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A PSYCHOSOMATIC PERSPECTIVE ON ENDOMETRIOSIS – A MINI REVIEW –

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Citation: Ledermann, K. (2023). A psychosomatic perspective on endometriosis – a mini review. Cortica 2(1) 197-214 https://doi.org/10.26034/cortica.2023.3778

INTRODUCTION

Chronic pelvic pain is defined as the presence of continuous or intermittent pain symptoms perceived in the pelvic area that last for at least 3 to 6 months (Brawn et al., 2014). Endometriosis is considered the most frequent reproductive tract-related cause of pelvic pain (Shin and Howard, 2011). Endometriosis is an estrogen-dependent gynecological disorder defined as the presence of endometrium-like tissue outside the uterine cavity, primarily on the pelvic perineum and pelvic organs, usually affecting women of reproductive age, typically between 25 and 35 years (Bulun et al., 2009).

It is an extremely disabling and long-term medical condition (Vigano et al., 2004),

characterized by the presence of endometriallike 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).

As these symptoms and complications are not specific to endometriosis and may be signs of other gynecological or non-gynecological conditions such as pelvic inflammatory disease, irritable bowel syndrome, and adenomyosis, endometriosis is often misdiagnosed or diagnosed with a significant delay (Huntington and Gilmour, 2005).

Since a definitive diagnosis is usually made by laparoscopy, timely diagnosis can be difficult, especially if lesions are deep or cannot be observed; therefore the exact prevalence in the general population remains unknown (Vigano et al., 2004). It is estimated to reach 5%-10% of the female population, and 30%-50% of infertile women, representing around 176 million women affected worldwide (Vigano et al., 2004; Armour et al., 2019).

Endometriosis varies from a mild disease with only peritoneal lesions to severe forms involving both ovaries associated with infiltrating lesions and extensive adhesions. Women with this disorder may have a range of pelvic and abdominal pain symptoms that vary significantly among patients and do not always correlate with the severity of endometriosis (Apostolopoulos et al., 2016).

Some women with endometriosis suffer from chronic disabling pain whereas others appear symptom free, apparently independently of the disease stage; i.e., patients with mild endometriosis may suffer from severe pain symptoms, and vice versa (Apostolopoulos et al., 2016). There may be purely physiological explanations to this inverse relationship, such as decreased sensitivity to scar formation, but psychological factors could also influence pain experience in various ways. Affective state, attention, interpretations, and beliefs about the pain (e.g. about its cause, duration, and controllability) are important elements of pain perception, which modify pain experience. In the past years, it has become clear that psychological factors such as pain catastrophizing, pain pain anxiety and vigilance are important determinants contributing to pain perception (Dysvik et al., 2004).

Chronic pain is associated with an impairment of health-related quality of life and interferes with many aspects of a persons' life by causing high levels of physical and emotional stress (Lerman et al., 2015). The impact of endometriosis is far reaching, affecting numerous interrelated including aspects psychological, physical, reproductive, relational and quality of life (Vitale et al., 2016). Furthermore, endometriosis-related pain symptoms may significantly impair physical, mental, and social well-being; and infertility itself may cause psychological stress, low selfesteem and depression (Facchin et al., 2015; Roomaney and Kagee, 2018).

The etiology of endometriosis is still unknown, but women with this disease report more stress, anxiety pain, and negative impact on daily life activities than women who have other pain syndromes (e.g. migraines or irritable bowel syndrome (Facchin et al., 2015; Aredo et al., 2017).

As a result of its chronic manifestation, 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 are often extensive

and deserve particular attention (Culley et al., 2013; Pope et al., 2015; Vitale et al., 2016).

There are only a few previous articles specifically focusing on a psychosomatic perspective of this debilitating disorder. We will therefore review articles considering the psychological and/or somatic features of endometriosis and also discuss the complex interplay between psychological and somatic characteristics of this disorder. Furthermore, we will present a psychosomatic treatment model originating from chronic pain therapy particularly taking the psychological features of endometriosis into account.

