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Pilates training for health of women in menopause and postmenopause - a literature review

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Abstract

Introduction. Menopause is associated with significant physiological changes in women affecting the skeletal system, muscular function and mental health. The lower levels of estrogen leads to decreased bone mineral density, muscle weakness and an increased risk of osteoporosis. Additionally, hormonal fluctuations may elevate the risk of mental health disorders, including depression, anxiety and chronic stress.

Aim of study. The aim of our study is to present the benefits of practicing Pilates training in women during menopause and after menopause. The study analyzed the impact of Pilates training on the musculoskeletal system and mental health of the women.

Materials and methods. The work reviews articles published in the years 2013-2025 on Google Scholar or PubMed platforms. The keywords were used to search "menopausal women", "Pilates", "depression", "sleep disorder", "muscles".

Conclusions. Regular Pilates training can improve muscle strength and eliminate pain. Furthermore, Pilates enhances flexibility and joint mobility, contributing to improved functional movement. Pilates is an effective method for stress reduction and mood improvement. Its regular practice is associated with increased body awareness, promoting overall well-being. As a comprehensive form of exercise, Pilates offers both physical and psychological benefits making it a valuable intervention for menopausal and postmenopausal women.

Keywords: menopausal women, Pilates, depression, sleep disorders, skeletal muscles

Introduction

Menopause is a natural stage in a woman's life that marks the end of the menstrual cycle and reproductive functions. It usually occurs between the ages of 45 and 55 and is associated with the gradual decline in ovarian activity and a decrease in hormone levels such as estrogen and progesterone (Brinton et al., 2015). Menopause also known as the climacteric, it is marking the end of the reproductive functions of female and actual cessation of menstruation for at least 12 months (Makara-Studzińska et al., 2014). Menopause also affects overall quality of life (Twiss et al., 2007). Symptoms of menopause include mood swings, hot flashes, sleep and concentration problems, reduced bone density and muscle mass, as well as dryness of the skin and mucous membranes. Although it is a natural process, it can vary significantly from one woman to another. Many women seek ways to alleviate its effects, such as engaging in physical activity, maintaining a healthy diet or undergoing hormone therapy. As a result, there is growing awareness of the importance of physical activity as a key element in supporting women's health and well-being during this period. One form of exercise that is gaining increasing popularity among women in menopause is Pilates training. This system of exercises based on breath control, movement precision and core stabilization. It offers numerous benefits for both physical fitness and mental health. Regular Pilates training can improve flexibility, strengthen deep muscles, reduce stress and enhance body awareness, which is particularly important during menopause.

Aim of study

The aim of our review is to present the impact of Pilates training on physical and mental health in menopausal women. The analysis includes theoretical aspects of Pilates training as well as a review of scientific studies on its effectiveness. The role of Pilates exercises in the treatment of depression and sleep disorders in postmenopausal women is analyzed in detail. The impact of Pilates exercises on the musculoskeletal system is also described. The Google Scholar and PubMed platforms were used to create this study. The phrases searched were "menopausal women", "Pilates", "depression", "sleep disorder", "muscles".

Pilates training – a history

Joseph Pilates, a German boxer, developed a system of physical exercises known as Pilates training - at the beginning of the 20th century. Joseph Pilates suffered from asthma and rickets as a child. He practiced yoga, martial arts and physical exercises modeled on the gymnastics to improve his sickly body. The original name for the exercises was contrology, as they aimed to strengthen both the mind and body emphasizing controlled movements and breathing. The history of this training dates back to World War I, when Pilates was imprisoned in the Knockaloe internment camp on the Isle of Man (Kloubec, 2011). After the war, Pilates continued refining his system, incorporating elements of gymnastics, yoga, and rehabilitative practices. In the 1920s, he emigrated to the United States, where he and his wife Clara opened a studio in New York City. His method gained popularity among dancers and athletes, thanks to its ability to improve flexibility, strength, and injury prevention.

