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REVIEW ARTICLE

Behavioral, cognitive, and emotional coping strategies of women with endometriosis: a critical narrative review

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Abstract Endometriosis is a disabling and long-term medical condition affecting quality of life and mental health. Behavioral, cognitive, and emotional coping strategies, emotional intelligence, and metacognition could in part explain the link between the disease and impaired psychological and life functioning. This critical narrative review aimed at examining the state of the art of the relationships between endometriosis and these factors. According to PRISMA principles, we performed a systematic search for quantitative and qualitative studies on multiple electronic databases as regards coping strategies, emotional intelligence, and metacognition in women with endometriosis. Studies were subjected to interpretative and critical narrative synthesis. A total of 9 papers were included in the review. Three main categories were identified in the thematic analysis and resumed in the manuscript. Findings suggested that (a) pain is considered the major stressor; (b) they usually use both adaptive and maladaptive coping strategies; (c) women with endometriosis and related chronic pain seem to repress emotions more likely than healthy ones; (d) suppressing own emotions, pain catastrophizing, and having a passive coping style are related to higher self-reported pain; and (e) emotional and avoidance coping styles are associated to poor mental status, while positive coping strategies focusing on the problem or on emotions, detached and rational styles are associated to better mental health. Few studies with mixed results and some methodological flaws have focused on coping strategies in women with endometriosis. No studies focusing on metacognition or emotional intelligence were found. Methodological biases, suggestions for future research, and implications for clinical practice were discussed.

Keywords Endometriosis · Coping · Emotional intelligence · Metacognition · Review

Introduction

Endometriosis is a disabling and long-term medical condition affecting around 10% of the adult female population (Vigano et al. 2004), characterized by the presence of endometrial-like tissue outside the uterus (i.e., commonly ovaries, bowel, and bladder) usually manifesting as cramping, menstrual and ovulation pain, lower abdominal and pelvic pain, chronic fatigue, dyspareunia, and infertility (Kennedy et al. 2005). Considered to be one of the most important cause of pelvic pain and infertility, its incidence seems to be related to both demographic (e.g., age, race, body mass index) and lifestyle (e.g., alcohol consumption, smoking) factors (Missmer et al. 2004). As results of its chronic symptomatology, the delay in diagnosis, issues related to treatment, and its influence in various fields of daily life (e.g., couple's relationships, work, education, sexuality), the impact on quality of life and psychological functioning is often extensive and deserves particular attention (Culley et al. 2013; Denny 2004; Pope et al. 2015). Nevertheless, several clinicians consider themselves not adequately trained to understand and provide psychosocial care to women with endometriosis (Young et al. 2017). It is emerging an increasing need of professional formative opportunities and the development of clinical guidelines

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approaching the psychosocial-related issues of this disorder (Young et al. 2017).

A recent systematic review by Pope et al. (2015) reported that endometriosis is frequently associated with a number of psychiatric symptoms (such as depression and anxiety), increased stress, and poor quality of life, often in comorbidity and correlated with each other. In this context, some factors such as coping strategies, emotional intelligence, and metacognition may in part explain the link between the disease and the impairment in psychological functioning and quality of life. Indeed, these factors may affect the way these women react to stressful events related to their disease, then influencing indirectly their mental health.

Coping strategies are a wide range of behavioral, emotional, or cognitive efforts to manage stressful events (Taylor and Stanton 2007). The way an individual copes with a stressor can mitigate or exacerbate the levels of stress experienced, leading to a series of positive or negative mental and physical outcomes. Due to its importance in this context, the role of the wide range of coping strategies has been investigated in connection with several chronic diseases and mental outcomes (Collins et al. 2009; Compare et al. 2014; Jensen et al. 1991; Ruiz-Aranda et al. 2010; Strobel et al. 2014).

Strictly related to the construct of coping are emotional intelligence and metacognition. Emotional intelligence refers to the ability to be aware of, monitor one's own and others' emotions, regulate and discriminate among them, and use the information to guide one's thinking and actions. By enhancing adaptive coping strategies in front of negative emotions or social demands, emotional intelligence is considered to affect positively well-being, mental and physical health (Salovey et al. 1999; Zeidner et al. 2012) as well as mediate the experience of acute pain by reducing its negative effect (Ruiz-Aranda et al. 2011).