METHODS

The present article is a narrative overview, as it provides a comprehensive overall synthesis of previously published information regarding psychological factors and management of endometriosis from а psychosomatic perspective. It discusses critically the state of the art of understanding and managing endometriosis from а psychosomatic theoretical and contextual point of view. Five main topics will be covered and discussed: pathogenesis of endometriosis, endometriosis and psychological features, endometriosis and psychiatric comorbidity, early life stress as predisposing factor for pain sensitization; and implications for treatment. The literature search was carried out between June-August 2019 in the electronic database PubMed/Medline, with the following key words: "psychological factors" OR

"psychosomatic perspective" OR "psychiatric co-morbidity" OR "depression" OR bipolar" OR "mood disorders" OR "anxiety" OR "trauma" OR "stress OR "psychosocial factors" OR "personality traits" OR "bio-psycho-social model" OR "psychological management" OR "pain management" AND "endometriosis". Scientific reports, review articles, metaanalysis and guidelines published in the last 15 years in English language were included. Further relevant papers were extracted by clicking the icon "Related Articles" shown along with a pertinent citation in PubMed, and from the reference lists of located articles.

RESULTS

Etiology of endometriosis

Although there are now two established etiological concepts, the metaplasia theory (Zubrzycka et al., 2015) and the dissemination theory (Halme et al., 1984), the exact pathogenesis of endometriosis is still unknown. The dissemination hypothesis is the most widely accepted, supported bv observations that retrograde menstruation and intraperitoneal spillage of viable endometrial cells occur frequently in cycling women and more commonly in those with genital outflow tract obstruction (Halme et. al 1984).

Retrograde menstruation and increased exposure to menstrual flow (lower parity, short menstrual cycle interval, earlier menarche, lean body mass) have been identified as risk factors for endometriosis (Giudice and Kao, 2004). Gene-related factors such as ethnicity,



affected first-degree family members, hormonal factors and life style factors are known to be associated with an increased risk of developing endometriosis (Brosens et al., 2013; Peterson et al., 2013). Furthermore, it is assumed that specific environmental factors as well as immunological mechanisms influence the clinical manifestation of the disease (Berkkanoglu and Arici, 2003).

To explain pain perception and experience associated with endometriosis, a stress-model can be purported according to which subjective experience and interpretations of pain mediates the level of mental (emotional) and physical functioning. How a woman endometriosis affected by responds emotionally to the experience of pain (e.g. with depression or anxiety) results from an appraisal of the nature and implications of pain. The appraisal also determines which actions are perceived as useful ways of coping with the pain. The overall level of functioning is thus determined both by the emotional response to pain and the behavioral efforts aimed at coping with the pain, all based on beliefs about its nature (e.g. its cause, durability, and curability) and how it is best managed, or if it is at all manageable (Jensen et al., 1991).

Emotional neglect and maltreatment during childhood as predisposing factors Childhood abuse and neglect have been recognized as childhood stressors that impact long term health and could play a role in the etiology and/or clinical signs of endometriosis through influences on inflammation, menstrual cycle characteristics or chronic pelvic pain (Harris et al., 2018). Prevalence rates of sexual abuse in childhood in women with endometriosis have been reported to be around 20% (Wegman and Stetler, 2009), physical abuse between 25 and 50% (Norman et al 2012) and emotional abuse between 12 and 48% (Ghiasi et al., 2019). Specific environmental factors in childhood as well as immunological mechanisms have been suggested influence the clinical to manifestation of the disease (Berkkanoglu and Arici. 2003). In particular, associations between emotional abuse experiences/ emotional neglect and the development of pain conditions in endometriosis have been reported (Tietjen et al., 2010).

Exposure to violence during childhood and adolescence and higher endometriosis risk has been reported in a large cohort study (Harris et al., 2018). Both physical and sexual abuse were associated with endometriosis risk, with abuse severity, chronicity and accumulation of types of abuse each being associated with an increased risk (Harris et al., 2018). Furthermore, Harris et al. (2018) reported a stronger association between abuse and endometriosis presenting with pain symptoms versus asymptomatic endometriosis.