Pilates training – types of training, sports equipment

Pilates is a comprehensive exercise system that combines strength, flexibility, and movement control, engaging the entire body, but especially the deep muscles. The main roles of Pilates include precision, control, centering (which focuses on the core muscles such as the abdomen, back, and hips), fluidity of movement and breathing. The benefits of Pilates training include preventing joint and bone pain, increasing range of motion in joints, breath control, stress reduction, and use as a medical rehabilitation method. There are both Pilates workouts without equipment and with professional medical apparatus such as the reformer, wunda chair, trapeze table (Cadillac) and Pilates barrel. Additionally, Pilates can be supplemented with other helpful accessories such as resistance bands, Pilates mats, foam rollers, exercise balls and Pilates rings. The main types of Pilates training: classical, on the mat, equipment – based, with reformer.

The impact of Pilates training on the musculoskeletal system in menopausal women

Pilates engages multiple muscle groups, focusing on stabilization, strength, and flexibility. During training, deep abdominal muscles are particularly strengthened, including the transversus abdominis, internal and external obliques and rectus abdominis. These muscles support core stabilization and proper posture. Another important group is the back muscles, including the paraspinal muscles, trapezius, and latissimus dorsi. They strengthen the spine and help maintain correct posture. Pilates training also strengthens the pelvic muscles, especially the pelvic floor muscles and iliopsoas, which are responsible for stability and movement control.

Additionally, its impact is visible in the lower limb muscles - gluteus maximus, medius, and minimus, quadriceps, hamstrings, and calf muscles. Pilates exercises also affect the upper limb muscles, supporting movement control and upper body strength. Angın and colleagues conducted a study to examine bone mineral density, quality of life, pain levels, and physical performance in postmenopausal women. In the group of women who practiced Pilates training, a statistically significant increase in bone density, reduced pain, higher quality of life, and increased physical performance of the body were observed. As the cited study shows, Pilates training can improve the physical health of postmenopausal women (Angın et al., 2015). In 2016, a study was conducted to assess the effects of 8 weeks of Pilates training on postmenopausal women. The study examined the flexibility and strength of the lumbar spine and the symptoms associated with menopause. The women who used Pilates training experienced a reduction in menopausal symptoms, increased flexibility and increased strength in the lumbar spine, compared to a control group of postmenopausal women who did not participate in Pilates (Lee et al., 2016). A study was conducted to assess the effect of Pilates training on postmenopausal women with low back pain. The participants were also assessed for their quality of life and endurance. The study was conducted using appropriate scales and questionnaires. For this purpose, women were assigned to two groups, those who performed standard exercises and those who performed specialized Pilates training. Pilates training proved to be more effective compared to standard home training (Nageswari et al., 2025). A study by Bergamin et al. aimed to determine the effect of 12 weeks of Pilates training on muscle strength, balance, postural control and body composition in postmenopausal women. Pilates training failed to demonstrate improvement in balance, body composition, or posture, but did demonstrate increased muscle strength in the upper and lower extremities and abdominal muscles (Bergamin et al., 2015). Fatemeh Noroozi and colleagues conducted a study aimed at determining the impact of vitamin D3 supplementation combined with Pilates training in postmenopausal women. To achieve this, three groups were constructed. The control group consisted of women who neither took vitamin D3 supplements nor engaged in Pilates training. The first experimental group comprised women who supplemented with vitamin D3 but did not participate in physical activity. The second experimental group included women who both supplemented with vitamin D3 and practiced Pilates training. The study evaluated several parameters, including metabolic indices, quality of life, body composition and muscle strength. The most effective results were observed in women from the second experimental group. In both experimental groups women had increased muscle strength and increased percentage of lean body mass ($p<0.05$). Additionally, women in the second experimental group showed improvements in psychological health indicators ($p<0.05$). The findings highlight the multifaceted role of Pilates training in postmenopausal women, emphasizing its beneficial effects not only on physical health but also on psychological well-being (Noroozi et al., 2025). During menopause, the decline in estrogen levels leads to physiological changes, including sarcopenia and reduced collagen synthesis. Postmenopausal women experience a progressive loss of muscle mass, which adversely affects balance and increases the risk of falls and musculoskeletal injuries. Research has demonstrated that Pilates training plays a crucial role in postmenopausal women by enhancing neuromuscular coordination, reducing the incidence of falls, improving postural stability, and positively influencing mental health (Hita-Contreras et al., 2016).

