

ORIGINAL ARTICLE

EFFECTIVENESS OF STRETCHING EXERCISES IN SYMPTOMATIC AND ASYMPTOMATIC PHASE IN PRIMARY DYSMENORRHOEA

Raheela Kanwal, Tahir Masood, Waqar Ahmed Awan, Mirza Shamim Baig,
Muhammad Naveed Babur

Isra Institute of Rehabilitation Sciences, Isra University, Islamabad campus, Islamabad

Background: Primary dysmenorrhoea is health related problem within females with high prevalence affecting different aspects of their life and their productivity. The objective of the study was to compare the effectiveness of stretching exercises done during symptomatic and asymptomatic phase of menstrual cycle in primary dysmenorrhoea. **Methods:** Randomized controlled trial (RCT) (double blinded) study was carried out at Royal group of colleges Gujranwala, Pakistan. Sixty six students with confirmed diagnosis of primary dysmenorrhoea were included through non-probability convenience sampling. The students were randomly assigned to two equal (n=33) groups: Asymptomatic (A) and Symptomatic (B). Each student was assessed for pain and associated symptoms of dysmenorrhoea by using numeric pain rating scale and Daily record of severity of problems (DRSP). Stretching exercises were performed thrice per week for group A which did exercises during asymptomatic phase and same exercises were done twice a day for group B only in symptomatic days. Both groups did exercises for three months. Data was taken at baseline and post menstrual phase of three successive menstrual cycles. The data was analyzed using SPSS 20. An independent samples t test was used to compare both groups and repeated measures ANOVA was used to find the intervention-based effects within each group. **Results:** Mean age of students was 21.29 ± 2.60 (Year), mean weight was 52.70 ± 4.81 (Kg), mean age at menarche was 13.18 ± 1.11 (Year) and mean BMI was 16.87 ± 0.81 (Kg/m^2). Both groups were comparable at baseline for age, weight, BMI and age at menarche as $p > 0.05$. Significant changes for pain and associated symptoms were found within each group ($p < 0.01$). However, both groups have non-significant difference with each other ($p > 0.05$). **Conclusion:** It is concluded that stretching exercises in symptomatic phase and asymptomatic phase are equally effective to relieve pain and associated symptoms of Primary Dysmenorrhoea.

Keywords: Primary dysmenorrhoea, stretching exercises, numeric pain rating scale, DRSP

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INTRODUCTION

Dysmenorrhoea is a Greek word describing difficult menstrual flow. Primary dysmenorrhoea is crampy pain occurring immediately before or during menstruation in adolescence after the establishment of ovulatory cycles but in the absence of any pelvic pathology. It is caused by myometrial activity which produces pressure in excess of 60 mm Hg, resulting in uterine ischemia. This myometrial activity is augmented by prostaglandin synthesis which further triggers contractions in the uterine and intestinal walls.¹ The symptoms of primary dysmenorrhoea include aching pain or feeling of pressure in the lower abdomen, which can radiate to the hips, lower back, and inner thighs. Pain can be associated with upset stomach, vomiting and loose stools as well. Tiredness, fatigue, depression and acne are physiological effects of normal menstruation. The metabolic rate lowers during menstruation. 30 - 90% of women present with primary menstrual pain with varying intensity. From them one third to one half reports moderate or severe symptoms.² It represents public health problem having its effects on individual's psychological status, quality of life, stress level and other social activities. It is a common cause of

absenteeism from school and college. Results of some studies showed that more than 50% of menstruating females are affected by pain, with 10% to 12% of them having severe pain which results in decreased capacity for 1 to 3 days each month.^{3,4,5}

Management of menstrual cramps includes both pharmacological and non-pharmacological strategies. However, cultural variables and personality traits have been more influencing than the perceptual and cognitive levels in the management of menstrual cramps.⁶ Medical management consists of Aspirin or any other analgesic, Oral contraceptives, and local anaesthetics but all these methods have several side effects. Non pharmacological treatments comprise of physical therapy, acupuncture, acupressure, microwave diathermy, placebo and toftness techniques. Physical therapy treatments include: Transcutaneous electrical nerve stimulation (TENS), aerobic exercises, manual physical therapy, stretching exercises and connective tissue massage. All of these modalities are thought to act by stimulating endogenous opioid pain-modulating systems. It can also be managed effectively by natural methods provided one is psychologically prepared to face it.⁷

