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Can self-compassion and mindfulness predict psychological wellbeing in individuals with endometriosis? Findings from an online survey

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Abstract

Background Endometriosis presents diagnostic challenges and has profound impacts, encompassing physical and psychological symptoms, relationship difficulties, and disruptions in daily life. The emotional burden is pervasive, intensified by feelings of anxiety, depression, guilt, and shame. Despite extensive exploration of risk factors such as pelvic pain, knowledge about protective factors for mental health in this population is limited. Thus, this study aims to investigate whether self-compassion and mindfulness are associated with enhanced psychological wellbeing in individuals with endometriosis.

Methods This cross-sectional study involved 653 participants aged 18 years or older, self-reporting a clinical or surgical diagnosis of endometriosis. Data collection occurred online via Qualtrics from May 11 to August 24, 2022. Sociodemographic and endometriosis-related data were collected using a researcher-made questionnaire. Psychological wellbeing, self-compassion, and mindfulness were assessed using validated self-report questionnaires.

Results Out of 1,153 survey accesses, 653 participants (75%) provided complete responses and were included. Self-compassion and mindfulness exhibited a positive correlation with psychological wellbeing. In a hierarchical multiple regression model, controlling for confounding factors, both variables significantly increased the explained variance ($\Delta R^2 = 0.315$). However, only the association between psychological wellbeing and self-compassion remained statistically significant.

Conclusions Self-compassion emerges as an important protective factor for psychological wellbeing in the context of endometriosis. These findings, coupled with recent studies, emphasize the significance of promoting self-compassion in the psychological treatment of individuals with endometriosis, especially among the young and recently diagnosed.

Keywords Endometriosis, Mindfulness, Pelvic pain, Psychological wellbeing, Self-compassion

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Background

Endometriosis is a chronic inflammatory systemic condition characterized by the growth of endometrial-like tissue outside the uterus, affecting approximately 10% (190 million) of reproductive-age individuals assigned female at birth [1, 2]. Because diagnostic delays are common in the context of endometriosis, due to pain normalization and psychologization [3], the prevalence of the disease may be even higher, especially among adolescents [4–6].

Endometriosis is linked to various forms of pain, including dysmenorrhea, non-menstrual pelvic pain, and dyspareunia (most frequently). Additionally, individuals may experience dyschezia, dysuria, and other painful symptoms [1]. The condition is often characterized by its co-occurrence with other chronic overlapping pain conditions such as fibromyalgia, migraines, vulvodynia, and individuals' overall pain experience derives from the complex interaction of multiple pain contributors, including nociceptive and myofascial contributors, inflammation and peripheral sensitization, central sensitization, and psychological factors such as pain catastrophizing [7]. Beyond pain, people with endometriosis may report symptoms like infertility, chronic fatigue, and sleep disorders [2, 8, 9].

The negative impact of the disease is often pervasive, affecting multiple life domains—including intimate and social relationships, life choices concerning education, work, and reproductive plans—and creating uncertainty for the future, often tied to the unpredictable prognosis [10, 11]. Alongside symptoms of anxiety and depression, especially in association with pain and comorbidities, individuals with endometriosis often experience feelings of guilt and shame, particularly due to sexual difficulties, leading to frustration and progressive isolation [12–15].

As demonstrated by qualitative research, people with endometriosis frequently express feelings of guilt and self-judgement because they perceive themselves as the cause of their suffering, including physical symptoms ("I am the problem", "It is all in my head") [16, 17]. In the long-term management of the disease, dysfunctional coping strategies related to pain catastrophizing and anticipation, coupled with a lack of support and understanding from others, can contribute to an increased avoidance of social situations and even isolation, resulting in impaired physical and psychological health, helplessness, and hopelessness [3].

Given this scenario, there is a need for further research to identify predictors of psychological wellbeing in people with endometriosis. This involves not only examining risk factors like pain severity, but also exploring protective factors that can be incorporated into psychological treatment to support individuals in coping with the challenges associated with endometriosis. In the current study, our focus was on investigating the role of self-compassion and mindfulness.

Self-compassion

According to Neff [18, 19], self-compassion is a multifaceted construct that describes how individuals relate to themselves when experiencing personal suffering due to emotional or physical pain, or distress associated with adverse life events. This construct, distinct from self-pity, underscores the importance of being kind and caring toward oneself, irrespective of performance and ideal standards. It is based on the idea that suffering, vulnerability, and even failure are inherent aspects of our shared human experience [18].

