REVIEW ARTICLE

Medycyna Ogólna i Nauki o Zdrowiu 2023, Tom 29, Nr 3, 145–149
www.monz.pl

Physiotherapy and physical activity as adjunctive treatments in women with symptomatic endometriosis – literature review

Fizjoterapia i aktywność fizyczna jako leczenie wspomagające u kobiet z objawową endometriozą – przegląd literatury

Kateryna Shved[1,A-F], Klaudia Antkowiak[2,B-D], Zofia Kędzierska[3,B-C,E], Urszula Żurek[3,A-C], Klaudia Dadas[3,C,E-F], Aleksandra Świercz[3,A,F], Dominika Małachowska[3,E-F], Hubert Ciecierski-Koźlarek[4,C], Ignacy Tołwiński[3,E]

[1] *Multidisciplinary Municipal Hospital named after J. Strusia in Poznan, Poland*
[2] *Hospital of the Middle Heart of Jesus Company z o.o in Sroda Wielkopolska, Poland*
[3] *Warsaw Southern Hospital, Poland*
[4] *Provincial Specialist Hospital in Olsztyn, Poland*
A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Shved K, Antkowiak K, Kędzierska Z, Żurek U, Dadas K, Świercz A, Małachowska D, Ciecierski-Koźlarek H, Tołwiński I. Physiotherapy and physical activity as adjunctive treatments in women with symptomatic endometriosis: a review of the literature. Med Og Nauk Zdr. 2023; 29(3): 145–149. doi: 10.26444/monz/169984

Abstract

Introduction and Objective. Endometriosis can be identified by the presence of endometrial tissue in an abnormal location. It affects almost 10% of women of reproductive age and is characterized by persistent pelvic pain and chronic inflammation. There is no effective cure for endometriosis. The purpose of the study is to examine whether exercise and pelvic floor physiotherapy may help symptomatic endometriosis patients.
Review Methods. Using the PubMed database, an extensive examination of the existing literature was conducted. Keywords served as a guide for the search strategy. Each article was analyzed and assessed for eligibility for inclusion in the review.
Brief description of the state of knowledge. Due to the lack of targeted endometriosis therapy, non-pharmacological and less invasive methods are becoming increasingly prevalent. Pelvic floor physiotherapy is a therapeutic technique that reduces pain while also increasing quality of life. Physical exercise has an anti-inflammatory effect, slowing the course of the condition.
Summary. According to a review of the articles, both treatment methods can improve the biopsychophysical condition of endometriosis-afflicted females in a non-invasive manner, and can have a number of beneficial effects on the symptoms of this disease. In the light of the fact that standard treatments may be ineffective and endometriosis symptoms may reappear following treatment, it is crucial to inform women of the potential benefits of physiotherapy and exercise.

Key words

gynaecology, endometriosis, physiotherapy, pelvic floor physiotherapy, physical activity, deep infiltrating endometriosis

Address for correspondence: Kateryna Shved, Multidisciplinary Municipal Hospital named after J. Strusia in Poznan, Szwajcarska 3, 61-285 Poznań, Poland
e-mail: katey.shved@gmail.com

Received: 26.06.2023; accepted: 25.07.2023; first published: 31.07.2023

Streszczenie

Wprowadzenie i cel pracy. Endometriozę można zdefiniować jako obecność tkanki endometrium poza jamą macicy. Choroba dotyczy prawie 10% kobiet w wieku rozrodczym i charakteryzuje się uporczywym bólem miednicy i przewlekłym procesem zapalnym. Obecnie nie ma skutecznego leczenia endometriozy. Celem przeglądu jest analiza, czy ćwiczenia i fizjoterapia dna miednicy mogą pomóc pacjentkom z objawową endometriozą.
Metody przeglądu. Przeprowadzono badanie istniejącej literatury, korzystając z bazy danych PubMed. W celu wyszukiwania odpowiednich artykułów wykorzystane zostały słowa klucze. Każdy artykuł został przeanalizowany i oceniony pod kątem tego, czy kwalifikuje się do włączenia do przeglądu.
Opis stanu wiedzy. Z powodu braku ukierunkowanej terapii endometriozy coraz większy nacisk kładzie się na metody niefarmakologiczne i mniej inwazyjne. Fizjoterapia dna miednicy jest techniką terapeutyczną, która zmniejsza ból, a jednocześnie poprawia jakość życia. Ćwiczenia fizyczne wykazują działanie przeciwzapalne, spowalniając przebieg choroby.
Podsumowanie. Przegląd artykułów i badań w nich opisanych pokazuje, że obie metody leczenia mogą poprawić stan biopsychofizyczny kobiet dotkniętych endometriozą. Są one nieinwazyjne i mogą mieć szereg korzystnych opcji dla objawów tej choroby. Ponieważ standardowe leczenie endometriozy może być nieskuteczne, a objawy mogą pojawić się ponownie po zakończeniu leczenia, niezwykle ważne jest poinformowanie kobiet o potencjalnych korzyściach fizjoterapii i ćwiczeń fizycznych.