A recent study investigated whether exposure to different forms of childhood maltreatment is associated with endometriosis (Liebermann et



al., 2018). The study found that women with a diagnosis of endometriosis reported significantly more often sexual abuse, emotional abuse and neglect in childhood as well as inconsistency experiences in parenting behaviour than female controls. However, no such differences could be shown with regard to physical abuse and neglect experiences (Liebermann et al., 2018). Any combination of childhood maltreatment was reported more often in women with endometriosis compared to healthy controls. Another study found no association between sexual abuse above the age of 14 and a diagnosis of endometriosis (Schliep et al., 2016). Several factors support a role of maltreatment during childhood in the risk of developing painful endometriosis. A meta-analysis pointed out that people who report childhood abuse or neglect have more pain symptoms compared to those not exposed to such trauma, and that patients with chronic pain are more likely to report childhood trauma (Davis, Luecken, & Zautra, 2005).

Increasing evidence supports a significant association between the occurrence of early life stress or adversity, and an increased incidence of chronic pain later in life by inducing persistent sensitization of the central stress response systems. including dysregulation of the hypothalamic-pituitaryadrenal (HPA) axis (Low & Schweinhardt, 2012; Nicol et al., 2016 (Heim et al., 1998). Aberration of the HPA axis leading to hypocorticsolism has been suggested to result in a symptom triad of high stress sensitivity, fatigue and pain (Heim et al., 2000). The

resulting abnormal stress reactivity may also lead to both sustained psychological stress in adulthood and depression and anxiety disorders later in life (Sinaii et al. 2002).

Endometriosis and psychiatric comorbidity Several epidemiological studies have shown that mood and anxiety disorders frequent in women are more with endometriosis than in general population .(Sepulcri Rde and do Amaral, 2009: Cavaggioni et al., 2014; Pope et al., 2015). A review of psychological symptoms experienced by women with endometriosis indicated prevalence rates of 86% for depression, 29% for moderate to severe anxiety and 68% for mood disturbances, which is significantly higher than the prevalence of these disorders within the normal population (Saccone et al., 2017). Furthermore, a recent study reported at least mild anxiety (>79%) and depression (>54%) in women with endometriosis (Gonzalez-Echevarria et al., 2019). Almost half (45.8%) had moderatesevere levels of anxiety and a third (33.4%) had moderate-severe levels of depression (Gonzalez-Echevarria et al., 2019).

A recent systematic review reported that endometriosis is frequently associated with a number of psychiatric symptoms related to depression and anxiety, increased stress and poor quality of life, often comorbid with each other and associated with increased general distress and alexithymia (Pope et al., 2015). De Sepulcri and do Amaral (2009) found that

of 109 endometriosis patients, 86 and 87% reported depressive and anxiety symptoms, respectively, along with reduced quality of life. Moreover, a significant positive correlation between age and depression was reported by these authors, whereas current pain intensity was positively associated with anxiety (Spulcri & Do Amaral, 2009). In 2016, a longitudinal study showed that women with endometriosis had an elevated risk of developing major depression, any depressive disorder, and any anxiety disorder compared to those without endometriosis (Chen et al., 2016).

Several authors suggested that the relationship of endometriosis with the risk of subsequent depression and anxiety disorders dysregulated could explained by be immunological and inflammatory reactions (Dowlati et al. 2010, Drosdzol-Cop and Skryzulec-Plinta 2012). According to another study 59% of patients were affected by at least one psychiatric disorder, which, moreover, was significantly correlated with pain symptoms (Vannuccini et al., 2018). These authors also reported a positive association between pain intensity and higher incidence of psychiatric disorders (Vannuccini et al., 2018). Nevertheless, in recent years, there has been a growing number of studies suggesting that not all women with endometriosis are necessarily more distressed than healthy women, despite the indisputable number of challenges involved by the disease (e.g. (Facchin et al., 2015; Facchin et al., 2016; Facchin et al., 2017). Furthermore, Facchin et al. 2016 showed that the severity of chronic

pelvic pain can be increased by a tendency towards anxiety and catastrophism (i.e. harm avoidance) (Facchin et al. 2016). The same authors also suggested that distressed endometriosis patients, i.e. those with high levels of anxiety and depression, present an overall negative sense of female identity, with lower self-esteem and worse body image relative to non-distressed patients (Facchin et al., 2016; Facchin et al., 2017).