In 2020, a study was published examining the effects of Pilates training in Spanish women aged 60 and older. A total of 110 participants took part in the study, with the experimental group consisting of 55 women who practiced Pilates twice a week for 12 weeks. The control group comprised 65 women who were not physically active. Women who engaged in Pilates training demonstrated higher levels of cognitive and executive function compared to those who did not participate in the training. These findings highlight new possibilities for using Pilates to delay the effects of aging (García-Garro et al., 2020). Mina Bikaran et al. demonstrated the positive effects of Pilates training in postmenopausal women. Their study showed a significant increase in trunk core stability after 8 and 16 weeks of training, with a significant improvement observed at 16 week of observation ($p = 0.007$). Pilates training not only helps maintain trunk core stability in postmenopausal women but also enhances it over time (Bikaran et al., 2016). Pilates training is an effective way to improve abdominal muscle strength in post-menopausal women (Eloksery et al., 2021). Pilates training has a positive effect on bone tissue, which is why it can be recommended as a form of physical activity to prevent osteoporosis.

The impact of Pilates training on the mental health in menopausal women

Menopausal women often struggle with mental health issues. Hormonal fluctuations, lifestyle changes, and the social and emotional aspects of this period can affect well-being and mental health. Current research shows that post-menopausal women are more likely to experience problems such as depression, anxiety, sleep problems and low self - esteem. Below are some papers that discuss the impact of Pilates training on the mental health of post-menopausal women. Women in the perimenopausal period are at risk of developing depression. Studies indicate that during this time, this risk varies between 2-5 times compared to the time before menopause. Studies show that from 8.5% to 25.7% of women in the menopausal period experience depressive episodes. A severe depressive episode affects from 1% to 42% of women in the menopausal period (Campbell et al., 2015). In 2018, the results of a study were published that looked at the impact of Pilates training on mental health in postmenopausal women. The analysis took into account sleep quality, feelings of anxiety and depression, and fatigue. The study involved 86 postmenopausal women. They were assigned to a research group and a control group, with 43 people in each group. In the research group, women were required to do Pilates training for 8 weeks, while the control group did not do any specialized training. The research group observed improved sleep quality, reduced fatigue, and positive effects on anxiety and depression (Salehi Rad et al., 2023). The Goldberg General Health Questionnaire was used to assess the mental health of postmenopausal women who participated in 12 weeks of Pilates training, aerobic exercise, and no exercise. Pilates training was shown to be a more effective form of physical activity for depression than aerobic exercise (Soori et al., 2022). Jurakic et al studied elderly women with mild cognitive impairment. Pilates training, and resistance and balance exercises were effective and improved cognitive functions in the women studied (Jurakic et al., 2017). The results of a study published by Ahmadinezhad et al. showed, among other things, that a 6-week course of Pilates training effectively improved sleep quality as assessed by the Pittsburgh Sleep Quality Index (PSQI) in postmenopausal women (Ahmadinezhad et al., 2017).

The study examined the effects of Pilates training on psychological well-being in menopausal women, using the Subjective Well-Being Scale (SWS) as the assessment tool. Participants were required to perform Pilates exercises for eight weeks, three times per week. A total of 36 women participated in the study, with 21 assigned to the experimental group (engaging in Pilates) and 15 to the control group (not engaging in physical exercise). The results demonstrated that women in the Pilates group experienced significant improvements in subjective well-being compared to the control group. The findings were deemed statistically significant ($p<0.05$) (Yidizhan et al., 2020). Patients who trained Pilates showed a reduction in pain as determined by the Visual Analogue Scale (VAS) (Angin et al., 2015). Pain, a sense of dependency, social isolation and mood swings can significantly reduce the quality of life and mental health. As a result, the patient may experience negative emotions such as lack of self-confidence, a sense of worthlessness and depression (Küçükçakır et al., 2013). Oskuz et al. noted a reduction in pain in the Pilates group compared to the control group. Pilates training provides the ability to eliminate chronic pain, allowing for daily activities (Oksuz et al., 2017).

