitudes toward their physical selves (Cash et al., 2002). This concept includes not only satisfaction or dissatisfaction with specific body features, but also the broader sense of embodiment—how one experiences and relates to the body as a whole (Cash, 2012). Within the context of chronic illness, body image may shift over time due to altered physical functioning, persistent pain, appearance changes, or even lack of functionality (Cunha et al., 2024).

It is particularly relevant in the context of endometrioses due to physical (e.g., weight fluctuations, abdominal bloating, and surgical scarring) and psychological changes that can significantly disrupt women's perceptions of their bodies, potentially contributing to body image dissatisfaction (Luscombe et al., 2009; Mills et al., 2025; Moradi et al., 2014). Some studies indicated that body image disturbances are prevalent in endometriosis (Calvi et al., 2024; Van Niekerk et al., 2022; Volker & Mills, 2022), posing a clear risk to interpersonal relationships, sexual functioning, and overall psychological health (Pehlivan et al., 2022; Sullivan-Myers et al., 2023). Moreover, in a recent qualitative study conducted by Mills et al. (2025) the authors illuminated how women with endometriosis often describe feeling a profound sense of defectiveness, conflict, and alienation from their bodies, arising from both visible alterations (e.g., bloating, scars) and functional impairments (e.g., reduced mobility, sexual difficulties).

One important central mechanism through which endometriosis may contribute to body image concerns is through pain perceptions. A recent systematic review by Budzisz et al. (2024) highlighted the pivotal role of pain intensity in exacerbating body image disturbances. This is consistent with evidence from chronic pain research demonstrating that persistent pain can distort body image perception (Sündermann et al., 2018). For instance, a study by Volker and Mills (2022) found that individuals with endometriosis reported poorer body image compared to those without the condition, with pelvic pain being a key contributing factor. Also, Sayer-Jones and Sherman (2023) in their qualitative study highlighted that pain perception not only causes physical discomfort but also significantly impacts affective and social self-perception, with individuals often anticipating being perceived as less desirable by others, particularly in intimate contexts.

Taken together, these findings underscore the importance of investigating how endometriosis-related pain contributes to body image dissatisfaction, and how such body image issues may affect women's overall functioning and well-being. Despite the growing recognition of body image as a key component of endometriosis-related distress, current research on this topic remains relatively limited. Building upon the existing literature indicating that endometriosis is associated with both chronic pain and body image disturbances (e.g., Budzisz et al., 2024; Mills et al., 2025; Sayer-Jones & Sherman, 2023; Volker & Mills, 2022), the current study aims to provide a more nuanced understanding of how pain and body image dissatisfaction jointly affect the psychological well-being and QoL of women with endometriosis. Despite evidence suggesting that pain intensity is a key driver of negative body perceptions (Sündermann et al., 2018) and that body image dissatisfaction can compound the emotional and social toll of the disease (Calvi et al., 2024; Pehlivan et al., 2022), relatively few studies have investigated these factors simultaneously in a single model. Figure 1 presents the proposed model specific of this study that tested the links between pain, body image, and QoL.

Method

Participants

Inclusion criteria required participants to be literate in Portuguese and to have a clinically confirmed diagnosis of endometriosis. The final sample comprised 106 women aged 18 to 52 years ($M = 33.54$; $SD = 7.43$). Among the participants, 34% also had a clinically confirmed diagnosis of infertility. The majority were Portuguese (81.1%), in a romantic relationship (86.8%), had attained a university-level education (58.5%), and were actively employed (79.2%). See Table 1 for a detailed description of the sample characteristics.

Measures

Sociodemographic Questionnaire

A sociodemographic questionnaire was administered to collect data on participants' age, duration of endometriosis diagnosis, presence of infertility, marital status, romantic relationships, education level, nationality, employment status, number of children, and experience with infertility treatments.

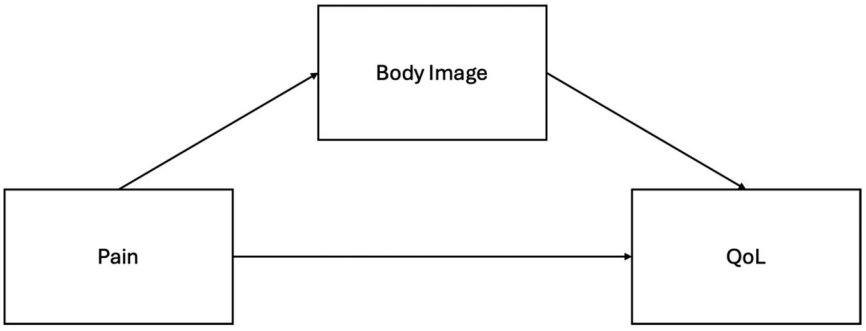

Figure 1. Proposed model linking pain, body image, and QoL.