Streszczenie

endometrioza, fizjoterapia, fizjoterapia dna miednicy, ginekologia, aktywność fizyczna, głęboko naciekająca endometrioza

INTRODUCTION AND OBJECTIVE

Endometriosis is a prevalent disease characterized by chronic inflammation and associated pain. It affects approximately 5–10% of women of reproductive age. At present, 190 million women are affected by endometriosis, according to statistics [1]. This disease is characterized by an increase of endometrial glands and stroma in areas outside the uterus, inside and outside the pelvic cavity [2]. In other terms, it signifies the presence of endometrial tissue outside of its normal location. Clinically, endometriosis looks very diverse, and there is no observable relationship between the severity of the disease and the occurrence of symptoms. This may indicate the role of other factors, more complex, in addition to basic organic disease. Endometriosis is now considered to be a multimodal etiology disease, as systems other than the gynecological contribute to the development of endometriosis alterations [3]. The pathogenesis of endometriosis is strongly associated with hormonal factors such as estrogen dependence or progesterone resistance, as well as genetic and environmental factors. Inflammatory processes, such as oxidative stress or an increase in inflammatory mediators, are also implicated in the pathogenesis of this condition [4]. The disease process involves the ectopic growth of endometrial tissue, which is stimulated by estrogens. Therefore, estrogen exposure appears to be necessary for the development of symptomatic endometriosis in the majority of women with childbearing potential. In addition to hormonal factors, genetic factors also contribute to the development of the disease, which is why patients with affected first-degree relatives have a seven- to tenfold increased risk. African-Americans and Asians seem to be less susceptible to endometriosis than Caucasians. Endometriosis risk factors include early and frequent or prolonged menstruation, high growth, and low BMI, i.e., it occurs primarily in tall and thin women; nulliparity; prematurity; abnormal uterine bleeding in the first year of life; and even abuse in childhood [5]. Whereas pregnancy, breastfeeding, and menopause all constitute factors that reduce the risk of endometriosis. The most common site of endometriosis implants is the peritoneal cavity (ovaries, Fallopian tubes, bladder, broad and round ligaments of the uterus, colon, and appendix). Disease outbreaks can also be found in the scars after the episiotomy or Caesarean section, in the uterine muscle wall (adenomyosis), and sometimes (but rarely) they may occur in the liver, kidneys, pleural cavity, or even in the gluteal muscles. Regrettably, there exists a disparity in the incidence of endometriosis across various research studies. In women with infertility, the prevalence ranges from 20–50%, which might be because endometriosis is a contributing factor to infertility. Chronic pelvic pain is present in a range of 71–87% of affected women. The primary clinical manifestation of endometriosis is the occurrence of intense menstrual pain, commonly referred to as dysmenorrhea. Dyspareunia, or pain during sexual intercourse, is also a frequently reported condition, often accompanied by the onset of chronic pelvic pain (CPP). It is important to note that progression of the disease may lead to infertility. Furthermore, it has been reported in numerous studies that there is a correlation between pain symptoms and loss of fertility with anxiety and depression among patients with endometriosis, leading to a rate of almost 87% of women developing some type of psychiatric disorder [6]. Despite being a common disease, misdiagnosis is still observed and the diagnosis is frequently delayed by a few years, and the administration of effective therapy often prolonged. On average, it can take anywhere from 8–10 years to diagnose endometriosis, depending on the study. During this time, it is possible for both musculoskeletal and mental disorders to develop as secondary changes [2]. Even after receiving proper treatment, many patients still feel pain, which worsens the quality of life [7]. Nowadays, the primary approach to managing endometriosis involves surgical intervention, hormonal therapy, and reduction of pain, which is the most difficult and disturbing symptom experienced by women. In the absence of effective endometriosis treatment at present, there is an increasing interest in other options for treating this condition that are non-pharmacological and less invasive. Physiotherapy and exercises can be such an 'other option'. The purpose of this review is to check the literature and assess whether exercise and pelvic floor physiotherapy can be used as supportive treatments for women suffering from symptomatic endometriosis.