The components of self-compassion encompass opposite tendencies: (i) Self-kindness (being able to treat ourselves with care and kindness when in pain) versus Self-judgement (being judgmental, with harshness and self-criticism); (ii) Common humanity (feeling connected to others, recognizing suffering and life challenges as integral parts of the human experience) versus Isolation (perceiving ourselves as alone or even isolated); (iii) Mindfulness (being able to acknowledge our suffering mindfully and compassionately in the here-and-now) versus Overidentification (being completely absorbed by the adverse experience and identifying with all its negative aspects) [18, 20].

The existing research literature consistently highlights self-compassion as a protective factor associated with enhanced psychological wellbeing (e.g., reduced anxiety, depression, distress, and suicidal thoughts) across various populations, including individuals with illnesses such as diabetes and breast cancer, as well as sexual and gender minorities [19, 21–23]. It has also been suggested that fostering self-compassion among individuals with chronic painful conditions, such as low back pain, can decrease pain intensity, psychological distress, and facilitate pain acceptance by reducing negative affects and pain catastrophizing, while encouraging a more caring and understanding approach to oneself [24]. Self-compassion can also improve health through physiological mechanisms. There is evidence that self-compassion, which modifies people's perception of stressors (i.e., making them less threatening), is linked to lower levels of stress-related inflammation, even when controlling for the effects of psychological variables such as self-esteem and depressive symptoms [25]. This body of evidence is particularly relevant in the context of endometriosis, which is an inflammatory condition [26]. However, the published literature on self-compassion in the endometriosis population is scant.

The role of self-compassion has been investigated in very few observational cross-sectional studies [26–29]. Van Niekerk et al. [26, 27] examined the association

between endometriosis-related symptoms and self-compassion. The authors also explored whether participant characteristics—either endometriosis variables (such as diagnostic delay, pain and other symptoms) or psychological health—were related to self-compassion. The authors found that anxiety and depression were negatively associated with self-compassion. Moreover, a higher number of symptoms, including pain, was related to lower self-compassion. Overall, the 318 participants included in the study showed moderate levels of self-compassion. Sullivan et al. [28] found an inverse association between self-compassion and sexual distress in 471 individuals with endometriosis. However, the findings could not clarify the role played by self-compassion concerning sexual dysfunction. Skinner et al. [29] found a positive association between self-compassion and health-related quality of life, with this relationship being mediated by perceived symptom severity and partly mediated by resilience.

This small body of literature consistently showed that older age is associated with greater self-compassion, suggesting that younger individuals may be particularly affected by the impact of the condition [26–29]. However, none of these studies investigated the mechanisms and processes underlying self-compassion in a systematic manner.

Mindfulness

Mindfulness is a complex psychological concept, distinguishable through at least two broad conceptualizations: a traditional Buddhist approach and a contemporary Western approach [30]. Among Western mindfulness concepts, two prominent approaches are those developed by Langer [31] and Kabat-Zinn [32]. Langerian mindfulness [31] is characterized by openness to novelty, sensitivity to context and perspective, creating new categories, challenging assumptions, active involvement, and taking responsibility. Langer defines mindfulness (versus mindlessness) as a general mode through which individuals actively reshape their environment by creating new categories and seeking diverse perspectives. Langer's mindfulness includes openness to novelty, flexible thinking, and cognitive reframing [33]. In this view, mindfulness involves "mind-openness", facilitating consideration of multiple perspectives. Consequently, a mindful attitude rejects narrow judgments of "good" and "bad", as well as other categories, including diagnostic labels. On the other hand, Kabat-Zinn initially defined Western mindfulness meditation as intentional, present-moment attention without judgment [32]. This approach centers on awareness and non-judgment, rooted in the Theravada Buddhism tradition.

Despite sharing the term "mindfulness", the two approaches address different facets of the concept. The Langerian model conceptualizes it as a cognitive style rather than an outcome to achieve, emphasizing awareness of external stimuli without delving into one's thought processes [31]. In contrast, Kabat-Zinn's approach considers both internal and external stimuli, necessitating metacognitive and introspective awareness [34].