Finally, metacognition refers to any knowledge or cognitive process that is involved in the appraisal, monitoring, or control of own cognition (Flavell 1979). According to the model of the metacognitive therapy (Wells and Simons 2013), mental disorders are characterized by a pattern of metacognitive beliefs and maladaptive coping strategies involving worry, rumination, and fixation of attention on threat. This pattern of response leads to the persistence of negative beliefs and, in turn, to mental health problems. Metacognitive beliefs have been related to a series of mental disorders in a variety of settings (Cook et al. 2015; Sica et al. 2007).

Given the importance of these factors on the occurrence of mental disorders and the prognosis of medical diseases, this critical narrative review aimed at examining the state of the art about the relationship between endometriosis and behavioral, cognitive, and emotional coping strategies, emotional intelligence, and metacognition. Moreover, main biases in literature and methodological issues as well as suggestions for future research are discussed.

Methods

We conducted a search for quantitative and qualitative studies on multiple electronic databases and subjected them to interpretative and critical narrative synthesis, following as more as possible PRISMA principles for systematic review (Moher et al. 2010). According to these principles, we reported a comprehensive literature search in order to show major findings and identify methodological issues of reporting studies (Moher et al. 2010). In order to include both quantitative and qualitative studies with different populations, aims, measures, and topics, in spite of lack of relevant data, interpretative process was done and the method of critical narrative synthesis as described by Popay et al. (2006) was followed. The process was subjected to two independently revisions of two authors. Any discrepancies were discussed between reviewers and consensus was achieved.

Information sources and search strategy

We conducted a systematic search of the major health, medical, and psychology-specific databases in July 2017. Reviewing articles on endometriosis and coping strategies, emotional intelligence, and metacognition helped to the construction of appropriate search terms. We chose "endometriosis" as key term to search due to the fact that articles reported a homogeneity for this terminology. The term "endometriosis" was then combined with other search terms specifically related to coping strategies, emotional intelligence, and metacognition (i.e., coping, cope, stress manag*, emotion* self-regulat*, "emot*, regulat*, "emotion-regulat*, "regulat* of cognit*, "emot* awar*, "emotion* intelligen*, knowl* about cognit*, metacognit* belief*, metacogn*). Searches were made in a range of scientific databases (PsychInfo/PsychArticles, Medline/Pubmed, Web of Knowledge, Scopus) for title, abstract, and keywords. No restrictions of year of publication were applied.

Process for selecting papers

Eligibility, inclusion and exclusion criteria

We included peer-reviewed English-language journal articles that assessed coping strategies, emotional intelligence, and metacognition in women with endometriosis. We excluded (a) papers that did not explicitly explore target variables (i.e., coping strategies, emotional intelligence, and metacognition in women with endometriosis); (b) papers that did not examine women with endometriosis; (c) reviews, thesis, dissertations, opinion pieces, commentaries, and clinical cases studies; (d) studies on treatment outcomes; (e) studies on animals; (f) non-English publications; and (g) studies without available abstract/full text. No exclusions on the basis of level of evidence of the study, quality of the study, findings, year of publication, country, or characteristics of participants were applied.

Screening, data collection process and analysis

Firstly, documents were screened and duplicates were removed. Following, the remained articles were evaluated on the basis of abstracts, according to inclusion and exclusion criteria. Ineligible articles were removed and detailed information about selected papers was allocated in an excel spreadsheet recording. Finally, we organized a process of coding aimed at selecting and naming main topic of each study ($N = 9$). Level of evidence of each study was established following guidelines reported by Sackett et al. (1996).

Results

Search, screening, and selection

We found a total of 97 studies through database searching and 2 from other sources. A total of 34 papers were removed because of duplicates. Fifty-six papers were excluded according to exclusion criteria. Finally, a total of 9 studies were selected and full text was analyzed. An overview of the search results and screening criteria is summarized in Fig. 1.

Characteristics of studies

We found few articles on behavioral, cognitive, and emotional coping strategies in women with endometriosis, and none on emotional intelligence and metacognition. Despite selected studies were few in number, they were heterogeneous and differed in methodology, aims, target, measures, sample size, and findings. An overview of the main characteristics of these studies is provided in Table 1.

Settings

We found studies published from 2005 to 2016, indicating a recent and increasing interest on these topics. The majority of studies were conducted in the USA (4), while the others were carried out in South Africa (1), Denmark (1), Brazil (1), and New Zealand (2). Studies recruited patients overall from hospital/clinics/centers (6); both clinics and university/support groups/web (1); support group (1); and from Endometriosis Research Program Patient Registry, database and support activities, notice boards, and social media (1). Healthy individuals for control group were recruited from convenience sample (1) and community (1).