MATERIALS AND METHOD

A comprehensive review of the literature was carried out by searching the PubMed database. The search strategy was guided by the following keywords: 'endometriosis', 'physiotherapy', 'gynecology,', 'pelvic floor physiotherapy, 'physical activity' and 'deep infiltrating endometriosis'. Each article was analyzed and assessed for eligibility for inclusion in the review. Eligibility criteria were: English or Polish language, articles published after 2015, full-text articles, articles on physiotherapy and exercises in women with laparoscopically confirmed endometriosis, and articles on the inclusion of all types of physical exercises. First, each article was checked by title and abstract, then downloaded and analyzed by qualification criteria. This analysis did not take into account articles published before 2015, articles on physiotherapy for women without diagnosed endometriosis, or articles without the possibility of downloading the full text. No effort was made to find studies that had not been published.

CURRENT STATE OF KNOWLEDGE

Endometriosis is a widespread gynecological disease that can interfere with everyday life due to chronic pain and reduced quality of life. This particular pathological state results in a systemic inflammatory response and induces changes in genetic transcription within the central nervous system, leading to heightened pain perception (pain sensitization) and affective disturbances, which are often mood disorders. Characterized by persistent pelvic and peritoneal inflammation and pain, this is the most commonly notified symptom. Females experience an ache during sexual intercourse, as well as during urination and defecation. During menstrual cycles, pain may be intensified through hormonal changes [8]. Patients presenting with endometriosis symptoms, such as infertility or pain, can pose a challenge in terms of treatment.

Endometriosis appears to be a systemic disease with various manifestations beyond the signs of classic gynecological disease, thereby necessitating a multidisciplinary approach for diagnosis and treatment. Given the chronic nature of endometriosis, it would be most advantageous to use agents

that are safe for long-term application. At present, the most effective modality of imaging to identify endometriosis implants is magnetic resonance imaging (MRI), but laparoscopy with direct visualization of lesions is still considered the gold standard for its diagnosis. A definitive diagnosis of endometriosis can only be made with a biopsy of the lesion.

Treatment. There is no target cure for endometriosis. With a view to the most prevalent symptoms reported by patients, namely chronic pain and infertility, the treatment concentrates on hormone therapy and surgery, both of which are directed against ectopic endometrial lesions. Such therapies do not allow the cure of endometriosis, although in the case of chronic pain they give the opportunity to control the progression of the disease but, unfortunately, have their limitations and adverse effects [9]. Hormonal treatment can become inefficient with time, whereas the efficacy of surgery is typically short-lasting. Chronic pelvic pain (CPP) is an annoying symptom in patients with endometriosis. In addition, it is often resistant to both hormonal and surgical treatments. Infertility, which is the second most common symptom of symptomatic endometriosis, affects up to 50% of women.

Prior to commencing treatment, it is necessary to ask the patient if she intends to conceive in the immediate future, given the limited treatment options available for those seeking both pelvic pain treatment and fertility. However, on certain occasions, gestation provides temporary relief from endometriosis-related pain. Furthermore, numerous studies have demonstrated a correlation between depression and manifestations of pain and infertility. It has been observed that nearly 87% of women diagnosed with endometriosis tend to develop a certain type of mental disorder [6]. The obvious fact is that medical interventions alone are not sufficient to treat and control the symptoms of endometriosis. Presently, there is an increased emphasis on non-pharmacologic and minimally invasive interventions; thus, physiotherapy and physical activity may be suggested as alternative or complementary treatments.

Relationship between pelvic floor physiotherapy and endometriosis – review of the literature. Based on a review of the 2021 article, it can be inferred that pelvic floor physiotherapy (PFP) can be a promising possibility for treating superficial dyspareunia and chronic pelvic pain (CPP) caused by chronic inflammation in women with deep infiltrating endometriosis (DIE) [10]. Deep infiltrating endometriosis is a condition when endometriosis implants occur below the peritoneum with access to the rectum, ureters, bladder, or uterine ligaments. There is a strong correlation between DIE and severe pelvic pain [11]. The article first highlights the occurrence of deep and superficial dyspareunia, while other studies focused on dyspareunia only as a symptom of aching sexual intercourse [12]. Women frequently report the superficial form of dyspareunia to their doctors as a manifestation of pain symptomatology [13]. Superficial dyspareunia is characterized by pain occurring in or around the vaginal entrance. Deep dyspareunia is characterized by discomfort during sexual activity [14].

