

Stretching or Core Strengthening Exercises for Managing Primary Dysmenorrhea

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Abstract

Background: Primary dysmenorrhea is the most common cyclic pelvic pain affecting quality of life. Incidence of primary dysmenorrhea was reported to be between 20% and 90% in different societies. Women that assigned in sports experienced fewer episodes of symptoms of dysmenorrhea. Several studies have shown that the reduction of dysmenorrhea in women, who regularly exercise may be due to effects of hormonal changes on uterine epithelial tissues or an increase in endorphin levels. It appears that exercise has analgesic effects that act in a non-specific way.

Aim of study: To prove that physical exercises can manage primary dysmenorrhea through using two types (stretching and core strengthening exercises) and compare between them as regard the intensity and duration of pain

Type of study: This randomized controlled study conducted on 150 females with primary dysmenorrhea attended to zagazig university hospital outpatient clinic. They were randomly assigned to two exercises and one control groups using a computer-generated randomization list. The interference groups were asked to comprehensive either active stretching or core strengthening practice for 8 weeks (4 days per week, 2 times a day, 10 min) at home. Pre-test and two post tests for all the groups were examined for pain intensity using Visual Analog Scale (VAS).and pain duration by hours. Data were entered into SPSS statistical software (v. 20) and analyzed using independent t-test, repeated measures ANOVA, Mean and Bonferroni Post hoc test. Besides, $P < 0.05$ was considered statistically significant.

Results: Intensity and duration of pain were significantly reduced in exercise groups ($P < 0.001$) as comparing to control group but no significant differences between readings of post test in both interventions groups.

Conclusion: Active stretching or core strengthening exercises seem to be an easy, non-pharmacological method for managing primary dysmenorrhea.

Keywords: Primary dysmenorrhea; Active stretching; Core strengthening; Exercise; Pain

Introduction

The term Dysmenorrhea comes from the Greek word for difficult monthly flow and describes painful menstruation. It is the most common gynecologic disorder, approximately, 20-90% of women suffer from this problem during their reproductive age [1]. It can be classified into two subtypes: Primary and Secondary Dysmenorrhea. Primary occurs when there is no identifiable pelvic disease and tends to occur within 12 months of menarche [2]. Dysmenorrhea generally, is characterized by cramping lower abdominal pain that concentrated in the supra pubic area and may radiate to the lower back and upper thighs. Pain usually develops within hours of the start of the menstruation and peaks as the flow becomes heaviest during the first day or two of the cycle [3]. Commonly, it is associated with nausea, vomiting, headache, fatigue, diarrhea, nervousness, mood swings, and (rarely) in severe cases syncope [4]. Primary dysmenorrhea is not life-threatening and does not cause disabilities but it leads to absenteeism and significantly affects the quality of life [5]. Dysmenorrhea is associated with restriction of activity and absence from school or work. The health burden and social and economic cost of dysmenorrhea is high. Non-attendance has been reported as between one third to one half missing school or work at least once, and 5% to 14% absent more frequently [6]. Dysmenorrhea is most commonly relieved by medication using like Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), analgesic tablets which reduce menstrual pain by affecting the level of prostaglandins and Oral Contraceptive Pills (OCP). The side effects from such medications are well known (nausea, breast tenderness, and intermenstrual bleeding, dizziness, drowsiness, hearing and visual disturbances) [7]. On the

other hand, complementary and alternative medicine include essential fatty acid, vitamins, supplements, Transcutaneous Electrical Nerve Stimulation (TENS), acupuncture, medicinal plants, acupressure, massage therapy and exercises [8].

Exercise can be defined as an activity that requires physical exertion, especially when performed to develop or maintain fitness [9]. Physical exercise has been suggested as a non-medical approach for the management of symptoms. The idea that various type of active or passive exercise might help in alleviating pain in primary dysmenorrhea is not a new issue. It is widely thought that exercise reduces the frequency and/or the severity of dysmenorrhea syndrome [2]. Research in the general population has shown that women who took part in regular, moderate, aerobic exercise had fewer pain and behavioral changes, than non-exercisers during period cycles. That reduction of dysmenorrhea may be due to effects of hormonal changes on uterine epithelial tissues or an increase in endorphin levels. It appears that exercise has analgesic effects that act in a non-specific way [10].