Catastrophizing

The onset and chronification of pain is known to impact negatively physical and mental wellbeing (Bergman et al., 2004). Pain catastrophizing, broadly defined as tendency to focus excessively on pain, exaggerates the threat value of pain by cognitive negative amplification of pain-related thoughts. Clinically important ones include rumination (i.e. thinking repetitively to pain), magnification (e.g. concerning exaggeratedly to negative consequences of pain), and helplessness (believing the pain will not change) (Sullivan et al., 2006). Pain catastrophizing has been consistently associated with a wide range of health-related outcomes, including pain intensity, interference of pain with patients' life, physical disability, and mental well-being (Quartana et al., 2009). Individuals, who tend to catastrophize, interpret pain as extremely threatening, causing an exaggerated negative orientation toward pain and making it impossible to shift attention away from painful signals.



The phenomenon in which it seems impossible to shift attention away from possible painful signals is known as "pain hypervigilance" (Sullivan et al., 2001). The Fear Avoidance Model by Lethem et al. (1983) suggests that a hypervigilant person with a tendency to catastrophize experiences more intense pain and increased emotional distress as this hypervigilant person is constantly scanning the body for somatic sensations (Lethem et al., 1983). As a consequence, these individuals disengage from physical, social and sexual activities leading to a vicious cycle of constant occupation with the pain.

Studies on pain catastrophizing of pain symptoms in women with endometriosis found that catastrophizing accounted for both 21% of the variance in pain at baseline and significant pain at 1-year follow-up (Martin et al., 2011). Furthermore, pain severity was stronger related to catastrophizing than to conventional demographic and clinical variables (Martin et al., 2011), indicating a need to emphasize catastrophic thoughts for pain perception in the treatment of pelvic pain and endometriosis.

Another study found a relationship between pain catastrophizing and affective pain scores only, but no association between pain catastrophizing and total pain scores (Carey et al., 2014). Higher pain catastrophizing results in higher affective dimension of pain (e.g. feeling tiring, sickening, fearful, punishing, wretched because of pain) suggesting a pivotal role of affection/emotions related to experience of pain and catastrophizing (Carey et al., 2014). A recent study looked at pain catastrophizing and health related guality of life in endometriosis and found that higher pain catastrophizing, more severe chronic pelvic pain and more severe dysmenorrhea and abdominal wall pain were independently associated with worse health related quality of life (McPeak et al., 2018). Furthermore, a study investigating pain cognition in women with endometriosis found a higher level of catastrophizing, fear of pain, and hypervigilance to pain compared with controls (van Aken et al., 2017). Taken together, this indicates that pain cognitions evidently influence pain perception in women with endometriosis. Accordingly, а multidimensional treat approach to endometriosis-related pain by adding elements of cognitive-behavioral therapy for women with negative pain cognition has been suggested (van Aken et al., 2017).

Quality of life (QoL)

According to the World Health Organization, QoL is defined as a multi-dimensional construct of the individual perception of one's position in life in the context of culture and value systems in relation to goal expectations, standards, and concerns (Fleck et al., 2000). Endometriosis has been reported to detoriate multiple domains in women's lives, including daily activities, social relationships, family planning and work productivity (Fairbanks et al., 2017). An integrative review of the healthrelated QoL burden in women with

endometriosis found worse QoL scores than in healthy women in several domains, including physical functioning, bodily pain, social functioning, role-emotional, mental health, general health and validity (Marinho et al., 2018). Another study differentiated between endometriosis-related three main pain syndromes, namely chronic pelvic pain, dysmenorrhoea and dyspareunia in a Turkish sample of women with severe endometriosis. That study reported a negative correlation with physical, social and environmental domains of QoL in women with dysmenorrhoea, although not in QoL domains in those with chronic pelvic pain and dyspareunia (Kiykac Altinbas et al., 2015)

Coping strategies

Numerous chronic pain studies clearly demonstrate that coping with pain symptoms affects pain experience per se, as well as the extent to which pain affects psychological and physical functioning. Coping strategies refer to a wide range of behavioral, emotional and cognitive efforts to manage stressful events (Jensen et al., 1991; Taylor and Stanton, 2007). The way a person copes with a stressor can mitigate or exacerbate the level of experienced stress, leading to a series of positive or negative mental and physical outcomes.