Design

The majority of studies adopted cross-sectional (5) and case-control (3) designs, while only one was prospective

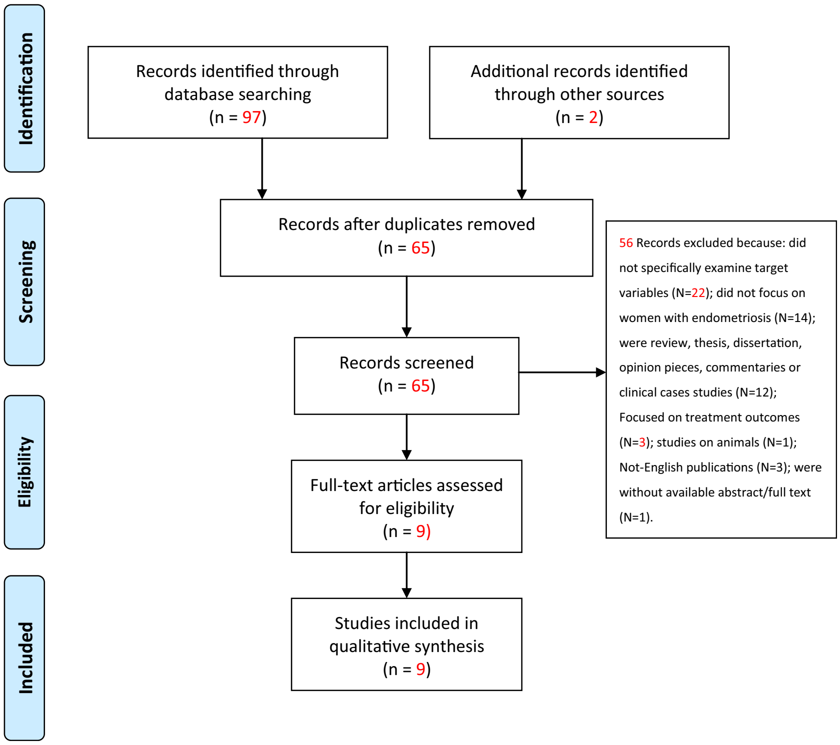

Fig. 1 Search results and screening

Table 1 Paper characteristics

Study	Level of evidence	C	Population	*N*	Age M (SD)	Recruitment methods
Carey et al. (2014)	3	USA	Women with endometriosis who have previously undergone surgery for CPP	79	36.4 (7.2)	Single tertiary referral center
Donatti et al. (2017)	3	BR	Women with endometriosis	171	35.9 (5.6)	Outpatient unit of endometriosis sector in a department of gynecology and obstetrics
Eriksen et al. (2008)	2	DK	Women with endometriosis with pain; women with pain-free endometriosis	20 women with pain; 43 women without pain	Women with pain = 33.1 (7.3); women without pain = 36.7 (7.0)	Department of Gynecology and Obstetrics at University Hospital
Huntington and Gilmour (2005)	3	NZ	Women with endometriosis	18	Nr	Support group
Martin et al. (2011)	3	USA	Women with endometriosis--associated CPP	114	Nr	Tertiary referral pelvic pain clinic
Nunnink and Meana (2007)	3	USA	Women with endometriosis with CPP	100	29.36 (5.94)	University, campuses, ob/gyn clinics, support group, web
Quiñones et al. (Quinones et al. 2015)	2	USA	Women with endometriosis; women without endometriosis (control)	29 Women with endometriosis; 29 women without endometriosis	Women with endometriosis = 29.1 (1.2); women without endometriosis (control) = 31.7 (2.4)	Endometriosis Research Program Patient Registry, database and support activities, notice boards, social media
Roomaney and Kagee (2016)	Na	RSA	Women with endometriosis	16	33 (nr)	Obstetrics and gynecology department at a tertiary academic hospital
Thomas et al. (2006)	2	NZ	Endometriosis-related CPP; CPP without endometriosis; non-pain controls	37 with endometriosis-related CPP; 24 with CPP without endometriosis; 37 non-pain controls	Endometriosis-related CPP 30.9 (8.6); CPP without endometriosis 31.7 (6.2); non-pain controls 32.9 (8.7)	Pelvic pain clinic, community (control group)