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Received October 12, 2015; **Accepted** November 04, 2015; **Published** February 09, 2016

Citation: Saleh HS, Mowafy HE, El Hameid AA (2016) Stretching or Core Strengthening Exercises for Managing Primary Dysmenorrhea. J Women's Health Care 5: 295. doi:10.4172/2167-0420.1000295

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It was believed that contracted ligamentous bands in the abdominal region were the causative factor for physical compression of nerve pathways and their irritation, so the proposed series of stretching exercise was considered very effective as it will increase the blood flow and metabolism of the uterus so reduces dysmenorrheal symptoms [11]. It was believed that the purpose of core strengthening is to combine the concepts of lumbar stabilization and how instability can lead to injury and pain specifically during stressful times of the female body and one of these repetitive stressful times is dysmenorrhea [12]. The lumbar portion of spine is sturdy and designed to take the force of the body and it also involved in the origin and insertion of certain musculature and nerve innervations to their correlated areas. If at any time a certain part of the lumbar spine is weak, it is not as its optimal level to handle functional stress, which can result in pain throughout the abdomen, low back, or thighs. These areas just happen to be the same areas that are affected by females suffering from dysmenorrhea [13]. Core strengthening allows the small intrinsic musculature surrounding the lumbar spine to be conditioned for greater performance, this type of training allows for isolation and strengthening of core muscle groups. When these muscles are strong, they are much more prepared to handle daily forces of normal biomechanics, even when the body is under the stress of the menstrual cycle. Core strengthening is a description of the muscular control around the lumbar spine to maintain functional stability [14]. Aim of this study is to assess the effectiveness of stretching and core strengthening exercises in the management of symptoms associated with primary dysmenorrhea and compare between them as regard the intensity and duration of pain.

Materials and Method

This Randomized controlled study was performed from December 2012 to April 2014 on 150 participants who came to outpatient clinic complained from painful menstruation. Samples were selected through convenience sampling and were then assigned to an intervention and a control groups by permuted block randomization. All participants experienced moderate to severe symptoms of dysmenorrhea. The selection processes of subjects were based on the diagnosis of primary dysmenorrhea after a thorough history and clinical examination. In some cases of doubt in differentiating primary or secondary dysmenorrhea, sonographic assessment was used. After the study protocol was approved by the Research Ethics Committee of the Zagazig University Hospitals, completely explaining the research course to the participants and receiving their verbal and written informed consents. The participants were randomly divided into 3 groups, 2 study groups (A, B) and control group (C). In the Intervention groups the subjects were asked to complete active stretching (A) or core strengthening protocol (B) for 8 weeks (4 days per week, 2 times a day, 10 min) at home. In the Pre-test, post-test 1 (after first cycle of doing exercise) and post-test 2 (after second cycle of doing exercise), all the subjects were examined for pain intensity and pain duration. At the beginning of this work, pain intensity was measured using Visual Analog Scale (VAS) (10-point scale). Which is valid reliable and proven in different studies as a measure of pain intensity. It is a 10-cm ruler on which, zero represent the lowest pain, 4 to 7 moderate and pain score between 7 and 10 were considered to be a severe form of dysmenorrhea pain intensity. Duration of pain was measured using pain hours [15]. The inclusion criteria of the study were saddle with primary dysmenorrhea, pain intensity of 5 or above in VAS. The exclusion criteria were: using pharmacological or non-pharmacological methods for pain relief during the study, suffering from systemic diseases or diseases in the genital organs abnormal vaginal bleeding and Irregular menstrual cycles, any history of regular exercises 3days/week. All Participants were given a self-administered questionnaire (one pre-test and two post

after the first and second menstrual cycle) and asked to answer them (Figure 1).

The protocol of exercises after confirmed by a specialized rehabilitation consultant was as follows:

Group A (stretching exercises)

Information was given to participants of group (A) to do 4 stretching exercises for 8 weeks at home (3 days per week and 3 times per day for 10 minutes). They were asked to avoid performing stretching exercises during the period cycle. They were given a questionnaire prior to the stretching exercises and completed it after 8 weeks of stretching exercises [16].

The prescribed exercises were as follows:

The first stretching exercise: The subjects were asked to stand and bend trunk forward from the hip joint so that the shoulders and back were positioned on a straight line and the upper body was placed parallel to the floor for 5 seconds repetition; 10 times (Figure 2).

The second stretching exercise: The subjects were requested to stand then raise 1 heel off the floor, then repeat the exercise with the other heel alternatively. The exercise was performed 20 times (Figure 3).