Studies have consistently shown pain is the most important stressor reported by women living with endometriosis (Roomaney and Kagee, 2016; Zarbo et al., 2018a) and that both problem-focused and emotion-focused coping strategies are used to deal with the disorder and its symptomatology (for review see (Roomaney and Kagee, 2018; Zarbo et al., 2018a)). Problem-focused coping strategies reported by participants of Roomanev and Kagee's study were scheduling everyday activities around the menstrual cycle, engaging in selfmanagement strategies (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) (Roomaney and Kagee, 2018).

Identified emotion-focused strategies were trying to reframe the way to think about the disorder, trying to accept the disease and learning to live with it. Furthermore, engaging in self talk, evoked spirituality (i.e., praying, speaking with God, reading the bible) and adopting a positive attitude towards the negative condition were mentioned (Roomaney and Kagee, 2018). Identified maladaptive coping strategies were limiting physical activity and repression of emotions (Roomaney and Kagee, 2016).

Remarkably, most of the patients stated that they had not received an adequate explanation for their disease. So, as a coping strategy, they had started out to conduct research on their own, for instance with a search on the internet, in order to fill in their knowledge gaps (Roomaney and Kagee, 2016).



There are notable differences in terms of coping strategies in patients with endometriosis with versus without pain. Patients with pain showed a significant negative correlation between rational/detached coping styles and anxiety or depression, whereas those without pain had a higher tendency to suppress emotions (Eriksen et al., 2008). These observations may suggest that coping styles are one mediator of the emotional response to pain and of the degree to which pain affects psychosocial functioning (Eriksen et al., 2008).

A recent study suggests a close relationship between coping and mental health outcomes (i.e. stress and depression) in women with endometriosis (Donatti et al., 2017). The authors found that women with endometriosis who used positive coping strategies reported less depression, stress and pelvic pain and less stress was alos reported by those using more problem-focused coping. In turn, women who used more maladaptive coping strategies reported more stress and depressive symptoms (Donatti et al., 2017).

Articles looking at nutritional management and physical activity as coping strategies found that for instance reducing caffeine and estrogen-containing foods on the one hand and increasing consumption of vegetables and fruit on the other were beneficial for women with endometriosis (Roomaney and Kagee, 2016). Regarding physical activity, one study found that women with endometriosis tended to limit physical activity in order to manage pain (Roomaney and Kagee, 2016). Contrary to this, another study found that women increase their level of exercise to reduce pain and improve mood (Huntington and Gilmour, 2005).

Emotion regulation

A recent study investigated the relationship between emotion regulation, pain symptoms and psychological variables including anxiety, depression and distress in women with endometriosis (Marki et al., 2017). They found that both greater physical pain and difficulties in emotion regulation were associated with lower quality of life mediated by psychological stress (anxiety, depression and distress) in women living with endometriosis. This may suggest that persistent pain and dysregulation in negative emotions can reinforce each other, whereby leading to stronger pain symptoms (Gatchel, 2004).

Personality factors and personality disorders The influence of personality factors and personality disorders in endometriosis is very limited, even though the literature on the influence of personality factors and personality disorders in other chronic pain conditions is rapidly expanding (Conrad et al., 2013). A polish study looked at personality and beliefs about pain control in women with endometriosis and found a positive correlation between internal pain control and pain reports (Bylinka and Oniszczenko, 2016). State and trait anxiety correlated positively with pain severity in a sample of Portuguese women



with endometriosis (Sepulcri Rde and do Amaral, 2009). А study investigating temperament and character dimensions in women with endometriosis found lower novelty seeking in women with endometriosis compared to healthy women but concluded that there was no specific personality profile for women with endometriosis (Facchin et al., 2016). Older studies found higher level of psychoticism, anxiety and introversion in women with endometriosis compared to women who suffer pain by other factors (Low et al., 1993).