A randomized study was conducted and described, involving 34 nulliparous females who reported the symptom of superficial dyspareunia and were diagnosed with deep infiltrating endometriosis (DIE). Female participants were assigned to 2 cohorts, the control and study groups, in a 1:1 ratio. The study cohort underwent a series of 5 sessions of pelvic floor physiotherapy. The requirement was attendance at all 5 sessions. The results of the study postulate that there was a notable reduction in the intensity of pain for the surface dyspareunia in the study group in relation to the control group. In addition, an identical outcome was achieved for chronic pelvic discomfort (CPP). Unfortunately, there was no statistically significant disparity between the two cohorts for deep dyspareunia or for other symptoms of endometriosis, such as dysuria, dyschezia, or painful periods. Studies performed with transperineal ultrasound in 3D and 4D show that women with superficial dyspareunia may have pelvic floor hypertonia [10, 13]. This also affirms the result of the previously described randomized study. The reduction in pain intensity for superficial dyspareunia in the study group, i.e., women who have completed all 5 physiotherapy sessions, suggests that this condition is caused by the lack or inadequate relaxation of the pelvic floor muscles. However, the lack of a PFP effect on deep dyspareunia suggests that this type of pain may be caused by the presence of endometriosis implants, and the effect of mass exerted by endometrial tissue during sexual intercourse [15].

Another article published in 2022, postulated that any type of physiotherapy can be used as an adjunctive treatment for endometriosis [5]. The most common forms of this therapy in endometriosis are physical therapy and kinesiotherapy. The article indicates that a crucial element in pain relief is women's physical activity as well as learning to relax and stretch the muscle. However, it does not specify the type and amount of physical activity that should be undertaken. It is noteworthy that physiotherapy can be used in both the physiotherapist's office and spa treatments. Based on the information provided in the article, it is evident that kinesiotherapy constitutes an important element of treatment for females who have been diagnosed with endometriosis. It is suggested that women should select an appropriate genital exercise regimen with the correct load and targeted massage techniques for the area. Attention should be paid to the fact that kinesiotherapy may be a treatment option for people who are ineligible for surgery and hormonal treatment [16]. Physicotherapy is also used in women with endometriosis, mainly phototherapy, electrotherapy, especially TENS, and laser therapy. Phototherapy and laser therapy are treatment modalities employed to accelerate and improve wound healing and tissue regeneration in the post-operative period. Phototherapy is utilized to enhance circulation in post-operative areas, whereas laser biostimulation promotes the proliferation of collagen and nerve fibres at wound sites. The main advantage of electrotherapy is its analgesic impact on the pelvic region. The effect of percutaneous electrical nerve stimulation (TENS) has been proven in cases in which there was noticeable reduction in pain intensity, resulting in an overall enhancement in the quality of life among women with deeply infiltrating endometriosis, and suffering from deep dyspareunia.

There are two different varieties of TENS therapy: low-frequency and high-frequency TENS. Regardless of the frequency distribution, this therapy is effective for reducing pain intensity.

Relationship between physical activity and endometriosis – a review of the literature. Physical activity works through an anti-inflammatory mechanism, impeding the progression of the disease.

Upon assessing the 2016 article regarding the impact of physical exercise, it can be posited that physical activity can reduce the likelihood of endometriosis development in women who have not yet developed the condition [17]. On the other hand, it is difficult to clearly determine whether physical activity reduces pain perception in women already diagnosed with endometriosis.

The following article assesses 3 studies, 2 of which were randomized. The research included a variety of exercises, ranging from strength training to yoga and varying in frequency of training [18]. The studies were conducted on a cohort of 109 female patients with varying degrees of symptomatic endometriosis, validated by surgical or imaging diagnostics. The findings were ambiguous. In Goncalves et al., women practiced 120 minutes of yoga twice a week for 8 weeks or 2 months [19]. The study was randomized, with the women assigned to 2 groups: study and control. The effects were evaluated using the visual VAS scale and the EHP-30 Scale (30-item Endometriosis Health Profile) specific to endometriosis. Friggi Sebe Petrelluzzi et al. included 30 women diagnosed with endometriosis and chronic pelvic pain lasting 7 years or longer [20]. Randomized, Carpenter et al. studied 39 women using Danazol, or hormonal endometriosis treatment [20]. Description and results are included in the Table below.