The third stretching exercise: The subjects were asked to spread their feet shoulder width, place trunk and hands in forward stretching

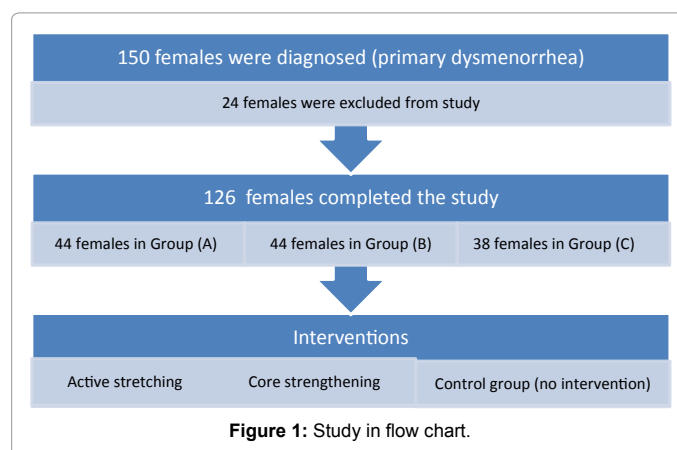


Figure 1: Study in flow chart.

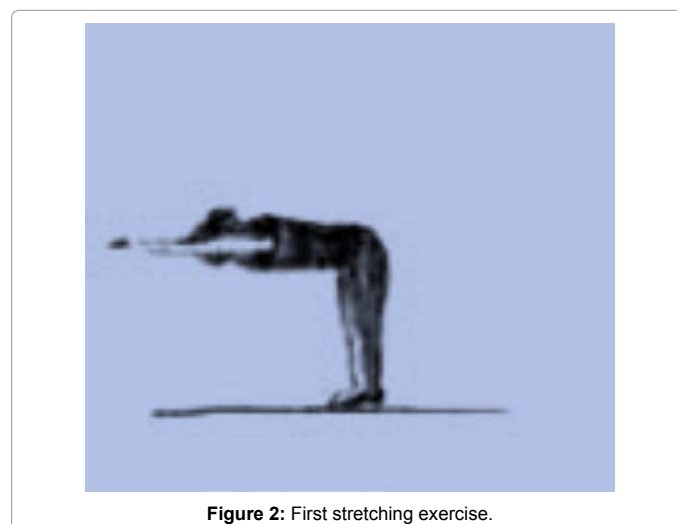


Figure 2: First stretching exercise.



Figure 3: Second stretching exercise.



Figure 4: Third stretching exercise.

mode, then completely bend her knees and maintain a squatting position, duration of this position was 5 sec, the subject then raised her body and repeated the same movements 10 times (Figure 4).

The fourth stretching exercise: The subjects were asked to spread her feet wider than shoulder width. Then the subject was asked to bend and touch left ankle with her right hand while putting her left hand in a stretched position above her head so that the head was in the middle and her head was turned and looked for her left hand, this exercise was repeated for the opposite foot with the same method. The exercises were repeated alternatively 10 times for each side of the body (Figure 5).

Group B (core strengthening)

The subjects were given a questionnaire and then they were requested to perform 4 core strengthening exercises for 4 days per week three times for 20 min (8 weeks).

The given exercises were as follows:

Pelvic bridging: The subjects were asked to lie supine and with knee flexed and then raise the pelvis upward till the comfort then hold that position for 5 sec and repetitions were 10 times (Figure 6).

Plank: The subjects were requested to lie prone and then by putting



Figure 5: Fourth stretching exercise.

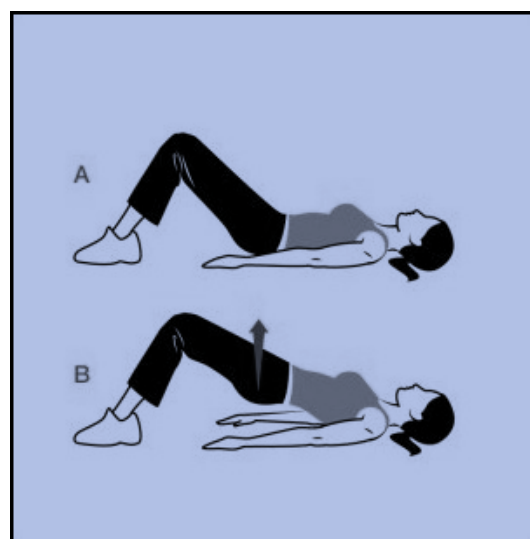


Figure 6: Pelvic bridging.