Table 1. Sociodemographic characteristics of the sample ($N = 106$).

		M	*SD*
Age (years)		33.54	7.43
Number of children		.30	.650
Relationship length (months)		97.12	93.69
		N	*%*
Nationality	Portuguese	86	81.1
	Brazilian	16	15.1
	Other	4	3.8
Marital status	Single	38	35.8
	Married/living together	64	60.4
	Divorced	4	3.8
Involved in a romantic relationship	Yes	92	86.8
	No	14	13.2
Education	Elementary school	6	5.7
	Secondary school	33	31.1
	Higher education	62	58.5
	Postgraduate degree	4	3.8
	Vocational education	1	0.9
Children	Yes	25	23.6
	No	81	76.4
Work status	Working	84	79.2
	Nonworking	22	20.8

Quality of Life

The World Health Organization Quality of Life Scale (WHOQOL-BREF) was used to assess participants' quality of life (Portuguese version: Vaz Serra et al., 2006). This instrument consists of 26 items distributed across four dimensions: physical health (7 items; pain and discomfort; energy; sleep), psychological health (6 items; self-esteem; negative feelings; body image), social relationships (3 items; social support; sexual activity), and environment (8 items; financial resources; transportation). For this study, environment items were excluded. This decision was made because our study focused specifically on the psychological and functional impact of endometriosis, and the environment domain (e.g., financial resources, physical safety, access to services) is less directly related to the mechanisms we aimed to examine. Items are scored from 1 to 5 on a response scale. In this sample, the Cronbach's alpha was 0.92 and the McDonald's omega was 0.92.

Body Image

The Body Appreciation Scale-2 (BAS-2) was used to assess body image (Portuguese version: Lemoine et al., 2018). This scale comprises 10 items assessing own body respect and acceptance (item examples: "*I feel good about my body*"; "*I am attentive to my body's needs*"). Higher scores indicate higher body appreciation. Items are scored on a five-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). In this study the Cronbach's alpha was 0.95 and the McDonald's omega was 0.96.

Pain Perceptions

The Endometriosis Health Profile Questionnaire-30 (EHP-30) was used to assess pain perceptions (Portuguese version: Nogueira-Silva et al., 2015). This questionnaire evaluates quality of life in patients with endometriosis and comprises 30 items that assess five core dimensions: pain (e.g., *"Been unable to go to social events because of the pain?"*), control and powerlessness (e.g., *"Felt unable to cope with the pain?"*), emotional well-being (e.g., *"Felt depressed?"*), social support (e.g., *"Felt others do not understand what you are going through?"*), and self-image (e.g., *"Felt your appearance has been affected?"*). Additionally, there is an optional 23-item modular section that may not apply to all women, assessing dimensions such as work, relationships with children, sexual relationships, and infertility.

For the purpose of this study, only the pain dimension was used. Other EHP-30 domains were not included to avoid redundancy and because they did not align directly with the hypothesized pathways. The Cronbach's alpha was 0.98 and the McDonald's omega was 0.98.

Procedure

This study received ethical approval from the University Ethics Committee, ensuring compliance with the ethical standards set by the Declaration of Helsinki for research involving human participants. Data were collected from January 2023 to June 2023 through an online questionnaire, which was distributed via social media platforms and endometriosis-related organizations. Participation was voluntary, anonymous, and nonmandatory, with informed consent obtained from all participants prior to data collection. Participants were assured that they could withdraw from the study at any time without any consequences, and no personally identifiable information was collected, to ensure anonymity. Participants did not receive any type of incentives.

Data Analysis

All statistical analyses were conducted using IBM SPSS Statistics (version 29). Prior to conducting the main analyses, data were screened for normality. Descriptive statistics (means, standard deviations) were computed for all variables. The assumption of normality was assessed using the Kolmogorov–Smirnov test and visual inspection of histograms.

Pearson's correlation coefficients were calculated to examine bivariate relationships between key study variables, including pain perceptions, body image, and quality of life. To compare differences between groups (according to age, relationship status, and fertility status), independent-sample *t*-tests were performed.

Mediation analyses were conducted using the PROCESS macro for SPSS (Hayes, 2017), specifically employing Model 4 to test for indirect effects. Bootstrapping procedures with 5,000 resamples were used to generate bias-corrected confidence intervals for the indirect effects, ensuring a robust estimation even when assumptions of normality were violated. The mediation model included pain perceptions (independent variable), body image (mediator), and quality of life (dependent variable, with statistical significance determined by the absence of zero within the 95% confidence intervals). All statistical tests were two-tailed, with an alpha level of 0.05 set for significance.

Results

Preliminary Analyses

The assumption of normality was assessed using the Kolmogorov–Smirnov test. Results indicated that all key variables—pain perceptions ($KS(106) = 0.08$, $p = .068$), body image ($KS(106) = 0.07$, $p = .200$), and quality of life ($KS(106) = 0.04$, $p = .200$)—did not significantly deviate from normality.