Study	Aims	Methodological design	Measures	Outcomes	Results	Limitations
Carey et al. (2014)	To examine pain and biopsychosocial correlates over time for women with persistent postsurgical pain after surgery for endometriosis	Cross-sectional observational	Short-form McGill Pain Questionnaire (SF-MPQ) Mental component summary—subscale of the 12 item Short-Form Health Survey Beck Depression Inventory	Pain (sensory and affective components; severity) Mental health Depression Catastrophizing-coping	Catastrophization was associated with higher affective pain scores, but not with higher pain total score, after surgery for endometriosis	Limited focus on catastrophization of pain

Table 1 (continued)

Study	Aims	Methodological design	Measures	Outcomes	Results	Limitations
			Coping Strategies Questionnaire (CSQ)—Catastrophizing subscale			
Donatti et al. (2017)	To investigate correlation between coping strategies, depression, levels of stress and perception of pain in patients with endometriosis	Cross-sectional observational	Visual analogue scale (VAS) Brief coping orientation to problems experienced (COPE) Beck Depression Inventory (BDI) Lipp's Stress Symptoms Inventory for Adults (LISS)	Pain Coping Depression Stress	Women with endometriosis who used positive coping strategies (i.e., focused on the problem) had better adaptation to stress and less depression	Diagnosis was not surgically confirmed. Few clinical information about the disease and demographics were reported
Eriksen et al. (2008)	To compare endometriosis patients with and without pain symptoms to see whether they differed in profile on four psychological parameters	Case-control observational	Visual analogic scale (VAS) Project-developed questionnaire Coping Styles Questionnaire (CSQ) Courthald Emotional Control Scale (CECS) Beck Depression Inventory (BDI) State-Trait Anxiety Inventory, Form Y-2 (STAI)	Pain severity Psychosocial impairment Coping Emotional inhibition Depression Anxiety	They found strong correlations in the group of women with endometriosis with pain between coping dimensions on the one hand, and levels of depression, anxiety, and psychosocial impairment on the other. Moreover, patients without pain had a higher tendency to suppress emotions when compared to patients with pain	Small sample size. Few demographic and clinical data were reported
Huntington and Gilmour (2005)	To explore women's perceptions of living with endometriosis, its effects on lives and strategies used to manage their disease	Cross-sectional observational (qualitative)	Semi-structured interview	Impact of endometriosis on lives and management strategies	Women with endometriosis change lifestyles (i.e., activity and nutrition) in order to manage pain and symptoms	No detailed demographic and clinical data were collected. Inclusion criteria were not reported. No detailed information (e.g., percentages) about findings
Martin et al. (2011)	To determine the biopsychosocial predictors of pain improvement among women with endometriosis	Prospective observational	Short-form McGill pain questionnaire (SF-MPQ) Mental component summary—subscale of	Pain (sensory and affective components; severity) Mental health Catastrophizing—coping	Pain severity at entry and at 1-year was more related to catastrophizing than demographic and conventional clinical	No exclusions were made based on pre-existing psychological and/or physical condition.

Table 1 (continued)

Study	Aims	Methodological design	Measures	Outcomes	Results	Limitations
			the 12 item Short-Form Health Survey Coping Strategies Questionnaire (CSQ)—catastrophizing subscale		variables. Catastrophizing predict pain at follow-up	Age M (SD) was not reported. Limited focus on catastrophization of pain
Nunnink and Meana (2007)	To investigate the accuracy of recall for pain experienced over a 30-day period, as well as potential psychological mediators of pain recall accuracy (e.g., passive and active coping)	Cross-sectional observational	Visual analogic scale (VAS) Coping Strategies Questionnaire (CSQ) Rand Mental Health Inventory Fertility Problem Stress Scale	Pain severity Coping Psychosocial well-being Stress-related to fertility issues	Women who exhibited a more passive coping style tended to recall pain as more intense than what they had recorded daily over the prior month. Passive coping seemed to be related to an overestimation of pain	No control was made over the pain-diary review
Quiñones et al. (Quinones et al. 2015)	To examine the relationship between HPA axis functionality, perceived stress, anxiety, and coping styles in a sample of women with endometriosis and healthy women	Case-control observational	Saliva samples State and Trait Anxiety Inventory (STAI) COPE Holmes and Rahe Stress Scale or Social Readjustment Rating Scale (SRRS) Visual analogic scale (VAS)	Cortisol levels Anxiety Coping Stressful events Pain severity	They found no significant differences between groups. Women with endometriosis and healthy women employed the same coping strategies equally when responding to a stressful event	Small sample size. Endometriosis was in part self-reported. No specific details on health status of control group were reported. Few clinical information about the disease and demographics of women with endometriosis were collected
Roomaney and Kagee (2016)	To explore how patients in a resource-constrained setting coped with living with endometriosis	Cross-sectional observational (qualitative)	Semi-structured interviews	Participants' experiences with endometriosis and coping strategies	Participants reported employing both problem-focused and emotion-focused strategies to cope with endometriosis. Problem-focused strategies included limiting physical activities, increasing knowledge about endometriosis, scheduling social and work activities around menstrual cycle, engaging in self-management and relying on social support. Emotion-focused coping	Qualitative study. Small sample size. No clinical information about the disease and demographics were collected. Improper setting for interviews (e.g., coffee shops)