References	Type of study	Number of participants	Outcome
Goncalves et al. [19]	Randomized study	40	Degree of daily pain was much lower in the study group, i.e., in exercising women, than in the control group.
Friggi Sebe Petrelluzzi et al. [20]	Non-randomized study. Pre-post study	30	No significant improvement in pain intensity.
Carpenter et al. [20]	Randomized study	39	Both groups, examined and controlled, demonstrated improvement in painful menstruation and dyspareunia.

The article, assessing 6 other studies about physical exercise in endometriosis, presents the results of Koppan et al., Awad et al., and Armor et al. [20, 21, 22]. Although not randomized, Koppan et al. presented interesting results [20]. Eighty-one women with intraoperatively confirmed endometriosis participated in the study. The patients who utilized analgesics while engaging in physical activity exhibited a decrease in the frequency of their consumption in comparison to those who refrained from exercising. The study by Awad et al. included a group of 20 female patients with laparoscopically confirmed endometriosis [21]. A variety of physical activities were employed over the course of 24 sessions. The findings indicate a positive outcome with a significant reduction in pain perception. However, according to the negative results of a newer study published in 2019 by Armor et al., women experienced an increase in pain sensation during physical exercise [22].

Summing-up the research findings, it can be inferred that due to the significant diversity in the studies (different methods, different durations, different numbers of women, and different research projects), it is challenging to determine definitive conclusions regarding the efficacy of physical training in alleviating symptoms of endometriosis, or its impact on women›s pain levels. Such a variety of studies indicate the necessity to perform high-quality randomized tests and utilizing appropriate pain measurement scales, such as the EHP-30, specifically developed for women with endometriosis.

CONCLUSIONS

Endometriosis remains a challenging health issue for the female population. The condition is being recognized not only as a gynaecological disease but also as an internal medicine concern. It is being emphasized that a multidisciplinary approach to treatment is needed. There is still a lack of effective treatment options, and only symptomatic therapy is available: painkillers, predominantly non-steroidal anti-inflammatory drugs (NSAIDs), hormonal medications, and surgical interventions. Physiotherapy and physical training, which are non-invasive and well-tolerated by women, appear to be viable options for supportive care. Furthermore, it can be an alternative treatment option for women who are not eligible for surgery.

Upon reviewing the literature on physiotherapy in the treatment of endometriosis, it is clear that this modality, in its various forms, can be a viable and efficacious complementary intervention for females suffering from this disorder. The therapeutic intervention of pelvic floor physiotherapy is known to effectively reduce pain, *ipso facto* improving the quality of life, although it cannot solve the issue of infertility. Regrettably, owing to the limited quantity of accessible articles and studies conducted, it is difficult to clearly determine the effectiveness of physical activity in endometriosis treatment. In order to improve research outcomes, it is imperative to conduct randomized studies with meticulous attention to high-quality methods, well-defined research groups, and clearly delineated physical training regimens. Test results should be measured using proven pain assessment scales dedicated to women with endometriosis. Despite this, this review of the articles and studies clearly indicates that both methods can enhance the biopsychophysical condition of females afflicted with endometriosis in a non-invasive manner and can have several advantageous outcomes for symptoms associated with this disease. Considering the fact that standard treatments may be ineffective and endometriosis symptoms may return after treatment, it is essential to convey to women the potentially beneficial effects of physiotherapy and exercise.

REFERENCES

1. Rasheed HAM, Hamid P. Inflammation to Infertility: Panoramic View on Endometriosis. Cureus. 2020;12:e11516. https://doi.org/10.7759/cureus.11516
2. França PRC, Lontra ACP, Fernandes PD. Endometriosis: A Disease with Few Direct Treatment Options. Molecules. 2022;27(13):4034. https://doi.org/doi:10.3390/molecules27134034
3. Zondervan KT, Becker CM, Missmer SA. Endometriosis. N Engl J Med. 2020;382:1244–1256. https://doi.org/10.1056/NEJMra1810764
4. Malvezzi H, Marengo EB, Podgaec S, et al. Endometriosis: current challenges in modeling a multifactorial disease of unknown etiology. J Transl Med. 2020;18:311. https://doi.org/10.1186/s12967-020-02471-0
5. Wójcik M, Szczepaniak R, Placek K. Physiotherapy Management in Endometriosis. Int J Environ Res Public Health. 2022;19:16148. https://doi.org/10.3390/ijerph192316148