Independent-sample *t*-tests did not reveal statistically significant differences in any study variables: for age (pain perceptions, $t(104) = 0.60$, $p = .547$; body image, $t(104) = 0.90$, $p = .370$; and quality of life, $t(104) = 1.79$, $p = .076$), relationship status (pain perceptions, $t(104) = 0.97$, $p = .332$; body image, $t(104) = -1.15$, $p = .250$; and quality of life, $t(104) = -1.18$, $p = .241$), and fertility status (pain perceptions, $t(104) = 0.82$, $p = .414$; body image, $t(104) = -.593$, $p = .555$; and quality of life, $t(104) = -1.35$, $p = 0.179$).

Pearson's correlations revealed a significant negative association between pain perceptions and both body image ($r = -.335$, $p < .001$) and quality of life ($r = -.573$, $p < .001$), as well as a significant positive association between body image and quality of life ($r = .602$, $p < .001$).

Mediation Model

The results showed that pain perceptions significantly predicted body image ($b = -0.33$, SE = 0.09, $t = -3.63$, $p < .001$), indicating that higher pain perceptions were associated with poorer body image. In turn, body image significantly predicted quality of life ($b = 0.36$, SE = 0.06, $t = 6.35$, $p < .001$), suggesting that better body image was associated with higher quality of life.

The total effect of pain perceptions on quality of life was significant ($b = -0.45$, SE = 0.06, $t = -7.13$, $p < .001$), indicating that higher pain perceptions were associated with lower quality of life. When controlling for body image, the direct effect of pain perceptions on quality of life remained significant ($b = -0.33$, SE = 0.06, $t = -5.76$, $p < .001$), but the effect was reduced, indicating partial mediation. The indirect effect of pain perceptions on quality of life through body image was significant ($b = -0.12$, BootSE = 0.04, 95% CI [−0.20, −0.05]). These results indicate that body image partially mediates the relationship between pain perceptions and quality of life, suggesting that women with higher pain perceptions tend to have poorer body image, which in turn contributes to a lower quality of life (see Figure 2).

Discussion

This study aimed to investigate the relationship between pain perceptions and quality of life in women with endometriosis, exploring the potential role of body image as a linking mechanism.

We found a significant negative association between pain perceptions and quality of life in women with endometriosis. This finding is consistent with previous research indicating that pain, as one of the most dominant and debilitating symptoms of endometriosis, can significantly impair daily functioning, emotional well-being, and overall quality of life (Hunsche et al., 2023; Maulenkul

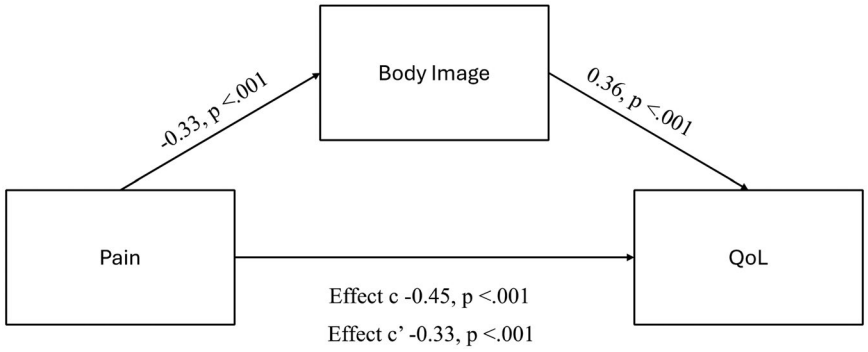

Figure 2. Mediation model ($N = 106$).

et al., 2024; Moradi et al., 2014). Women with endometriosis often experience a "constellation of pain," characterized by varying types, patterns, and intensities of pain in different locations (Drabble et al., 2021). This constellation of pain often interferes with various aspects of women's lives, including work, relationships, and social activities (e.g., Bell et al., 2023; Leuenberger et al., 2022; Zuh et al., 2023). Pain perceptions and their associated limitations contribute to physical discomfort, emotional distress, and reduced life satisfaction, leading to psychological symptoms such as anxiety, depression, and frustration, all of which negatively impact quality of life (e.g., Kigloo et al., 2024).