Stretching exercises reduce pain intensity, duration, and the amount of painkillers being used by vasodilatation, release of endogenous opiates, shutting of blood flow from viscera resulting in less pelvic congestion. They also improve flexibility, restore mobility, relax tense uterine muscles and maintain good abdominal tone.⁸ All of these are acute effects of stretching exercises. Long term effects of continuous stretching exercises are increase in range of joints and increase in length of muscles. Stretch-based exercises also lower the excitability of the motor neuron pool.⁹ In dysmenorrhoea, contracted ligamentous bands in the abdominal region cause physical compression and irritation of nerve pathways, so the series of stretching exercise can be effective.^{10,11} Stretching and core strengthening exercises are effective in Primary Dysmenorrhea.¹² 12 week of stretch training causes significant decrease in Physical and Psychological symptoms of dysmenorrhea.¹³

There is dire need to find a cost effective and optimal management strategy for primary dysmenorrhoea. Several studies have been conducted on complementary and alternative methods due to high costs, complications, and contraindications of drug therapies as well as accessibility and public desire for using complementary treatments.¹⁴⁻¹⁶ However the findings regarding the effects of physical exercise on primary dysmenorrhoea have been contradictory,^{12,17} if moderate self-stretching exercises for three to four days per month give relief from pain and decrease the symptoms of dysmenorrhoea more than or equal to other methods including stretching exercises during asymptomatic phase then it is more feasible for girls to do it twice daily. To the best of authors' knowledge, there is no published study investigating the role of stretching exercises in symptomatic phase for primary dysmenorrhoea.

METHODS

A double-blind randomized controlled trial was conducted in Royal group of colleges Gujranwala after approval from ethical review board. Sixty six subjects with complaints of primary dysmenorrhoea with age of 16–21 years, non-athletes, free from any neuromuscular disorders were recruited in the study. Athletes, individuals with neuromuscular problems, pregnant females and students with complaints of secondary dysmenorrhoea were excluded. The subjects were recruited through convenience sampling technique and randomly assigned to two equal (n=33) groups: Asymptomatic (A) and Symptomatic (B) through lottery method (Figure-1). After taking written, informed consent, data was collected in terms of age, weight, Body Mass Index and social status. Each student was assessed for pain and associated symptoms by numeric

pain rating scale and Daily record of severity of problems (DRSP).

Group A was given stretching exercises of abdominal muscles and they were asked to stop these exercises during symptomatic phase (Table 1). Group B was given same exercises but only in symptomatic days (Table-1). Exercises were demonstrated by an expert and were performed at least once during the familiarization session. Follow up with the subjects was done every month after menstrual cycle for three successive months. Data was collected after every cycle with same tools. Repeated measures ANOVA was used to analyze effects of stretching exercise on the symptoms of primary dysmenorrhoea for each group individually. In order to compare both groups independent samples t test was used. The data was analyzed through SPSS-20. The level of significance was set at $p < 0.05$.

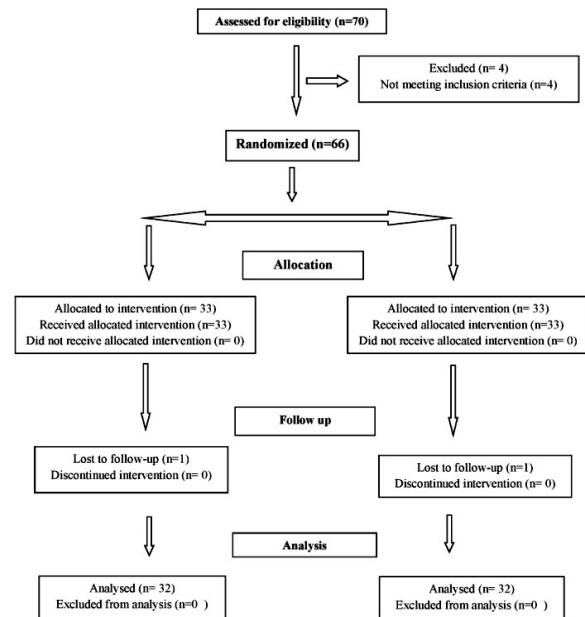


Figure-1: CONSORT diagram

Following exercises were performed:

Step I: Bend both knees with the feet flat on the ground and roll them to one side. At the Same time, carry both arms and head to the other side too. Then repeat for other side.

Step II: stand behind a chair. Bend trunk forward from the hip joint. Shoulders and back are positioned on a straight line. The upper body is placed parallel to the floor.

