Original Study

Comparison of the Effect of Massage Therapy and Isometric Exercises on Primary Dysmenorrhea: A Randomized Controlled Clinical Trial

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A B S T R A C T

Study Objective: Dysmenorrhea is the most common cyclic pelvic pain, and it affects the quality of life of many women. We sought to compare the effects of massage and isometric exercises on primary dysmenorrhea.
Design, Setting, and Participants: We conducted a randomized controlled trial at the dormitories of Shiraz University among 102 students with primary dysmenorrheal.
Interventions: The student groups were randomly divided into massage, isometric exercises, and control groups. The first group received 2 consecutive cycles of effleurage massage with lavender oil. The second group had 8 weeks of isometric exercises. No intervention was performed for the control group.
Main Outcome Measurements: Pain intensity was measured and recorded by using a visual analog scale. In addition, the duration of pain was measured in hours, and Spielberger's questionnaire was used to measure the anxiety level.
Results: Pain intensity had significantly reduced in the massage and exercises groups; the reduction was more significant in the massage group ($P < .001$). The results revealed a significant difference among the 3 groups in regard to the mean duration of pain after the third cycle ($P = .006$). However, no significant difference was found among the 3 groups concerning the mean level of anxiety. The results of intragroup comparisons only showed a significant reduction of anxiety level in the massage group after the third cycle ($P = .017$).
Conclusion: Based on the present findings, it seems that massage therapy and isometric exercises were effective in reducing some symptoms of dysmenorrhea.
Key Words: Dysmenorrhea, Isometric exercises, Massage, Anxiety, Students

Introduction

Dysmenorrhea is the most common cyclic pelvic pain.[1] The prevalence of dysmenorrhea has been reported as 25% to 97%, and nearly 20% of cases have debilitating pains.[2] Based on the prevalence age, primary dysmenorrhea starts at the age of 15 to 17 years and reaches its peak at 20 to 24 years of age.[3,4] Primary dysmenorrhea is not life threatening, but it causes absence from school and work and affects quality of life.[5] In comparison with those without dysmenorrhea, signs of depression, suicidal thoughts, increased anxiety, and lack of feeling healthy appear more often among those with severe dysmenorrheal.[6,7] Dysmenorrhea treatments include medications, such as oral contraceptive pills, nonsteroidal anti-inflammatory drugs, and sedatives.[8] However, the adverse effects of some medications, such as indigestion, headache, drowsiness, and drug dependency, lead to the patient's lack of interest in receiving such treatments.[9]

Dysmenorrhea can also be treated by using complementary therapies, including essential fatty acids, vitamins, acupuncture, herbal medicine, aromatherapy, reflexology, acupressure, massage therapy, and exercise.[10–14] Massage improves blood and lymph flow, reduces stress, and relaxes the contracted muscles.[15] Extracts of different oils are used in massage therapy. Aromatic oil extracts are absorbed through the skin or olfactory system.[16] Lavender extract is one oil whose analgesic effects have been reported in some studies.[10,16,17] Performing exercise can also be a supplementary medical component that reduces pain intensity, pain duration, and medication doses.[18] Isometric exercises are a special kind of exercise that lead to constant muscle contractions without moving and changing the angle of the joints.[19] The positive effects of isometric exercises on primary dysmenorrhea have been observed in some, but not all, studies.[18,20,21] Given the prevalence of primary dysmenorrhea, its undesirable symptoms, and the complications of some common treatments, this study was conducted to compare the effects of aromatic massage and

The authors indicate no conflicts of interest.

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1083-3188/$ - see front matter
http://dx.doi.org/10.1016/j.jpag.2015.02.003

isometric exercises on pain intensity, pain duration, and anxiety level in students with primary dysmenorrhea.

Materials and Methods

The present controlled clinical trial was conducted with 120 students residing in dormitories of Shiraz University, who were majoring in nonmedical fields and had primary dysmenorrhea. Considering the power of 90%, confidence level of 95%, predicted effect size of 60%, and loss rate of 10%, and using the following formula:

$$n=\frac{2\phi^2 ks^2}{(\partial)^2},$$

a 120-student sample size (40 in each group) was determined to be sufficient for the study. The study lasted for 8 months, from October 1, 2012 to May 31, 2013. At the beginning of the study, the participants were provided with complete information about the study, and written informed consent was obtained from them. Then, pain intensity was measured by using a visual analog scale (VAS), a 10-cm ruler on which "0" and "10" represent the minimum and maximum pain level, respectively. In addition, pain duration was measured based on the hours of pain reported by the participants. Spielberger's standard anxiety questionnaire was also used to assess the patients' anxiety levels. This questionnaire contains 40 questions on trait and state anxiety. Aghamohammadi-Kalkhora and Karimollahi[22] used Spielberger's questionnaire with 150 surgical patients and reported its reliability to be 97%. The reliability and validity indexes reported by Aghamohammadi-Kalkhora and Karimollahi[22] formed the bases of the present work. The inclusion criteria of the study were studying in nonmedical fields, having primary dysmenorrhea (diagnosed based on the demographic questionnaire and a gynecologist's confirmation) with pain intensity of 5 or higher according to the VAS, lack of routine use of any pharmacologic or nonpharmacologic analgesic agents, being nulliparous, not taking oral contraceptive pills, not having a systemic or a reproductive system disease, and not having limitation for performing isometric exercises, such as **a** cardiovascular disease.[23] On the other hand, the exclusion criteria were not being willing to cooperate in the study, using other treatments during the study, being allergic to lavender oil, taking any medications, having any disease, and having any physical or psychiatric problem.

The samples were selected using convenient sampling and were classified into 3 groups by using permuted-block randomization. In doing so, each sample was assigned to groups B, A, and C by using the table of random numbers. Numbers 1 to 3, 4 to 6, and 7 to 9 were appointed to groups A, B, and C, respectively. In addition, an inequality of 3 was replaced as needed to maintain balance.

This study was not blinded. All of the group members' pain duration, pain intensity, and anxiety level were measured at the peak of dysmenorrhea in the first month (before the intervention).

In the massage group, lavender extract based on olive oil with 10% purity was used. Skin sensitivity to lavender extract was tested by placing it on the inner part of the arm for 15 minutes. Because menstruation pain in primary dysmenorrhea starts from several hours before the beginning of bleeding up to 24 to 48 hours later, most individuals experience this pain on the first day.[24] Therefore, the study participants were asked to contact the researcher at the peak of menstrual pain (usually on the first day). Afterward, the procedure was explained to the patients, and they were asked to lie down in a supine position. Then, some lavender oil was applied on the massage spot, and effleurage massaging of the upper part of symphysis pubis and umbilicus was started in a clockwise manner (each for 15 minutes). Effleurage massage, which is performed with gentle and rotary strokes, is a simple, soothing, and light massage that is more easily tolerated by the patients who have pain.[25] The patients' pain intensity and duration were measured and recorded right after the massage by using the VAS. On the second day of menstruation, all the steps of the previous day were equally repeated for all the participants at almost the same hour of the day. Based on the study by Kim et al,[10] anxiety level was measured 24 hours after the second massage.

The participants of the second group were required to perform the isometric exercises since the third day of the menstrual cycle 5 days a week, 2 sessions a day, and 10 times per session for 8 weeks. These exercises included 7 stages, which were modified and confirmed by a specialized rehabilitation consultant. The protocol of the isometric exercises was as follows:

1. Sleeping in the supine position, extending the feet next to each other, pressing the feet on each other, holding for 5 seconds, and relaxing (pelvic floor and femoral adductor muscles)
2. Sleeping in the supine position, putting the feet crossed and pressing them on each other, holding for 5 seconds, and relaxing (pelvic floor and femoral adductor muscles)
3. Sleeping in supine position, bending the knees and thighs, putting a pillow between the 2 knees, pressing the knees to each other, holding for 5 seconds, and relaxing (pelvic floor and femoral adductor muscles)
4. Going back to the third position, putting the hand below the waist and pressing the waist to the ground, holding for 5 seconds, and relaxing (rectus abdominis and transverse abdominis muscles)
5. Sleeping in supine position, bending the knees and thighs and trying to raise the head and neck above the ground level, holding for 5 seconds, and relaxing (rectus abdominis and transverse abdominis muscles)
6. Sleeping in supine position, bending the knees and thighs and trying to move the head and neck toward the right thigh, holding for 5 seconds, and relaxing (abdominal internal and external oblique muscles)
7. Repeating stage 6 toward the left thigh (abdominal internal and external oblique muscles)
8. Taking 1 abdominal deep breath among the abovementioned movements (sleeping in supine position with bent knees and thighs and breathing through the nose in a way that the abdomen expands. One hand can also be placed on the abdomen to ensure abdominal