We also found that pain perceptions were negatively associated with body image, suggesting that higher levels of pain are linked to more negative perceptions of one's body. This finding aligns with previous research indicating that pain conditions, including endometriosis, can lead to body dissatisfaction due to functional limitations, physical discomfort, and feelings of loss of control over one's body (Mills et al., 2025; Senkowski & Heinz, 2016; Sündermann et al., 2018). The persistent and unpredictable nature of endometriosis-related pain may contribute to a sense of bodily disconnection and diminished self-esteem, further exacerbating body image concerns. Pain and its impact can also heighten body awareness, leading women with endometriosis to focus on their physical discomfort and bodily changes, such as bloating, fatigue, and surgical scars. This heightened awareness may result in a negative self-perception and dissatisfaction with one's body image, as suggested by previous studies (Mills et al., 2025; Sayer-Jones & Sherman, 2023; Sündermann et al., 2018). Pain-related functional limitations, such as reduced physical activity and social withdrawal, can also impact body image. Women who are unable to engage in activities they once enjoyed may experience changes in body weight, muscle tone, and overall physical condition, contributing to body dissatisfaction (Mills et al., 2025, Moradi et al., 2014). Furthermore, the impact of pain on intimate relationships, particularly sexual activity, may lead to feelings of inadequacy and negative self-perception (Sullivan-Myers et al., 2023).

Finally, we found that body image partially explained the link between pain perceptions and quality of life. This partial link suggests that the negative impact of pain perceptions on quality of life can be, in part, due to the influence of pain perceptions on body image. This is consistent with the broader literature showing that both pain and body image are likely to influence women's QoL (Van Niekerk et al., 2022; Wu et al., 2024). This is consistent with the broader literature, which has documented that women with endometriosis often experience heightened body dissatisfaction due to endometriosis-related symptoms, especially pain (Luscombe et al., 2009; Mills et al., 2025; Moradi et al., 2014), with impacts on women's well-being emotional distress, reduced self-esteem, and social withdrawal, all of which are critical components of QoL (Calvi et al., 2024; Pehlivan et al., 2022; Ruszała et al., 2022).

However, the partial nature of the mediation suggests that additional factors likely contribute to the pain–QoL relationship. Psychological variables such as anxiety, depression, or sexual functioning can be implicated in women's QoL, as suggested by a recent review (Maulenkul et al., 2024). Future research should explore whether these factors interact with body image in modulating the effects of pain on QoL.

Limitations and Future Research

This study has some limitations that should be acknowledged. First, the cross-sectional design limits our ability to infer causal relationships between pain perceptions, body image, and QoL. Longitudinal studies are needed to establish the directionality of these relationships and to assess potential changes over time, since the links between pain and body image are likely to be bidirectional. Also, because our sample included only women with a self-reported confirmed endometriosis diagnosis, we were not able to compare outcomes with women without the condition. Future studies should consider including a comparison group to clarify whether the observed associations are specific to this population.

Second, the sample size, while adequate for statistical analysis, may not fully represent the broader population of women with endometriosis, particularly in terms of demographic and clinical diversity (e.g., in terms of infertility diagnosis). Future studies should aim for larger, more diverse samples to enhance generalizability. Another limitation is the reliance on self-reported measures, which may be influenced by recall bias or subjective interpretation. Incorporating objective clinical assessments of endometriosis severity alongside self-reports could provide a more comprehensive understanding of the relationships examined. Additionally, while body image was identified as a significant mediator, other psychosocial factors such as social support, self-compassion, and resilience may also play critical roles. Future research should explore these additional mediators to further refine interventions aimed at improving QoL in this population.

Clinical Implications

The findings of this study highlight important clinical implications for the management of women with endometriosis. Given that body image concerns partially mediate the relationship between pain and QoL, healthcare providers should integrate psychological interventions into standard endometriosis care. Cognitive-behavioral therapy (CBT; e.g., Donatti et al., 2025) and body acceptance programs (Evans et al., 2019) could be valuable tools in addressing body dissatisfaction and its impact on well-being.

Moreover, a multidisciplinary approach that includes gynecologists, pain specialists, psychologists, and physical therapists is essential for comprehensive care. Providing education on the impact of endometriosis-related symptoms on body image may help patients develop healthier self-perceptions and coping strategies. Clinicians should also be mindful of the potential emotional distress associated with body dissatisfaction and encourage open discussions about self-image concerns during medical consultations.

Additionally, targeted interventions such as mindfulness-based stress reduction (MBSR) and acceptance and commitment therapy (ACT) may help women with endometriosis cultivate self-compassion and resilience (Van Niekerk et al., 2025). Addressing body image concerns alongside pain management strategies may enhance overall treatment efficacy and improve QoL outcomes.

Author Contributions

CRediT: **Mariana Correia**: Conceptualization, Data curation, Formal analysis, Writing – original draft; **Tânia Brandão**: Conceptualization, Formal analysis, Supervision, Writing – review & editing.

Disclosure statement

No potential conflict of interest was reported by the authors.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

During the preparation of this work the authors used ChatGPT to improve language and readability. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication

Institutional Review Board Statement

All subjects gave their informed consent for inclusion before they participated in the study. All data were obtained in a confidential form and data are not externally accessible. The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the ISPA Ethics Committee.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

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Data Availability Statement

The data supporting this study's findings are available upon reasonable request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

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