A study looking at personality traits, beliefs about parenthood and mindfulness abilities between infertile women with and without endometriosis reported that perfectionism as personality trait predicted quality of life related to fertility (Zarbo et al., 2018b). A recent Swedish nation-wide cohort study looked at psychiatric disorders and later diagnosis of endometriosis (Gao et al., 2020). They reported that women with personality disorders had more likely a later diagnosis of endometriosis. Taken together there are not many studies that looked specifically how personality factors in women with endometriosis influence their pain and disease perception and management. Investigation of personality factors could help identifying and treating women with endometriosis that suffer more or are more resistant to treatment and therefore more vulnerable to enter the vicious cycle of chronic pain, suffering and disability.

Treatment

Current treatment approaches for endometriosis-related pain predominantly fit within a biomedical model of illness with treatment aiming to restore health by attenuating or removing the disease through laparoscopic procedures. Current pain therapies often involve various pharmacological and surgical treatments, and the symptoms of endometriosis are frequently treated with estrogen-gestagen combinations or gonadotropin-releasing hormone (GnRH) agonists to block the menstrual cycle.

However, many such interventions do not sufficiently affect pain and pain relapses are possible (Fedele et al., 2004). Based on the finding of a high prevalence of psychological consequences associated with endometriosis, psychological interventions have explicitly been emphasized in the treatment of endometriosis. However, only rarely have investigated effects studies of health psychological interventions for women with endometriosis, and controlled studies are particularly few in number. Meissner et al. showed that psychotherapy with somatosensory stimulation lead to significant improvement in overall pain, physical and mental QoL at 3-month follow-up in 67 endometriosis patients randomly assigned to the intervention (n=35) compared with a waiting list control group (n=32). These positive effects proved to be table at 6 and 24 months after the intervention (Meissner et al., 2016).

An intervention comprising hormonal therapy and progressive muscle relaxation has been shown to improve QoL and mood symptoms in patients with endometriosis (Zhao et al., 2012). Another study found that pain symptoms in endometriosis improved with mindfulness training (Evans et al., 2019). Mindfulness intervention helps women to cultivate a flexible attentional capacity for detached observation of pain, serving as a tool with lasting positive effects on QoL and psychological wellbeing. Another study using mindfulness training, visualization techniques, counseling, group support, and patient education with a specific focus on fatigue, QoL, job, relationships and family issues reported a global long-lasting improvement on health-related QoL at 6-year follow-up (Hansen et al. 2017).

Taken together, the existing literature reports positive effects on short- and long-term outcomes of psychological interventions with a main focus on endometrioses-related symptoms, especially pelvic pain. However, qualitative research suggests that psychological interventions should not be exclusively focus on pain-related outcomes, as endometriosis can cause a disruption of both biographical continuity and women's sense of female identity (Facchin et al., 2017). In spite of an apparent need to integrate endometriosis into a woman patient's history, several clinicians consider themselves not adequately trained to understand and provide psychosocial care to women with endometriosis. There is an increasing need for professional training opportunities and the development of clinical guidelines that address psychosocial issues of endometriosis (Young et al., 2017).

Physical activity has been identified as a possible protective factor for endometriosis, as protective effects of regular physical activity on other disorders involving inflammatory processes have been shown (Demarzo et al., 2008). A systematic review and meta-analysis on the association between endometriosis and physical activity concluded that although physical activity may reduce the risk of the disease, but there is no definitive support for the hypothesis that physical activity is a protective factor (Ricci et al., 2016).

A qualitative study with15 women undertaking yoga group therapy reported that women felt yoga was beneficial in controlling pain. The women reasoned that this effect occurred in part through awareness of the integration of the mind, body and breath as well as a feeling of being psychosocially supported by the group (Goncalves et al., 2016; Gonzalez-Echevarria et al., 2019).

An RCT from Germany examined Systematic Autoregulation Therapy (SART) involving Chinese medicine and psychotherapy including hypnotherapy, CBT and mindfulness compared to a waitlist control condition. They found improved pain, anxiety and depression scores 3 months after the SART intervention (Meissner et al., 2016). At 6 months, waitlist participants received treatment, while the



original intervention group continued with their previous treatment. Scores for the original intervention group were similar to postintervention improvements, with the former waitlist group showing similar improvements. At 24 months, sustained improvements in pain, depression and anxiety were reported in both groups. An RCT from China compared 12 weeks of usual care augmented with progressive muscle relaxation (PMR) with usual care alone and found improved pain, anxiety, depression, fatigue scores in the treatment group compared to usual care (Zhao et al., 2012).

