

Exercise for Primary Dysmenorrhea: Network Meta-analysis of Randomized Controlled Trials

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Abstract

Background: Exercise is increasingly being promoted as an effective treatment for primary dysmenorrhea (PD); therefore, it is important to establish the efficacy of exercise interventions and to further investigate the optimal exercise modalities for PD populations. **Objective:** To determine the effectiveness of different exercises that can alleviate menstrual pain, reduce pain duration, and relieve menstrual symptoms through a network meta-analysis approach. **Methods:** This meta-analysis followed the PRISMA-NMA guidelines. The Cochrane Library, Web of Science, PubMed, Embase, and Medline databases were systematically searched for randomized controlled trials (RCTs) through April 24, 2024. The study aimed to measure the intensity of menstrual pain as the primary outcome, while the duration of pain and menstrual symptoms were considered secondary outcomes. Bayesian network meta-analyses were conducted for data analysis using STATA software and the R. The exercise interventions were ranked based on their surface under the cumulative ranking curve (SUCRA) values concerning pain intensity, duration, and menstrual symptoms. **Results:** Forty-nine randomized controlled trials (RCTs) involving 3,129 participants were included in this network meta-analysis. All types of exercise interventions were found to be effective in alleviating menstrual pain. Besides, Multi-component Exercise (ME) (SUCRA = 87.7%, standard mean difference (SMD) = -4.14; 95% confidence interval (95%CI) = -6.02 to -2.26) and Resistance Exercise (RE) (SUCRA = 77.6%, SMD = -3.96; 95%CI = -7.41 to -0.52) were found to have the most superior effects on reducing the pain according to the SUCRA analysis. Subgroup analysis highlighted that ME (SMD = -7.84; 95%CI = -17.16 to -0.12) and Mind-Body Exercises (MBE) (SMD = -2.62; 95%CI = -9.97 to -0.39) were more effective when the duration was more than eight weeks, while Aerobic Exercise (AE) (SMD = -2.81; 95%CI = -10.51 to -0.07) with a frequency of 1 to 3 sessions per week presented more significant effects. Additionally, Stretching Exercise (SE) (SUCRA = 74.0%) is more effective in reducing the duration of pain, while RE (SUCRA = 71.7%) was found to be more effective in improving menstrual symptoms. **Conclusion:** Exercise interventions are an effective treatment for PD. Both ME and RE are more effective than other exercises in reducing menstrual pain. Specifically, ME interventions lasting for over eight weeks were found to be particularly effective in reducing pain intensity, while AE interventions with 1-3 weekly sessions showed significant effects. Additionally, SE interventions showed superior impacts on improving pain duration, while RE interventions were more effective in alleviating menstrual symptoms.

Keywords

Exercise, Primary Dysmenorrhea, Therapeutic Exercise, Network Meta-analysis