Mindfulness has been consistently identified in numerous studies as a protective factor against stress [33]. Its utilization in clinical psychology is gaining popularity, with mounting evidence supporting its effectiveness [35]. Mindfulness, in both these approaches, can serve as a protective factor against stress, linked to resilience, coping mechanisms, and the improvement of social functioning [36]. The more "contemplative" approach refers to mindfulness meditation practices to improve awareness and non-judgmental attitudes. However, meditation practices are currently accepted and used by a relatively limited portion of the population, around 5–10% in the Western worlds [37]. The Langerian approach, which is implemented through simple educational and cognitive exercises, and does not require formal practices, has the potential to be more widely accepted and implemented, both on the social and clinical levels [33].

The literature on mindfulness in endometriosis is limited as well. Evidence collected by preliminary studies [38] showed that mindfulness-based psychological treatment of chronic pain appears to be relevant to women with endometriosis, offering the potential to improve their quality of life, as it was also suggested in a systematic review by Evans et al. [39]. More recently, a randomized controlled trial [40] investigated the effects of a brief mindfulness-based intervention in 63 individuals with deep endometriosis who continued to experience symptoms despite conventional medical treatment. The findings of this study suggest that a brief mindfulness-based intervention can be valuable in managing endometriosis-related pain and enhancing women's psychological wellbeing. There is also evidence that a brief mindfulness-based intervention can have a positive impact on attention and parasympathetic regulation in individuals experiencing pain caused by endometriosis [41]. In these studies, the mindfulness-based interventions were conducted following Kabat-Zinn's approach. Currently, there are no endometriosis studies examining the role of mindfulness according to Langer's scientific approach and using specific validated measures.

In our study, we adopted Langer's approach because it conceptualizes mindfulness as a person's mindset encompassing cognitive flexibility, openness to novelty, and the social context [42]. These traits can play a protective role for mental health in individuals with endometriosis, who often exhibit worry traits, self-blame, and dysfunctional coping strategies involving catastrophizing, rumination, and control, which are linked to negative affects [43].

The current study

Our study aimed to investigate whether the psychological wellbeing of individuals with endometriosis could be predicted by self-compassion and mindfulness, controlling for the effects of potential cofounders. We hypothesized that participants with higher levels of self-compassion and mindfulness, conceptualized as potential protective factors, would exhibit greater psychological wellbeing. Additional analyses were also performed to further explore the relationship between the two putative predictors and participants' age, time since diagnosis, and pain symptoms. The aim of these analyses was to explore whether specific groups of individuals with endometriosis (for instance, young and recently diagnosed individuals with more severe pain [26]) were characterized by poorer self-compassion and mindfulness, which would be useful information for targeted interventions. Based on the findings of previous research [26–29], we anticipated observing higher levels of self-compassion in older participants with a longer time since diagnosis and lower pain severity.

Materials and methods

This cross-sectional study was conducted online using Qualtrics (Qualtrics Ltd.) from 11 May to 24 August 2022. Data collection—which also included questionnaires on sexuality, not considered in this article—was carried out in collaboration with an endometriosis patient association (Associazione Progetto Endometriosi). Participants were recruited using snowball sampling, with invitations posted on the association's social media and website and disseminated through the newsletter. The data were collected anonymously, and participants provided their consent directly on Qualtrics after reading an attached information document. The study included individuals aged at least 18 years with a self-reported clinical or surgical diagnosis of endometriosis, to minimize the risk of including individuals with pelvic pain symptoms without a diagnosed endometriosis. Participants who reported spontaneous menopause or current pregnancy were automatically excluded by the system before starting the survey to avoid the confounding effects of these specific physiological conditions on both psychological health and endometriosis. The research received approval from the institutional Ethics Commission (protocol number: 26 – 22; approval date: 21 April 2022).

Measures

We collected sociodemographic data, including age, nationality, level of education, employment, relationship, and family status. Additionally, we gathered endometriosis-related information such as age at diagnosis, endometriosis stage and type, infertility and assisted reproductive technology, surgical interventions, and hormonal therapy. These data were collected using a set of researcher-made questions specifically created for this study and presented as Supplementary material. Pain severity, encompassing dysmenorrhea, non-menstrual pelvic pain, dyspareunia, dyschezia, and dysuria, was assessed using a Numerical Rating Scale (NRS) ranging from 0 (no pain at all) to 10 (the worst imaginable pain), with a focus on the past six months.

Psychological wellbeing was assessed using the Psychological General Wellbeing-Short (PGWB-S) [44], a 6-item questionnaire with responses rated on a 1–6 Likert scale, yielding a global score ranging from 6 (lowest achievable wellbeing) to 36 (greatest achievable wellbeing). In this study, Cronbach's alpha for the PGWB-S was 0.85.