Table 1 (continued)

Study	Aims	Methodological design	Measures	Outcomes	Results	Limitations
					strategies included accepting the disease, adopting a positive attitude, engaging in self talk and evoking spirituality	
Thomas et al. (2006)	To investigate whether the tendency to repress or suppress unwanted thoughts and emotions contribute to the experience of pain in patients with CPP	Case-control observational	Visual analogic scale (VAS) National Women's Sexual Pain Scale Marlowe-Crowne Scale of Social Desirability Bendig short-form of the Taylor Manifest Anxiety Scale White Bear Suppression Inventory State-Trait Anger Expression Inventory Sexual and Physical Abuse History Questionnaire	Pain (at the time of reporting; cyclic pain) Pain associated with sexual arousal and intercourse Emotional coping styles—repression Emotional coping styles—repression Emotional coping styles—thought suppression Emotional coping styles—suppression of anger Abuse reporting	Both CPP groups were more likely to be emotional suppressors when compared with the control group and reported significantly higher levels of thought suppression. Endometriosis patients were also more likely to be repressors of emotions when compared with controls. Suppression but not repression was related to higher levels of pain	Few clinical information about the disease and demographics were collected

BR Brazil, *CPP* chronic pelvic pain, *DK* Denmark, *na* not applicable, *nr* not reported, *NZ* New Zealand, *RSA* South Africa, *USA* United States of America observational. Seven of the selected studies reported quantitative data, while two were qualitative.

Participants

Qualitative papers reported 16–18 participants, while sample size of quantitative papers ranged from 29 to 171 for women with endometriosis and from 29 to 37 for healthy controls. The mean sample size of endometriosis women in quantitative studies was 69.6. Mean age of women with endometriosis ranged from 29.1 to 36.7.

Instruments

Qualitative studies assessed coping strategies by means of a semi-structured interview. Quantitative studies used a wide range of standardized questionnaires to assess coping strategies. Some studies used more than one measure. The majority of studies (3) assessed coping strategies by means of the Coping Strategies Questionnaire (CSQ). In particular, two of them utilized only the catastrophizing subscale of this questionnaire. Moreover, coping was assessed through the Coping Styles Questionnaire, the COPE inventory, the Courthald Emotional Control Scale (CECS), the White Bear Suppression Inventory, the State-Trait Anger Expression Inventory, the Marlowe-Crowne Scale of Social Desirability, and the Bending short-form of the Taylor Manifest Anxiety Scale.

Findings on behavioral, cognitive, and emotional coping strategies

Major findings will be discussed in the next sections. Selected studies (a) assessed in-depth characteristics of problem-focused and emotion-focused coping strategies utilized by women with endometriosis; (b) compared women with and without endometriosis as regard coping strategies; (c) evaluated the role of coping strategies on self-reported pain and mental health. One study (Thomas et al. 2006) was reported in both the second and the third paragraphs given its multiple findings.

Which coping strategies use women with endometriosis?

Two studies focused on the specific coping strategies adopted by women with endometriosis. Both Roomaney and Kagee (2016) and Huntington and Gilmour (2005) conducted a qualitative cross-sectional study administering and examining a semi-structured interview on women with endometriosis in order to explore in depth how this population lives and copes with the disease.

Findings showed that pain was the main self-reported stressor in living with endometriosis and that both problem-focused and emotion-focused strategies were utilized to deal with the disorder and its symptomatology (Roomaney and Kagee 2016). Scheduling everyday activities (i.e., social and working) around menstrual cycle, engaging in self-management (e.g., alleviating pain and discomfort through taking analgesics, relaxation, or controlling diet), and seeking for social support (in particular by family members and partners) were the main problem-focused coping strategies declared by participants in the study of Roomaney and Kagee (2016).