Conclusions

Pilates is an effective training method that offers numerous benefits to menopausal women, both in terms of musculoskeletal health and psychological well-being. Regular practice strengthens deep muscles, enhances flexibility and improves body stabilization. It provides a better posture and reducing the risk of musculoskeletal injuries. Additionally, Pilates supports bone health by providing gentle resistance training, which may help maintain bone mineral density and prevent osteoporosis. From a psychological perspective, Pilates serves as an excellent strategy for stress reduction and mood enhancement. The breathing techniques incorporated into the exercises help regulate cortisol levels, potentially alleviating menopausal symptoms such as mood fluctuations and sleep disturbances. Moreover, Pilates improves body awareness and cognitive focus, promoting overall emotional well-being. Consistent Pilates practice can yield noticeable results within a few weeks, enhancing physical fitness, stabilizing the musculoskeletal system, and fostering emotional balance. It provides a comprehensive approach to improving the quality of life for menopausal women. The exercises can be performed independently at home, even without the use of professional sports equipment, this form of activity should be proposed to women during menopause who suffer from negative symptoms. Women in menopause should be provided with special psychological and psychiatric care due to the increased risk of psychiatric disorders during this period. In addition to standard pharmacological therapy, in the case of mental disorders, it is worth encouraging patients to Pilates training, which has a positive effect on physical condition and mental health.

Disclosure

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Conflict of Interest Statement

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Informed Consent Statement

Not applicable.

Data Availability Statement

The authors confirm that the data supporting the findings of this study are available within the article's bibliography.

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References:

1. Brinton, R. D., Yao, J., Yin, F., Mack, W. J., & Cadenas, E. (2015). Perimenopause as a neurological transition state. Nature reviews. Endocrinology, 11(7), 393–405. https://doi.org/10.1038/nrendo.2015.82
2. Makara-Studzińśka, M., Kryś-Noszczyk, K., & Jakiel, G. (2014). Epidemiology of the symptoms of menopause – an intercontinental review. Menopause Review/Przegląd Menopauzalny, 13(3), 203-211. https://doi.org/10.5114/pm.2014.43827
3. Twiss, J. J., Wegner, J., Hunter, M., Kelsay, M., Rathe-Hart, M., & Salado, W. (2007). Perimenopausal symptoms, quality of life, and health behaviors in users and nonusers of hormone therapy. Journal of the American Academy of Nurse Practitioners, 19(11), 602–613. https://doi.org/10.1111/j.1745-7599.2007.00260.x
4. Kloubec J. (2011). Pilates: how does it work and who needs it?. Muscles, ligaments and tendons journal, 1(2), 61–66.
5. Angın, E., Erden, Z., & Can, F. (2015). The effects of clinical pilates exercises on bone mineral density, physical performance and quality of life of women with postmenopausal osteoporosis. Journal of back and musculoskeletal rehabilitation, 28(4), 849–858. https://doi.org/10.3233/BMR-150604
6. Lee, H., Caguicla, J. M., Park, S., Kwak, D. J., Won, D. Y., Park, Y., Kim, J., & Kim, M. (2016). Effects of 8-week Pilates exercise program on menopausal symptoms and lumbar strength and flexibility in postmenopausal women. Journal of exercise rehabilitation, 12(3), 247–251. https://doi.org/10.12965/jer.1632630.315
7. Nageswari, C., Meena, N., Gupta, S., & Thillaieaswaran, B. (2025). Effect of Pilates Exercises on Pain, Endurance, Quality-of-Life, and Disability in Postmenopausal Women With Low Back Pain. Musculoskeletal care, 23(1), e70071. https://doi.org/10.1002/msc.70071
8. Bergamin, M., Gobbo, S., Bullo, V., Zanotto, T., Vendramin, B., Duregon, F., Cugusi, L., Camozzi, V., Zaccaria, M., Neunhaeuserer, D., & Ermolao, A. (2015). Effects of a Pilates exercise program on muscle strength, postural control and body composition: results from a pilot study in a group of post-menopausal women. Age (Dordrecht, Netherlands), 37(6), 118. https://doi.org/10.1007/s11357-015-9852-3
9. Noroozi, F., & Saremi, A. (2025). Pilates and vitamin D is an effective intervention protocol to improve strength and muscle mass and quality of life related to menopause in women. The Journal of Tolooebehdasht. https://doi.org/10.18502/tbj.v23i6.18196
10. Hita-Contreras, F., Martínez-Amat, A., Cruz-Díaz, D., & Pérez-López, F. R. (2016). Fall prevention in postmenopausal women: the role of Pilates exercise training. Climacteric : the journal of the International Menopause Society, 19(3), 229–233. https://doi.org/10.3109/13697137.2016.1139564
11. García-Garro, P. A., Hita-Contreras, F., Martínez-Amat, A., Achalandabaso-Ochoa, A., Jiménez-García, J. D., Cruz-Díaz, D., & Aibar-Almazán, A. (2020). Effectiveness of A Pilates Training Program on Cognitive and Functional Abilities in Postmenopausal Women. *International Journal of Environmental Research and Public Health, 17*(10), 3580. https://doi.org/10.3390/ijerph17103580