Step III: stand 10–20 cm behind a chair, and then raise one heel off the floor. Repeat with the other heel alternately.

Step VI: Place trunk and hands in forward stretching mode, completely bend knees. Maintain a squatting position.

Step V: spread feet wider than shoulder width. To bend and touch left ankle with right hand, putting left hand in a stretched position above head, the head is in the middle, then head turned and looked for left hand. Repeat for the opposite ankle with the same method.

Step VI: lie down in the supine position, the shoulders, back, and feet are kept on the floor, the knees were bent with the help of her hands and brought towards chin.

Step VII: to stand against a wall and put hands behind head with elbows pointed forward in the direction of the eyes, slightly bending the vertebral column to contract the abdominal muscle wall for 10 seconds.

Table-1: Stretching exercises protocol

	Group A	Group B
Frequency of sessions	3 times/week (asymptomatic)	Twice/day (symptomatic days)
Repetition of stretches	3 times	3 times
Hold of stretch	5 seconds	5 seconds
Relaxation time	25 seconds	25 seconds
Duration of intervention	3 times/week for 3 months	4 days/ month for 3 months

RESULTS

At baseline both groups were comparable in terms of age, body mass index, weight, level of pain and other symptoms of primary dysmenorrhoea as shown by $p > 0.05$ and Mean±SD (Table-2, 4).

Table-2: Subjects demographics

Demographics	Mean±SD		P-value
	Group A	Group B	
Age(year)	21.15±2.46	21.63±2.63	0.456
Age at menarche (year)	13.33±1.36	13.06±0.73	0.345
BMI(kg/ m²)	16.89±0.63	16.82±0.98	0.724
Weight(kg)	52.87±3.74	52.73±5.77	0.905

Within-Group Analysis:

Pain: Within group a, pain started to improve after two months treatment ($p < 0.05$). Similarly within group B pain improved after 2 months session ($p < 0.05$). Consequently, there was significant improvement in pain at the end of rehabilitation in both groups (Figure-2). Month wise p-values can be seen in Table-3.

DRSP scale: In group A, all symptoms had significant improvement after 3 months exercise sessions except the effects on increased appetite. In group B there was significant improvement of all components of DRSP except effects on sleep. Also total DRSP score improved significantly in both groups ($p < 0.001$). Month wise p values can be seen in Table-3.

Between-Group Comparison:

Pain: When both groups were compared, there are no significant group differences at any stage of rehabilitation ($p > 0.05$) (Table-4).

DRSP score: When both groups are compared to each other no significant difference is found ($p > 0.05$) (Table-4).

Table-3: Month wise treatment Induced changes within both groups

Scale	Groups	Months	Mean±SD		P		
			Pre	Post			
Pain	Group A	0-1	6.24±2.16	6.00±1.87	1.00		
		1-2	6.00±1.87	5.21±1.93	0.00		
		2-3	5.21±1.93	4.81±1.74	0.54		
		0-2	6.24±2.16	5.21±1.93	0.01		
		0-3	6.24±2.16	4.81±1.74	0.00		
		0-1	6.59±1.96	6.25±1.86	0.08		
	Group B	1-2	6.25±1.86	4.84±1.70	0.00		
		2-3	4.84±1.70	4.18±1.73	0.02		
		0-2	6.59±1.96	4.84±1.70	0.00		
		0-3	6.7±1.96	4.30±1.72	0.00		
		DRSP	Group A	0-1	53.96±7.03	47.21±8.18	0.00
				1-2	47.21±8.18	41.15±10.99	0.00
2-3	41.15±10.99			35.18±12.14	0.00		
0-2	53.96±7.03			41.15±10.99	0.00		
0-3	53.96±7.03			35.18±12.14	0.00		
0-1	50.87±13.93			46.09±12.37	0.00		
Group B	1-2		46.09±12.37	37.75±12.38	0.00		
	2-3		37.75±12.38	31.71±11.04	0.00		
	0-2		50.87±13.93	37.75±12.38	0.00		
	0-3		50.87±13.93	31.71±11.04	0.00		

Table-4: Post intervention comparison between groups (Mean±SD)

Scale	Months	Group A	Group B	P
Pain	0	6.17±2.16	6.7±1.96	0.31
	1	5.97±1.85	6.3±1.91	0.48
	2	5.2±1.90	4.9±1.72	0.50
	3	4.73±1.78	4.30±1.72	0.32
DRSP	0	53.05±7.78	51.16±14.09	0.50
	1	47.02±8.02	45.53±12.46	0.56
	2	40.91±10.72	37.36±12.67	0.23
	3	34.87±12.08	32.0±11.33	0.33

DISCUSSION

Pain decreased significantly after 2 months treatment within both groups. Mean values showed a sustained improvement in pain every month but significant in only second month in group A and in each of last two months in group B. There are different other studies regarding the effects of stretching exercises which also showed improvement of pain due to Primary Dysmenorrhoea.