In an RCT study from Portugal 10 sessions of physical therapy were combined with CBTbased psychotherapy. Results indicated significant improvements in pain and depression scores from baseline to postintervention. However, there were no postintervention outcomes reported for the usual care control group, limiting the interpretation of intervention effects (Lorencatto et al., 2007). Applying a similar design combining physical therapy with CBT for 10 weeks, another study showed significant improvements in stress and fatigue but not pain perception. In women with endometriosis, cortisol levels at baseline were higher than in healthy control women but post-treatment approached those of controls (Friggi Sebe Petrelluzzi et al., 2012).

Effects of a 10-week mindfulness and psychotherapy intervention were examined in 10 women from Denmark. Immediately postintervention, pain and fatigue had significantly improved. Similar effects could be observed after 6 six months, 12 months and even 6 years suggesting long term maintenance of improvements in pain and fatigue (Evans et al., 2019).

A recent systematic review of psychological and mind-body interventions for pain and associated outcomes in patients with endometriosis concluded that pain had improved in 89% of the included studies (Evans et al., 2019). Furthermore, all studies that included anxiety and / or depression reported a reduction in symptoms and the same could be observed in terms of fatigue and stress. Therefore, psychological and mind-body interventions are very promising means to improve endometriosis-related pain, anxiety, depressive symptoms, stress and fatigue.

Implications for treatment

Taken together, numerous recommendations are made as guidelines for psychosomatic practice (e.g. (Fava and Sonino, 2009)). It is suggested that a comprehensive assessment based on the psychosomatic conceptualization of endometriosis is being conducted using validated questionnaires, targeting psychiatric comorbidity, quality of life, pain catastrophizing, early traumatic experiences, emotion regulation and psychosocial factors.

Furthermore, psychoeducation about endometriosis from a biopsychocultural understanding should be provided (for review



see (Van Niekerk et al., 2019)). This should including aspects of development of persistent influence of psychological pain. and psychosocial factors, psychiatric comorbidity, aspects of relationships and sexuality. Appropriate interventions for endometriosis related pain and psychological distress may include elements of CBT including protocols for persistent pain management, mindfulnesstherapies and acceptance based and commitment therapy (Van Niekerk et al., 2019). Furthermore, treatment of comorbid anxiety and depressive disorders should be included in the therapy plan, as psychiatric comorbidity has repeatedly been shown to influence pain experience negatively.

CONCLUSIONS

This mini-review discusses the current evidence psychological about the management of endometriosis, with particular attention to psychiatric comorbidity and psychosomatic aspects involved, in order to provide a comprehensive framework with the ultimate aim to improve quality of care. Based on the literature, prevalence rates of psychiatric comorbidities such as depression, anxiety, as well as psychological factors and personality traits impacting patient care and QoL are substantial. Therefore, there is a clear need to take these conditions into account when formulating effective treatment plans. There is strong evidence that pain is associated with poorer psychological outcomes (Facchin, 2015), indicating that teaching patients how to manage pain

symptoms is а fundamental part of endometriosis multidisciplinary treatment. Psychological interventions may reduce the risk of developing a mental disorder by helping women to find more effective strategies to cope with the disease and its implications. The disruptive impact of endometriosis on couples' relationships as well as the important emotional support provided by intimate partners have been highlighted (Facchin et. al 2017). Further research is needed to better understand the specific ingredients of integrative intervention approaches for endometriosis to be the most effective for a positive impact on QoL. Promisina interventions are self-management techniques, mind-body medicine techniques and mindfulness-based techniques, although larger studies are needed to evaluate their effectiveness, for instance to improve the ability to recognize and express emotions, a hitherto underexplored topic in endometriosis.

Informed consent:

There was no need for informed consent as this project did not include any participants.

Conflict of interest: None of the contributing authors claims any conflict of interest.

Ethical approval: There was no ethical approval needed for this project.

Funding: There was no substantial funding for this project.

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