12. Bikaran, M. , Shirzad, E. and Barati, A. H. (2016). The Effect of 16 Weeks of Pilates Training on Trunk Core Stability in Menopausal Women. Sport Sciences and Health Research, 8(1), 1-14. https://doi.org/10.22059/jsmed.2016.61458
13. Eloksery, S. M., Nahla, M., Botla, A. M. M., & Hazem, S. (2021). Effect of Pilates Exercises on Abdominal Muscle Strength in Post Menopausal Women. The Medical Journal of Cairo University, 89(September), 1877-1882. https://doi.org/10.21608/mjcu.2021.203298
14. Mikalacki M, Cokorilo N, Obradovic B, Marijanac A, Ruiz-Montero PJ. Effects of Pilates-interventional program on calcaneus-bone density parameters of adult women. International Journal of Morphology. 2015;33(4):1220–4. http://dx.doi.org/10.4067/S0717-95022015000400004
15. Campbell, K. E., Szoeke, C. E., & Dennerstein, L. (2015). The course of depressive symptoms during the postmenopause: a review. Women's midlife health, 1, 3. https://doi.org/10.1186/s40695-015-0003-x
16. Salehi Rad, E. and mousavi sadati, S. K. (2023). The effect of 8 weeks of Pilates exercises on old menopausal women's psychological health. Journal for Research in Sport Rehabilitation, 10(20), 41-49. https://doi.org/10.22084/rsr.2022.25865.1627
17. Soori, S., Heirani, A., & Rafie, F. (2022). Effects of the aerobic and Pilates exercises on mental health in inactive older women. Journal of women & aging, 34(4), 429–437. https://doi.org/10.1080/08952841.2021.1924576
18. Greblo Jurakic, Z., Krizanic, V., Sarabon, N., & Markovic, G. (2017). Effects of feedback-based balance and core resistance training vs. Pilates training on cognitive functions in older women with mild cognitive impairment: a pilot randomized controlled trial. Aging clinical and experimental research, 29(6), 1295–1298. https://doi.org/10.1007/s40520-017-0740-9
19. Ahmadinezhad, M., Kargar, M., Vizeshfar, F., & Hadianfard, M. J. (2017). Comparison of the Effect of Acupressure and Pilates-Based Exercises on Sleep Quality of Postmenopausal Women: A Randomized Controlled Trial. Iranian journal of nursing and midwifery research, 22(2), 140–146. https://doi.org/10.4103/1735-9066.205954
20. Yidizhan, Y., & Ağgön, E. (2020). The effects of regular physical activities on subjective well-being levels in women of menopause period. Balneo Research Journal, 11(2). http://dx.doi.org/10.12680/balneo.2020.344
21. Küçükçakır, N., Altan, L., & Korkmaz, N. (2013). Effects of Pilates exercises on pain, functional status and quality of life in women with postmenopausal osteoporosis. Journal of bodywork and movement therapies, 17(2), 204–211. https://doi.org/10.1016/j.jbmt.2012.07.003
22. Oksuz, S., & Unal, E. (2017). The effect of the clinical pilates exercises on kinesiophobia and other symptoms related to osteoporosis: Randomised controlled trial. Complementary therapies in clinical practice, 26, 68–72. https://doi.org/10.1016/j.ctcp.2016.12.001