Self-compassion was measured using the Self-Compassion Scale (SCS), consisting of 26 items with responses rated on a 1 ("almost never") – 5 ("almost always") Likert scale [20, 45]. We computed scores for each of the six subscales (Self-kindness, Self-judgement, Common Humanity, Isolation, Mindfulness, Over-identification) and a global score reversing the items of the negative subscales. Higher scores on the positive subscales (Self-kindness, Common Humanity, Mindfulness), as well as the total score, indicate greater self-compassion. Conversely, higher scores on the three negative subscales (Self-judgment, Isolation, Over-identification) indicate poorer self-compassion. As clarified by Neff (see https://self-compassion.org/wp-content/uploads/2021/03/SCS-information.pdf), there are no clinical norms or cut-offs for the SCS. However, the author of the scale suggests that SCS scores between 1.0 and 2.49 indicate low self-compassion, scores between 2.5 and 3.5 indicate moderate self-compassion, and scores between 3.51 and 5.0 indicate high self-compassion. This categorization has also been used in previous studies on endometriosis [20, 26]. The Cronbach's alpha values for this study ranged from 0.70 for Common Humanity to 0.93 for the SCS-Total score.

Mindfulness was evaluated using the Italian version of the Langer Mindfulness Scale (LMS) [46] comprising 14 items with responses scored on a scale from 1 ("strongly disagree") to 7 ("strongly disagree"). The scale encompasses three subscales, assessing the level of openness to novel stimuli (Novelty Seeking), the level of creative thinking (Novelty Producing), and one's ability to actively interact with and be sensitive to the environment (Engagement). Higher scores indicate greater mindfulness. For the LMS, Cronbach's alpha ranged from 0.64 for Engagement to 0.85 for the LMS full-scale score.

Statistical analyses

Statistical analyses were performed using SPSS version 25. In the initial set of analyses, we derived descriptive statistics to summarize participant characteristics. The distribution of continuous variables was examined by

considering skewness and kurtosis (values between −2 and +2 were deemed acceptable and indicative of normal distribution, consistent with previous research [47].

In a first set of analyses, we examined whether our main outcome variable (PGWB-S) was associated with potential confounders (age, partner, employment [dichotomized as having versus not having a job], children, age at diagnosis, time since diagnosis [calculated as the difference between age and age at diagnosis]), infertility, severity of pain symptoms and the two potential predictors (self-compassion and mindfulness). In this set of analyses, we employed a *t*-test to identify group differences and utilized Pearson correlation to investigate correlations between continuous variables.

When significant associations were found, the variables (the confounders and the putative predictors) were entered into a hierarchical multiple regression analysis. We adopted this approach because we wanted to determine the distinct effects of self-compassion (SCS-Total) and mindfulness (LMS-Total) on psychological wellbeing, examining their unique contribution to the model prediction (i.e., R^2 change [ΔR^2]) while controlling for the effects of other variables associated with PGWB-S, conceptualized as confounders.

In a final set of analyses, we examined whether the two predictors were associated with age, time since diagnosis, and severity of pain symptoms, because previous endometriosis research showed that these variables can be linked to self-compassion and mindfulness [26, 29, 38]. In these analyses, we considered only the SCS and LMS total scores. For self-compassion, we conducted two separate multivariate analyses of variance (MANOVAs). In the first analysis, age and time since diagnosis were included as dependent variables; in the second, the different forms of pelvic pain were treated as dependent variables. In both analyses, the three levels of self-compassion (low, moderate, high) served as the independent variable [26]. For these analyses, we report the values of partial eta squared (η^2_p) as measures of effect size. For mindfulness, we used Pearson correlations. The strength of all Pearson correlations was evaluated considering the absolute values of r (small: $r=0.10$; medium: $r=0.30$; large: $r=0.50$) [48].

Given that the research was carried out online, which limits the ability to predict and control the exact number of respondents, data collection followed two criteria: [1] a minimum of 250 participants was deemed necessary to ensure stable correlations between variables, as demonstrated by previous research on sample size in observational studies [49] and applied in other studies [16, 50]; [2] data collection was interrupted after a period of no new responses from additional participants. Missing data were not imputed (with regard to the two predictors and psychological wellbeing, there were 21 missing values for LMS), and the level of statistical significance was $p<0.05$.