6. Farshi N, Hasanpour S, Mirghafourvand M, et al. Effect of self-care counselling on depression and anxiety in women with endometriosis: a randomized controlled trial. BMC Psychiatry. 2020;20:391. https://doi.org/10.1186/s12888-020-02795-7
7. Mikocka-Walus A, Druitt M, O'Shea M, et al. Yoga, cognitive-behavioural therapy versus education to improve quality of life and reduce healthcare costs in people with endometriosis: a randomised controlled trial. BMJ Open. 2021;11:e046603. https://doi.org/10.1136/bmjopen-2020-046603
8. Goździewicz T, Jarząbek-Bielecka G, Luwański D, et al. The Role of Visceral Therapy in the Sexual Health of Women with Endometriosis during the COVID-19 Pandemic: A Literature Review. J Clin Med. 2022;11:5825. https://doi.org/10.3390/jcm11195825
9. Zondervan KT, Becker CM, Koga K, et al. Endometriosis. Nat Rev Dis Primers. 2018;4:9. https://doi.org/10.1038/s41572-018-0008-5
10. Del Forno S, Arena A, Pellizzone V, et al. Assessment of levator hiatal area using 3D/4D transperineal ultrasound in women with deep infiltrating endometriosis and superficial dyspareunia treated with pelvic floor muscle physiotherapy: randomized controlled trial. Ultrasound Obstet Gynecol. 2021;57:726–732. https://doi.org/10.1002/uog.23590
11. Uccella S, Gisone B, Serati M, et al. Functional outcomes of nerve-sparing laparoscopic eradication of deep infiltrating endometriosis: a prospective analysis using validated questionnaires. Arch Gynecol Obstet. 2018;298:639–647. https://doi.org/10.1007/s00404-018-4852-z
12. De Graaff AA, Van Lankveld J, Smits LJ, et al. Dyspareunia and depressive symptoms are associated with impaired sexual functioning in women with endometriosis, whereas sexual functioning in their male partners is not affected. Hum Reprod. 2016;31:2577–2586. https://doi.org/10.1093/humrep/dew215
13. Mabrouk M, Del Forno S, Spezzano A, et al. Painful Love: Superficial Dyspareunia and Three Dimensional Transperineal Ultrasound Evaluation of Pelvic Floor Muscle in Women with Endometriosis. J Sex Marital Ther. 2020;46:187–196. https://doi.org/10.1080/0092623X.2019.1676852
14. Rogers RG, Pauls RN, Thakar R, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for the assessment of sexual health of women with pelvic floor dysfunction. Neurourol Urodyn. 2018;37:1220–1240. https://doi.org/10.1002/nau.23508
15. Mabrouk M, Raimondo D, Del Forno S, et al. Pelvic floor muscle assessment on three- and four-dimensional transperineal ultrasound in women with ovarian endometriosis with or without retroperitoneal infiltration: a step towards complete functional assessment. Ultrasound Obstet Gynecol. 2018;52:265–268. https://doi.org/10.1002/uog.18924
16. Tennfjord MK, Gabrielsen R, Tellum T. Effect of physical activity and exercise on endometriosis-associated symptoms: A systematic review. BMC Womens Health. 2021;21:355. https://doi.org/10.1186/s12905-021-01500-4
17. Ricci E, Vigano P, Cipriani S, et al. Physical activity and endometriosis risk in women with infertility or pain: Systematic review and meta-analysis. Medicine (Baltimore). 2016;95:e4957. https://doi.org/10.1097/MD.0000000000004957
18. Tennfjord MK, Gabrielsen R, Tellum T. Effect of physical activity and exercise on endometriosis-associated symptoms: a systematic review. BMC Womens Health. 2021;21:355. https://doi.org/10.1186/s12905-021-01500-4
19. Goncalves AV, Barros NF, Bahamondes L. The practice of hatha yoga for the treatment of pain associated with endometriosis. J Altern Complement Med. 2017;23:45–52. https://doi.org/10.1089/acm.2015.0343
20. Hansen S, Sverrisdóttir UÁ, Rudnicki M. Impact of exercise on pain perception in women with endometriosis: A systematic review. Acta Obstet Gynecol Scand. 2021;100:1595–1601. https://doi.org/10.1111/aogs.14169
21. Awad E, Ahmed HAH, Yousef A, et al. Efficacy of exercise on pelvic pain and posture associated with endometriosis: within subject design. J Phys Ther Sci. 2017;29:2112–2115. https://doi.org/10.1589/jpts.29.2112
22. Armour M, Sinclair J, Chalmers KJ, et al. Self-management strategies amongst Australian women with endometriosis: a national online survey. BMC Complement Altern Med. 2019;19:17. https://doi.org/10.1186/s12906-019-2431-x