Moreover, most of them stated that they did not receive an adequate explanation of their disease and, as coping strategy, they conducted their own research (e.g., using Internet) in order to increase their knowledge (Roomaney and Kagee 2016). About emotion-focused strategies, they declared to try to reframe the way they thought to the disorder. Some participants tried to accept the disease and learn how to live with it, while some of them engaged in self talk in order to assure or encourage themselves, evoked spirituality (i.e., praying, speaking with God, reading the bible), and adopted a positive attitude towards the negative condition (Roomaney and Kagee 2016).

Nutritional management as coping strategy (e.g., reduce caffeine and estrogen foods, increase consumption of vegetable and fruit) has been found in both studies (Huntington and Gilmour 2005; Roomaney and Kagee 2016). Conversely, the two studies suggested different results as regard physical activity. The study of Roomaney and Kagee (2016) found that women with endometriosis tended to limit physical activity in order to manage pain; while, participants in the study of Huntington and Gilmour (2005) declared to increase levels of exercise to relief pain and improving mood.

Do women with endometriosis differ from healthy ones?

We found two studies assessing differences in coping strategies between women with endometriosis and healthy women (i.e., women without endometriosis or other gynecological disorder; Quinones et al. 2015; Thomas et al. 2006). Quinones et al. (2015) conducted a case-control study with the aim of evaluating problem-focused and emotional-focused coping skills differences between women with endometriosis and healthy ones. Their findings suggested that women with endometriosis and healthy women cope with stressful events using the same problem-focused and emotional-focused types of coping strategies.

At the contrary, the study of Thomas et al. (2006) reported differences in emotional coping strategies (i.e., tendency to repress or suppress unwanted thoughts and emotions) between women with endometriosis-related chronic pelvic pain (CPP), women with CPP without endometriosis, and non-pain women (healthy control). Findings suggested that women with endometriosis-related CPP if compared to healthy control were more likely to repress emotions. Similarly, both women with endometriosis-related CPP and women with CPP without endometriosis showed a higher tendency to suppress thoughts and emotions if compared to healthy women. Therefore, women with endometriosis and related chronic pain showed higher levels of repression of emotions and suppression of emotions and thoughts than healthy women. However, results about suppression could be related to the occurrence of high level of pain in this population, and not to the exclusively presence of the pathology.

Do coping strategies influence self-reported pain and mental health?

We found six studies focused on the influence of coping strategies on self-reported pain and mental health in women with endometriosis. In particular, Nunnink and Meana (2007) reported data on the role of passive coping on the overestimation of previous pain; Carey et al. (2014) and Martin et al. (2011) focused on the catastrophization of self-reported pain; Eriksen et al. (2008) reported the relationships between coping skills, pain, and emotional disorders; Donatti et al. (2017) explored the link between coping and mental health (i.e., stress and depression); finally, Thomas et al. (2006) focused on suppression of emotions and thoughts and its influence on self-reported pain.

The study of Nunnink and Meana (2007) aimed at investigating the accuracy of pain recall and the extent to which coping styles mediate pain recall accuracy in women with endometriosis who reported chronic pelvic pain. Participants completed a diary for a 30-day period, recording every day an average rating of pain intensity in a visual analogue scale (VAS). After this phase, they were assessed on current pain level, coping styles, and other psychological measures. During this step, a researcher asked them to recall their average pain during the diary period. Findings showed that a large proportion of the sample was relatively accurate in pain recall, and that inaccuracy usually skewed on overestimation of pain. They found that women who exhibited a more passive coping style (i.e., feeling of helplessness to deal with the stressor and relying on others to resolve the stressful event or situation) were more likely to recall pain as more intense than they recorded daily over the prior month (Nunnink and Meana 2007). This leads to the suggestion that passive coping could be related to a catastrophization of pain in this population. Catastrophizing can be described as a cognitive negative amplification of pain-related thoughts that includes rumination (i.e., thinking repetitively to pain), magnification (i.e., concerning exaggeratedly to negative consequences of pain), and helplessness (believing the pain will not change) (Sullivan 2009).

The catastrophization of pain symptoms in women with endometriosis and chronic-related pain was investigated by both Martin et al. (2011) and Carey et al. (2014). The study of Martin et al. (2011) assessed pain and catastrophizing (i) at entry, and (ii) 1-year follow-up in a sample of women with endometriosis-associated chronic pelvic pain. Their findings suggested that biopsychosocial factors, specifically catastrophizing, may play a key role in pain experience. In particular, catastrophizing accounted for 21% of the variance of pain at baseline and significantly predicted pain at follow-up. Moreover, at entry and at follow-up, pain severity was more related to catastrophizing than to conventional demographic and clinical variables (Martin et al. 2011).