Results

In total, the survey was accessed by 1,153 people. Among them, 101 (9%) did not provide electronic consent and were automatically directed to the end of the survey. Subsequently, 181 individuals (17% of those who gave electronic consent) were excluded for the following reasons: being aged < 18 years ($n=2$), lacking an actual diagnosis of endometriosis ($n=90$), experiencing spontaneous menopause ($n=68$), or being pregnant ($n=21$). Out of the remaining 871 participants, 653 (75%) provided complete responses to the PGWB-S and were included in this study.

The characteristics of the final study population are detailed in Table 1. Interestingly, only a minority of participants reported high levels of self-compassion (19%).

The analyses conducted to examine associations between potential predictors and PGWB-S revealed a positive correlation between participants' age and psychological wellbeing ($r=0.132$, $p=0.001$). Employed participants exhibited higher PGWB-S scores (19.92 ± 5.11) than those without a job (17.82 ± 5.43) (t = -3.681, $p<0.001$). Additionally, there were significant negative correlations between psychological wellbeing and all types of pain considered, with $ps<0.001$ (non-menstrual pelvic pain: $r=-0.220$; dysmenorrhea: $r=-0.161$; dyschezia: $r=-0.265$; dysuria: $r=-0.175$; dyspareunia: $r=-0.159$). Self-compassion (SCS subscales and total score) and mindfulness were also associated with psychological wellbeing, as reported in Table 2. For self-compassion, correlations with PGWB-S ranged from moderate ($r>0.3$) to strong ($r>0.5$). Specifically, Isolation, Over-identification, Self-judgment, and overall self-compassion were strongly associated with psychological wellbeing. On the other hand, the correlations between LMS (subscales and total score) and PGWB-S were significant but small.

Hierarchical multiple regression was then conducted, with PGWB-S as the dependent variable. Age and employment were entered in Block (1) Because in this study pain was conceptualized as a confounder rather than as a predictor—meaning we were not interested in examining the associations between specific pain symptoms and psychological well-being—the severity of the five forms of pain considered was summarized in a single variable using Principal Components Analysis (PCA). One single component was extracted (KMO test = 0.79, Bartlett's test of sphericity = 878.575; $p<0.001$), with 54% of total variance explained. Component loadings ranged from 0.642 to 0.803. This component was named "overall pain severity" and was entered in regression Block (2) SCS-Total and LMS were entered in regression Block (3)

Table 1 Participant characteristics

Sociodemographic data		
Age (in years) (M ± SD)		38.31 ± 6.65
Partner (N [%])	Yes	573 (87.7)
	No	80 (12.3)
Relational status (N [%])	Single	89 (13.6)
	In a relationship	258 (39.5)
	Married	294 (45)
	Separated/divorced	12 (1.8)
Level of education (N [%])	Postgraduate	111 (17)
	Graduate	235 (36)
	High school	285 (43.6)
	Middle school	22 (3.4)
Employment status (N [%])	Homemaker	37 (6)
	Unemployed	47 (7)
	Full-time job	411 (63)
	Part-time job	126 (19)
	Student with a job	19 (3)
	Student without a job	13 (2)
Employment (N [%])	Yes	556 (85.1)
	No	97 (14.9)
Children (N [%])	Yes	200 (30.6)
	No	453 (69.4)
Country of origin (N [%])	Italy	640 (98)
	Other countries	13 (2)
Endometriosis-related data		
Type of diagnosis	Laparoscopic surgery	208 (31.9)
	Clinical diagnosis	445 (68.1)
Age at diagnosis (in years) (M ± SD)		29.26 ± 6.49
Time since diagnosis (in years) (M ± SD)		9.05 ± 6.92
Rectovaginal endometriosis (N [%])		369 (56.5)
Ovarian endometriosis (N [%])		476 (72.9)
Adenomyosis (N [%])		422 (64.6)
Peritoneal, bladder, bowel, parametrial or ureteral endometriosis (N [%])		350 (53.6)
Endometriosis stage (Asrm) (N [%])	Stage I	32 (4.9)
	Stage II	37 (5.7)
	Stage III	99 (15.2)
	Stage IV	269 (41.2)
	Not known	216 (33.1)
Surgical interventions (N [%])	Yes	487 (74.6)
	No	166 (25.4)
Hormonal therapy (N [%])	Yes	400 (61.2)
	No	253 (38.7)
Infertility (N [%])	Yes	266 (40.7)
	No	387 (59.3)
Assisted Reproduction (in case of infertility)	Yes	39 (14.7)
	No	227 (85.3)
Severity of dyspareunia (M ± SD)		4.93 ± 3.11
Severity of non-menstrual pelvic pain (M ± SD)		4.91 ± 3.03
Severity of dysmenorrhea (M ± SD)		5.93 ± 3.65
Severity of dyschezia (M ± SD)		3.91 ± 3.21
Severity of dysuria (M ± SD)		1.83 ± 2.59
Psychological well-being		
PGWB-S (M ± SD)		19.60 ± 5.21
Self-compassion		