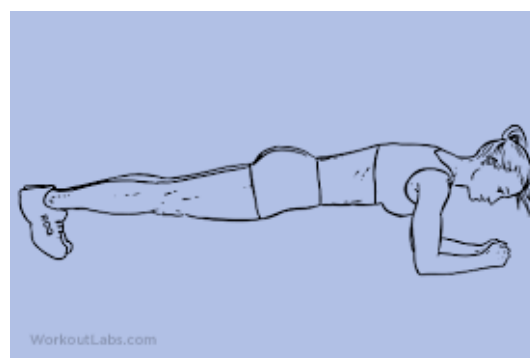


Figure 7: Plank.

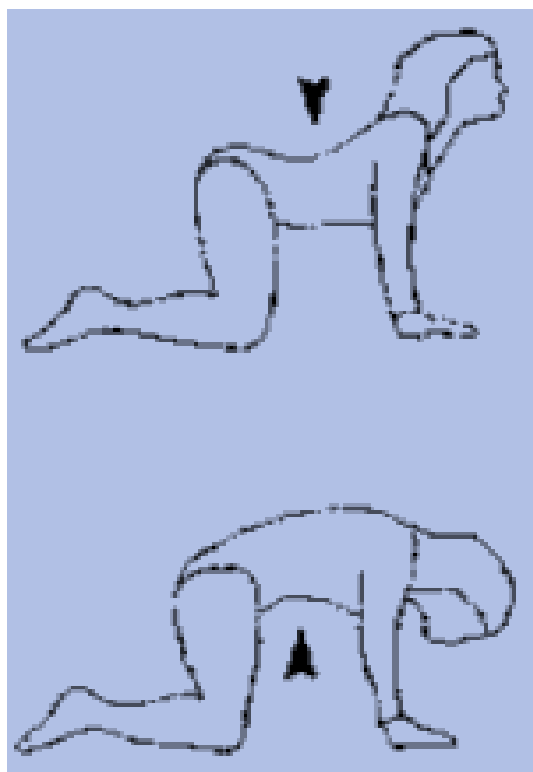


Figure 8: Cat and camel.

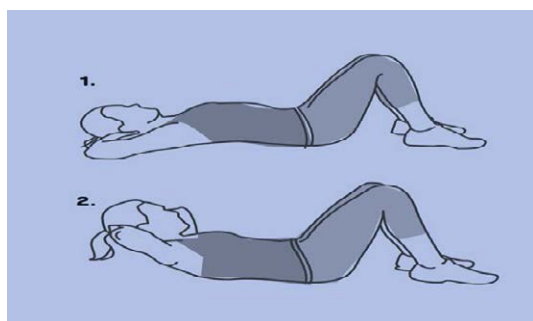


Figure 9: Curl up.

the weight on elbows and toes lift the body upward hold this position for 5 sec and 5 times repetitions (Figure 7).

Cat and camel: The subjects were requested to prone kneel and then take a deep breath from nose while making hump in the back (cat) and breathe out from mouth while curving the spine (camel) for 5 second 10 times repetitions (Figure 8).

Curl up: The subjects were requested to lie supine and mild knee flexed and clasp both hands behind the head and move the body towards the knee. For 5 second 10 repetitions (Figure 9).

After this at 8th week, post reading was taken for NPRS and primary dysmenorrhea questionnaire.

Group C (control)

The participants of this group would not participate in any exercise regimen described before. The first post reading (p1) was taken at 4th week and second post reading (p2) was taken at 8th week.

All were investigated in three menstrual cycles. In the first month in which no intervention was performed, the intensity and duration of pain were evaluated in control and exercise groups. Study questionnaire was completed and VAS was assessed in three groups after the second and third menstrual cycles.

Data were entered into SPSS statistical software (v. 20) and analyzed using independent t-test, repeated measures ANOVA, Mean and Bonferroni Post hoc test. Besides, $P < 0.05$ was considered statistically significant.