Carey et al. (2014) assessed pain catastrophizing in women with endometriosis with persistent postsurgical pain (PPSP) who have previously undergone surgical intervention for chronic pelvic pain. Likewise Martin et al. (2011), their results showed an association between catastrophization of pain and persistent postsurgical pain outcomes in women with endometriosis. However, unlike Martin et al. (2011), Carey et al. (2014) found a relationship only between catastrophization and the affective pain scores. No association was found between pain catastrophizing and total pain scores. They found that higher pain catastrophizing results in higher affective dimension of pain (e.g., feeling tiring, sickening, fearful, punishing, wretched because of pain). These results suggested a pivotal role of affection/emotions related to the experience of pain and coping strategy (i.e., catastrophization).

The relationship between coping strategies, pain, and emotional disorders/psychosocial impairment in women with endometriosis has been deeply investigated by Eriksen et al. (2008). In their study, they compared endometriosis patients with and without pain symptoms to understand whether they differed in profile on psychological parameters (e.g., coping strategies). Their results found in the group with pain a negative correlation between rational/detached coping styles and anxiety/depression and a positive correlation between emotional/avoidant coping styles and anxiety/depression. Therefore, detached and rational coping styles seem to be related to better mental health, while both emotional and avoidance coping styles to a poor mental status. These results support the hypothesis that coping styles are mediator of the emotional response to pain and of the degree to which pain affects psychosocial functioning. Moreover, patients without pain had a higher tendency to suppress emotions when compared to patients with pain.

The relationship between coping strategy and mental health (i.e., stress and depression) in a group of women with endometriosis has been investigated also by Donatti et al. (2017). In this study, they found that most of participants (66%) used positive coping strategy (i.e., focused on the problem), while 26.9% of them used adaptive coping focused to emotions, and only 6.7% declared to utilize unadaptive coping focused to emotions. Moreover, their results suggested a close relationship between coping strategy with depression and stress. Indeed, more stressed and depressed women were those who used more than one unadaptive coping strategy focusing on emotions, while less stressed women utilized more positive strategies focused on the problem (Donatti et al. 2017).

Finally, suppression in relation to self-reported pain in women with endometriosis has been investigated by Thomas et al. (2006), reporting a relationship between suppression and the severity of self-reported pain. In particular, their results suggested that higher levels of suppression were related to higher levels of self-reported pain. No relationship was instead found between repression and pain in this population.

Methodological issues of studies

The interesting findings reported in this critical narrative review are partially limited by some methodological biases concerning studies design, levels of evidence, recruitment methods, instruments, main topics, and lack of demographics or clinical information.

As regards study design, the majority of them was cross-sectional observational. Cross-sectional study does not allow to infer a cause-effect between the variables, limiting conclusions as regard their association (Levin 2006). Moreover, few studies compared the group of endometriosis women with a group of healthy women, and only one was a prospective observational study.

Furthermore, one study in part recruited patients with self-reported diagnosis of endometriosis not clinically verified. This could constitute an important selection bias, since researcher did not know if the disease was really present. Furthermore, a part of these studies lack of demographic and clinical information. Most of them did not report clinical information like the stage of the disease, the localization, comorbidities, or current and past treatments. The lack of clinical information introduces an important bias in interpreting findings, as they could affect answers of these women and the way they cope with their disorder. Moreover, a part of these studies lack of demographical information such as marital status, education, actual employment, as well as mean age and standard deviation. The absence of demographic information does not allow to generalize and compare findings.

Instruments showed a series of limitations. A large part of studies utilized the CSQ and focused on coping strategies in relation to pain, considered as the main stressor in a life of women with endometriosis. However, even if pain is a significant stressor for a wide range of women with this disorder, it is not the exclusive. Focusing only on distress related to pain reduces the possibility of comprehension of the way these women cope with their disease. Other factors, such as the difficulty in treatment, the related-infertility, the sexual dysfunction, or couple difficulties, could be considered as everyday-stressors in the life of women with endometriosis. Moreover, we should consider that pain is present only in almost a half of women with endometriosis and usually it is treated and reduced with medical treatment (Fauconnier and Chapron 2005).