Table 1 (continued)

SCS (M ± SD)	Self-kindness	2.64 ± 1.00	
	Self-judgement	3.23 ± 1.00	
	Common humanity	2.95 ± 0.92	
	Isolation	3.30 ± 1.10	
	Mindfulness	2.93 ± 0.95	
	Over-identification	3.21 ± 1.04	
	SCS-Total	2.80 ± 0.79	
SCS-levels (N [%])	Low	227 (34.8)	
	Moderate	300 (45.9)	
	High	126 (19.3)	
Mindfulness			
LMS (M ± SD)	Novelty Seeking		28.91 ± 4.27
	Novelty Producing		23.81 ± 6.10
	Engagement		20.96 ± 4.36
	Total score		73.68 ± 11.86

Table 2 Self-compassion, mindfulness, and psychological well-being: pearson correlations

		PGWB-S
SCS	Self-kindness	0.453**
	Self-judgement	−0.509**
	Common humanity	0.305**
	Isolation	−0.574**
	Mindfulness	0.380**
	Over-identification	−0.519**
	SCS-Total	0.584**
LMS	Novelty Seeking	0.151**
	Novelty Producing	0.170**
	Engagement	0.170**
	LMS-Total	0.204**

** $p < 0.001$

Although all three models were statistically significant with *ps* < 0.001 (Model 1: $F = 10.484$, $R^2 = 0.033$; Model 2: $F = 21.854$, $R^2 = 0.097$; Model 3: $F = 85.313$, $R^2 = 0.412$), in Model 3, the effect of age was no longer significant (see Table 3). In the third model, employment ($p = 0.001$) and overall pain severity ($p < 0.001$) remained significant predictors of psychological wellbeing. Between SCS and LMS, only self-compassion significantly predicted psychological wellbeing ($p < 0.001$). From Model 2 to Model 3, ΔR^2 was 0.315.

In the final set of analyses, we explored whether self-compassion and mindfulness were associated with age, time since diagnosis, and the severity of pain symptoms. For self-compassion (see Table 4), multivariate tests revealed a significant association with age and time since diagnosis (Wilk's $\Lambda = 0.964$, F [1288, 4] = 5.900, $p < 0.001$, $\eta^2_p = 0.018$). Specifically, individuals with high self-compassion were characterized by older age and longer time since diagnosis compared to participants with moderate and low self-compassion. No significant effects of self-compassion levels were detected on the severity of pain symptoms. Pearson correlations between mindfulness and all the other variables were not statistically significant.

Table 3 Hierarchical multiple regression coefficients

Model		B	SE	β	*p*	95% CI	
						Lower bound	Upper bound
1	Constant	14.348	1.289		< 0.001	11.816	16.880
	Age	0.092	0.031	0.116	0.004	0.030	0.153
	Employment	1.944	0.589	0.131	0.001	0.786	3.101
2	Constant	15.315	1.256		< 0.001	12.849	17.781
	Age	0.075	0.030	0.095	0.014	0.015	0.135
	Employment	1.550	0.573	0.105	0.007	0.424	2.676
	Overall pain severity	-1.333	0.203	−0.255	< 0.001	-1.731	−0.934
3	Constant	5.919	1.422		< 0.001	3.127	8.711
	Age	0.006	0.025	0.008	0.809	−0.043	0.055
	Employment	1.616	0.464	0.109	0.001	0.704	2.528
	Overall pain severity	-1.100	0.165	−0.210	< 0.001	-1.424	−0.775
	SCS-Total	3.604	0.217	0.550	< 0.001	3.178	4.030
	LMS-Total	0.026	0.014	0.060	0.066	−0.002	0.054

Table 4 Levels of self-compassion, age, time since diagnosis, and severity of pain symptoms