Results

This study was conducted on 150 female. (100 in group (A, B) (50 in each studying group) and 50 in control group). First group (G1) consisted of 44 females who performed 4 stretching exercises for 8 weeks at home (3 days per week and 3 times per day for 10 minutes), Second group (G2) consisted of 44 females who performed core strengthening exercises for 4 days per week three times for 20 min protocol and control group consisting of 38 females with no intervention. 24 patients were excluded (6 in group (A) stretching exercise group, 6 in group (B) core strengthening and 12 in group (C) control group) due to poor response to exercise management, soaring pain intensity and or for not correctly doing exercises or reluctance to continue one's assistance (Figures 10 and 11). Before intervention, no significant difference was found between participants regarding the mean age ($P=0.324$), menarche age ($P=0.411$), BMI ($P=0.897$), duration of menstrual cycles ($P=0.792$), duration of bleeding ($P=0.528$) (Table 1). No significant difference was observed between these three groups regarding the mean of pain

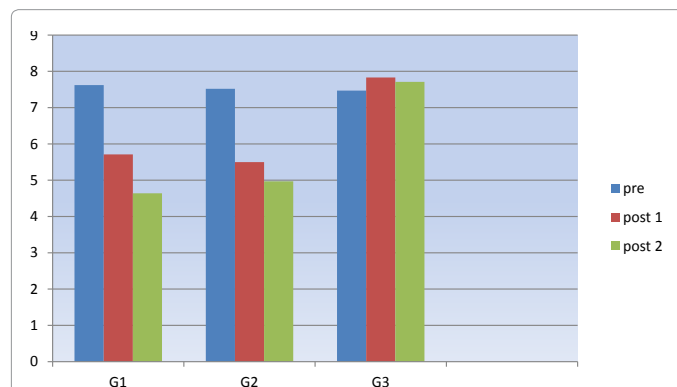


Figure 10: The comparison of pain intensity within the Group A (G1), Group B (G2) and Group C (G3).

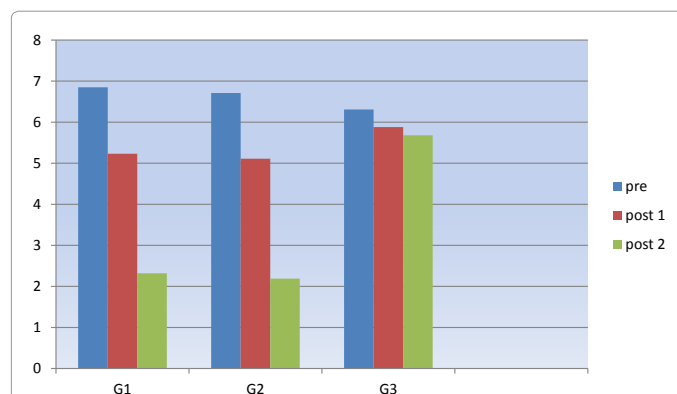


Figure 11: The comparison of pain duration within the Group A (G1), Group B (G2) and Group C (G3).

Demographic Characteristics	Stretching exercise N (44) SD ± mean	Core strengthening Exercise N (44) SD ± mean	Control N (38) SD ± mean	P-value
Age	20.52 ± 1.03	20.62 ± 1.06	21.06 ± 1.31	0.324
Menarche	12.29 ± 1.36	12.31 ± 1.29	12.24 ± 1.07	0.411
BMI	23.24 ± 1.02	23.30 ± 1.07	23.27 ± 1.09	0.897
Duration of Menstrual cycle	24.63 ± 4.26	24.73 ± 3.62	24.52 ± 4.34	0.792
Duration of Bleeding	5.71 ± 1.18	5.81 ± 1.16	24.52 ± 4.34	0.528

Mean values (± SD), P<0.05=Significant

Table 1: Demographic characteristics of the three groups.

Pain intensity	stretching exercise N (44) SD ± mean	Core strengthening Exercise N (44) SD ± mean	Control N (38) SD ± mean	F- value	P value
First cycle (before the intervention) (pre)	7.62 ± 1.82	7.52 ± 1.98	7.47 ± 1.56	0.723	0.876
Second cycle (post 1)	5.71 ± 2.81	5.53 ± 2.49	7.83 ± 1.78	711.05	<0.001
Third cycle (post 2)	4.64 ± 2.01	4.97 ± 1.69	7.71 ± 1.35	1025.76	<0.001

SD=Standard Deviation, F-value=F-test, P<0.05=Significant

Table 2: Comparing mean scores of pain intensity in three groups using visual analog scale score (VAS).