Finally, some study utilized too long questionnaires. This choice, especially in medical settings, could lead to difficulties in the administration and to a decrease in participation and validity of findings (Galesic and Bosnjak 2009).

Discussion

Findings lead to several and mixed conclusions due to the heterogeneity of aims, target, and outcomes of these studies. Main conclusions could be resumed in the following points: (a) pain is considered the major stressor for this population and the most investigated in association with coping; (b) women with endometriosis declare to use both adaptive (e.g., seeking for social support, self-management, acceptance, increasing exercise, nutritional changes) and maladaptive (e.g., limiting physical activity, repress emotions) coping strategies; (c) women with endometriosis seem to utilize the same problem-focused and emotional-focused coping strategies of healthy women, while ones with related CPP were more likely to repress emotions; (d) there is a relationship between suppression of emotions and specific coping styles or strategies (i.e., passive coping, catastrophization) and the experience of pain; indeed, suppressing own emotions, pain catastrophizing, and having a passive coping style have been related to higher self-reported pain; (e) coping strategies focusing on emotions, detached and rational coping styles as well as positive strategies focused on the problem seem to be related to better mental health, while emotional and avoidance coping styles to a poor mental status.

These findings are particularly interesting if we consider the pivotal role of these factors on different outcomes of physical and mental disorders (Collins et al. 2009; Compare et al. 2013; Compare et al. 2014; Jensen et al. 1991; Stowers Johansen and Kohli 2012; Taylor and Stanton 2007; Zarbo et al. 2013). In particular, catastrophization is considered an important determining factor of both short- and long-term pain-related outcomes and has widely been associated with higher pain levels in a variety of physical conditions (Buer and Linton 2002; Edwards et al. 2006; Hanley et al. 2008; Sullivan et al. 2006; Turner et al. 2002). Likewise, suppression of emotion/emotion inhibition is known to have negative physical and mental consequences (Chapman et al. 2013; Cordova et al. 2003; Quartana et al. 2010; Slatcher and Pennebaker 2007).

Suggestion for future research

From this critical narrative review emerges the need to overcome abovementioned methodological limitations and increases the range of knowledge on these topics, especially in European countries. Due to the complexity of the disorder and the severe impact on women's quality of life, rigorous qualitative research should be supported (Denny and Khan 2006).

Future research should focus on a wider range of behavioral, cognitive, and emotional coping strategies (such us acceptance, positive appraisal, refocusing on planning, self-blame, rumination, etc.) and perform innovative studies on emotional intelligence and metacognition in this specific population. This is an important point if we consider the role of these factors for a wide range of physical and mental outcomes (Butow et al. 2015; Cook et al. 2015; Key et al. 2008; Kvillemo and Branstrom 2014; Meints et al. 2016; Sica et al. 2007; Spada et al. 2016).

Furthermore, future research should study catastrophizing as a cognitive coping strategy for a range of stressful condition in this population (e.g., issues related to couple, family, infertility, sexuality, or work).

Finally, there is the need to develop studies including control groups and with a longitudinal design. Including a control group is a resource for a study as it allows to identify factors that may contribute to a medical condition or to identify predictors of an outcome (Mann 2003). Longitudinal design may allow to evidence how these factors affect subsequent quality of life or mental health. Coping strategies, emotional intelligence, and metacognitive beliefs could be studied as risk or protective factors for subsequent outcomes in endometriosis population.

Conclusion

Concluding, despite the importance of these findings, "limited evidence" emerges from this review. Indeed, only few studies with mixed results and some methodological flaws have focused on coping strategies in women with endometriosis. No studies focusing on metacognition or emotional intelligence were found.

In addition to effectiveness and safety of care, patient-centeredness and particular attention in clinical practice should be encouraged (Dancet et al. 2014). Due to the association between uncertainty about the disorder and emotional distress (Lemaire 2004), increasing information and support given to this population is crucial.

These findings have significant implications on clinical practice. Focusing on coping strategies used by women with endometriosis is significant for health professionals as it allows to take into account the way these women adapt to the disease as well as prevent from the onset of mental disorders. In this context, crucial is the close collaboration between health professionals (doctors, gynecologists, psychologists, behavioral health specialists, etc.). Hopefully, gynecological examination, both in the department and in the outpatient clinic, should provide for the support of mental health professionals able to evaluate coping strategies. Investigating coping strategies is particularly significant in this setting as they could be considered to improve the compliance between patients and doctors as well as lay the foundations to develop specific treatments or preventive programs for women with endometriosis.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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