		Low self-compassion	Moderate self-compassion	High self-compassion
1	Age (in years)	37.15 ± 6.70	38.26 ± 6.47	40.68 ± 6.44
	Time since diagnosis (in years)	8.40 ± 6.36	8.87 ± 6.94	10.70 ± 7.63
2	Pain severity			
	NRS-non-menstrual pain (M ± SD)	5.06 ± 2.98	4.82 ± 2.93	4.71 ± 3.37
	NRS-dysmenorrhea (M ± SD)	6.18 ± 3.59	5.75 ± 3.65	5.79 ± 3.77
	NRS-dyschezia (M ± SD)	4.39 ± 3.16	3.74 ± 3.11	3.31 ± 3.41
	NRS-dysuria (M ± SD)	2.04 ± 2.67	1.70 ± 2.55	1.65 ± 2.51
	NRS-dyspareunia (M ± SD)	5.03 ± 3.19	4.98 ± 2.98	4.65 ± 3.27

Discussion

The primary objective of this cross-sectional study was to investigate whether self-compassion and mindfulness could predict the psychological wellbeing of individuals with endometriosis. An initial noteworthy result suggests that individuals with the condition tend to report low to moderate levels of self-compassion, aligning with findings from previous studies [26]. While this result is primarily descriptive, its clinical significance is notable, as it underscores that individuals with endometriosis often harbor harsh and judgmental attitudes toward themselves.

In her recent literature review [19], Neff emphasized that being overly identified with our negative thoughts and feelings can severely impact our self-worth. For example, it goes beyond acknowledging a mistake; it transforms into defining ourselves by that mistake.

This phenomenon is frequently observed in the subjective experiences of individuals with endometriosis, who may perceive the condition not as something they have but as a defining aspect of their identity. While paradoxical, given that endometriosis is a medical condition commonly associated with severe pain and additional debilitating symptoms such as chronic fatigue and comorbidities, which should necessitate a particularly compassionate attitude toward oneself, this finding is supported by both qualitative research and clinical practice. In a qualitative study conducted by Facchin and colleagues [51], a 28-year-old participant expressed feeling like she was "only half a woman" due to endometriosis. These negative attitudes and emotions, coupled with a sense of guilt, are frequently linked to infertility and, notably, impaired sexuality [9]. In a study by Wahl [15] a participant said: "I feel insignificant, you almost feel broken or something".

Experiences of loneliness and isolation are also common in individuals with endometriosis, with negative consequences on psychological health and overall quality of life [12]. In a qualitative study by Cole and colleagues [52], a participant named Nadia, who experienced depression and suicidal thoughts, expressed, "Endo has got to be the most lonely condition I can imagine" (p. 184). Our study corroborated these findings, revealing a strong association between uncompassionate self-responding—encompassing Self-judgment, Isolation, and Overidentification [19]—and lower psychological wellbeing, as indicated by the values of Pearson correlations.

The statistical analyses performed in our study confirmed a significant relationship between pain severity and poor psychological wellbeing in individuals with endometriosis, consistent with the extensive literature since the inception of endometriosis studies. Being employed was also significantly associated with greater psychological wellbeing, highlighting the importance of exploring the impact of endometriosis on people's life choices, including education and work [10].

The distinctive contribution of our research lies in demonstrating a robust association between self-compassion and psychological wellbeing in a large sample of individuals with the condition, allowing the generalization of the findings to the broader endometriosis population. As confirmed by our regression analyses, self-compassion retained its robust predictive role in psychological wellbeing, while the impact of mindfulness was comparatively less pronounced. Although Pearson correlations between LMS (subscales and total score) and psychological wellbeing were statistically significant (albeit small), the effect of this potential predictor was no longer significant in the regression model. It is noteworthy that Mindfulness is also a subscale of the SCS, which, in our study, was significantly associated with psychological wellbeing. The items of this subscale specifically pertain to situations of suffering (e.g., "When something painful happens I try to take a balanced view of the situation")—in contrast to the LMS, which has a general focus—and, therefore, may be more adept at capturing the specific nuances of the lived experience of individuals with endometriosis.

Our findings did not support an association between self-compassion and endometriosis-related pain symptoms, identified instead in previous research [26]. However, they highlighted that young and recently diagnosed individuals reported lower levels of self-compassion. These findings are intriguing, suggesting that younger individuals and those recently diagnosed with endometriosis may be more prone to being harsh and judgmental

toward themselves, experiencing a sense of isolation and a more severe impact of the condition on their identity. This is particularly noteworthy considering that a shorter time since diagnosis is associated with increased symptoms of anxiety and depression [53]. Promoting self-compassion, especially in young individuals with endometriosis [26], may be particularly useful, given its association with various factors related to psychological wellbeing, including happiness, decreased anxiety, depression, and stress, contributing to an overall better quality of life [54].