Pain duration	stretching exercise N (44) SD ± mean	Core strengthening Exercise N (44) SD ± mean	Control-38 SD ± mean	F -value	P value
First cycle (before the intervention)	6.85 ± 0.19	6.71 ± 0.14	6.31 ± 1.12	0.35	>0.05
Second cycle	5.23 ± 0.42	5.11 ± 0.38	5.88 ± 1.29	32.74	<0.001
Third cycle	2.32 ± 0.39	2.19 ± 0.29	5.68 ± 1.03	120.12	<0.001

SD=Standard Deviation, F-value=F-test, (P<0.05)=Significant

Table 3: Comparing mean scores of pain duration (h).

intensity and pain duration in the pretest reading. However, results revealed a significant difference between exercise and control groups in terms of pain intensity after the first and second cycles (P<0.001) (Table 2). Also, a significant difference was observed between exercise and control groups regarding the mean duration of pain in the second and third cycles (P<0.001) (Table 3).

Discussion

Pain in general has disabling nature and makes dysmenorrhea stressful and it can become important irritating factor in the life of lots of women, particularly who are self-financing. Some women are completely prostrated and cramped to bed, whereas others are able to remain in the works with the support of analgesics. So, many studies were done to replace medication by physical exercises in management of primary. The present study was conducted to see effect of physical exercises in relieving pain of primary dysmenorrhea and which exercise protocol is more better either active stretching or core strengthening. In this study, treated females reported a significant reduction in menstrual pain within an average of 8 weeks of exercises (Group 1 and Group 2). Since time ago, Israel et al. [17] found that after 12 weeks of aerobic training, the intensity of symptoms decreased and Golub et al. [18] expressed that dysmenorrhea in high school girls who were involved in sports and physical activities were less than non-exercise group. In present study, pain of primary dysmenorrhea has reduced in both exercise groups than in control group as regard intensity and duration. Pain duration is significant decrease in Group (1) from 6.85 to 5.23 (after first cycle) to 2.32 (after second cycle) and in Group (2) 6.71 to 5.11 (after first cycle) and to 2.19 (after second cycle) in Group 2 but in Group 3 the results are non-significant. These findings are similar to those of lots of authors who studied the effects of exercises on primary dysmenorrhea. Abbaspour et al. [19] and Shahr-jerdy et al. [20] proved that stretching exercises are effective in reducing pain intensity, pain duration, and the amount of painkillers used by girls with primary dysmenorrhea. Onur et al. [21] studied the impact of home-based exercise on quality of life of women with primary dysmenorrhea and

concluded that there is evidence that exercise has a positive effect in the treatment of dysmenorrhea.

This improvement may be due to the increase in the blood flow and metabolism of the uterus during exercise which may be effective in the reduction of dysmenorrheal symptoms. Stress tends to enhance sympathetic activity and may increase menstrual pain by exacerbating uterine contraction. Exercise may decrease this sympathetic activity and relief the stress through release of endorphins, substances produced by the brain that raise the pain threshold, so reducing symptoms [22]. Dawood [23] has shown that therapeutic exercise can increase the secretion of endorphins from the brain, and these materials in turn raise the pain threshold of the body. Daley [2] believed that contracted ligamentous bands in the abdominal region were the causative factor for physical compression of nerve pathways and their irritation, so the proposed series of stretching exercise was considered very effective. It was suggested that increasing core stability improve the symptoms of dysmenorrhea [13].

As core strengthening allows the small intrinsic musculature surrounding the lumbar spine to be conditioned for greater performance, Izzo and Labrila [24] proposed that the increase in the blood flow and metabolism of the uterus during exercise may be effective in the reduction of dysmenorrheal symptoms. Golomb et al. [25] concluded that exercise is widely accepted as a mean of moderating stress and biochemical changes in the immune system. A mechanism by which exercise may improve the symptoms of dysmenorrhea (reducing stress) has been articulated by Golomb et al. [25] so, findings of different studies have shown that therapeutic exercise and physical activity was related with reduced incidence of dysmenorrhea.

Conclusion

According to the results of this study, performing exercise in various forms including stretching and core strengthening exercises reduces pain intensity and duration of primary dysmenorrhea. So these can be

safely used as an alternative therapy for pain relief in dysmenorrhea as we are not selling with a disease state but with a functional problem.

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