As clarified by Neff [19], self-compassion is a skill that can be fostered through specific interventions. In the context of psychotherapy and clinical practice, regardless of theoretical orientation (e.g., cognitive behavioral or psychodynamic), therapists can help their patients adopt a more caring and less judgmental approach toward themselves [55]. Techniques aimed at nurturing self-compassion include, for instance, writing letters to oneself from the perspective of an unconditionally loving friend [55]. In Mindful Self-Compassion programs, these techniques are combined with mindfulness and loving-kindness meditation [19]. Compassion-Focused Therapy is a therapeutic intervention specifically developed to help patients be more aware of their emotional reactions, including self-criticism, take care of themselves and their own needs without confusing it with being selfish, and thus reduce self-judgment [19]. We believe that self-compassion-focused interventions may be particularly useful in clinical practice with individuals suffering from endometriosis. Evaluating the effectiveness of these interventions may be a promising avenue for future research, relying on the evidence provided by preliminary, exploratory studies (including ours) demonstrating the association between self-compassion and psychological health in this population.

Our study carries significant implications, particularly highlighting the potential of exploring self-compassion and mindfulness-based interventions for future research and clinical applications aimed at enhancing the perceived quality of life in the endometriosis population. To the best of our knowledge, this study stands as one of the initial endeavors within the limited body of literature addressing these constructs in the context of endometriosis.

Despite the novelty of these findings, it is essential to acknowledge certain limitations. The use of snowball sampling through the patient association's social media and newsletter introduces potential sampling bias, relying on individuals actively engaged with the association's online presence and possibly excluding those less inclined to participate in such platforms. Furthermore, the cross-sectional design employed in this study, while suitable for identifying associations between variables, cannot capture changes over time (which would be interesting, considering that self-compassion is associated with age and time since diagnosis). This limitation should be recognized when interpreting the dynamic nature of the relations under investigation. Due to the paucity of research on this topic, the specific aim of our study was to investigate the relationships between variables (self-compassion, mindfulness, and psychological wellbeing), rather than describing processes. We acknowledge the exploratory nature of our study as a limitation, and we encourage future studies to delve deeper into processes and mechanisms, now that the protective role of self-compassion for the psychological wellbeing of individuals with endometriosis has been clearly demonstrated.

In addition, the study focused on specific factors such as self-compassion, mindfulness, psychological wellbeing, and pain severity. While valuable, and despite controlling for the potentially confounding effects of several variables, the analyses conducted in our study may not encompass all the factors that could influence the psychological wellbeing of individuals with endometriosis, including personality traits, dyadic coping, and social support, lifestyle (e.g., smoking habits, alcohol use, physical exercise, nutrition) as well as the economic burden of the condition. This potential for unaccounted factors should be acknowledged when interpreting the findings and considered for future research.

Conclusions

In conclusion, our findings strongly suggest that integrating the promotion of self-compassion into clinical practice could be highly beneficial for individuals with endometriosis. Future research is needed to evaluate the effectiveness of self-compassion interventions within the endometriosis population.

Abbreviations

SCS	Self-compassion Scale
LMS	Langer Mindfulness Scale
PGWB-S	Psychological General Wellbeing-Short
NRS	Numerical Rating Scale

Supplementary Information

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Supplementary Material 1

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Author contributions

Conceptualization: F.F., E.S., P.V., F.P.; investigation: F.F.; methodology, project administration, data analysis and curation, resources: F.F., F.G., F.P.; writing -

original draft, F.F.; writing - review and editing: F.F.; F.G., F.P., E.S., P.V.; supervision: P.V., F.P. All authors contributed to this work and have read and agreed to the submitted version of the manuscript.

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Data availability
The data supporting this article will be shared upon reasonable request to the corresponding author.

Declarations

Ethics approval and consent to participate
The research was approved by the Ethics Commission for Research in Psychology of the Department of Psychology, Catholic University of the Sacred Heart (protocol number: 26 – 22; approval date: 21 April 2022), and was conducted in accordance with the Declaration of Helsinki. Electronic informed consent was obtained from all the participants on the Qualtrics platform before initiating the survey.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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