For example, one comparative study showed that active stretching and core strengthening exercises both can be safely used as an alternative therapy for pain relief in primary dysmenorrhoea. Active stretching and core strengthening exercises both can also be safely used as an alternative treatment for pain relief in dysmenorrhoea without mediation through progesterone. Primary Dysmenorrhoea is a functional problem that is not a disease state, so there should be a true focus on holistic approach.¹⁸ Similarly, another study compared aerobic exercises with stretching exercises and both were equally effective to reduce the intensity of pain but in this study the protocol was a little different as it included 10 stretches and each stretch started with 10 seconds and 1 second was added with every session.¹⁹ Mario et al did one study and showed that strengthening, stretching, muscle relaxation techniques and jogging are effective for reducing

dysmenorrhic symptoms when they are regularly performed but in this study control group was on placebo so combination of all these exercises showed positive results.²⁰ One study done in Iran showed that the exercise can decrease the duration and severity of dysmenorrhea and also using of the sedative tablets in high school girls.²¹ Dysmenorrhea affects the regular classes, studies and daily activities of the adolescent girls. As society has tremendous technological advancement in day to day life so the natural method of pain reduction is acceptable and accessible to everyone in the world. One study examined the effect of simple exercises including 10 min stretching and showed significant improvement by also using VAS to assess pain.²² One study was done to see the effects of Pilates on pain and all of its components like sensory, affective and evaluative and it also showed significant improvement for all components with p value < 0.05.²³

Primary Dysmenorrhoea cannot be fully represented by only pain. Pain is though a major symptom but other symptoms are also associated with it. So for complete assessment of symptoms of primary dysmenorrhoea, DRSP has been used. In the present study if every domain according to DRSP is analyzed individually then depression, anxiety level, mood swings and anger improved significantly within both groups. For interest in activities, there was gradual but non-significant improvement within both groups. Regarding difficulty in concentration level in group A it showed gradual but non-significant improvement but within group B it improved significantly every month. Energy level improved in group A while in group B improvement was vague. For eating habits in both groups it improved gradually but non-significantly. Sleep problems improved with significant difference only in group A. Self-control improved within both groups significantly. For physiological symptoms significant improvement was only in group A. In majority of studies effects of exercises and interferential currents have been studied by only measuring pain, only very few are there which also observed the effects on other symptoms of dysmenorrhoea as well. In one study the intensity of dysmenorrhoea was determined using a modified questionnaire adopted from Menstrual Symptom Questionnaire (MSQ) and results showed that exercising had positive effects on all menstrual symptoms (19). One review for effects of exercises for Primary Dysmenorrhoea suggests that there is a beneficial impact of physical exercise on menstrual cycle symptoms thus reducing the symptoms of dysmenorrhoea. Medical literature indicates for the effectiveness of exercise in women's other complaints about menstrual cycle.^{24,25}

One study showed decline in the severity of symptoms of Primary Dysmenorrhoea after 12-week aerobic training program.²⁶ Izzo and Labriola showed

that dysmenorrhoea is less prevalent in athletes who had begun their sports activities prior to menarche.²⁷ Several studies have shown that the improvement of dysmenorrhoea in women who regularly exercise is due to effects of hormonal changes on uterine epithelial tissues or an increase in endorphin levels. Exercise has analgesic effects that act in a non-specific way.²⁸ Physiologic mechanism through which exercise might improve symptoms resulting from the menstrual cycle are not clear. However, some hypotheses are proposed for its explanation. Izzo and Labriola proposed that the increase in the blood flow and metabolism of the uterus is effective in the reduction of dysmenorrhoeal symptoms.²⁷ Some studies have shown that exercise can result in reduced stress, fatigue and depressed mood so it relieves some of the symptoms that can occur with primary dysmenorrhoea. It is therefore possible that the relationship between exercise and primary dysmenorrhoea is mediated by stress reduction rather than via direct biological pathways.²⁹

Another hypothesis suggests that therapeutic exercise (including stretching exercises) increase the secretion of endorphins from the brain, which in turn raise the pain threshold of the body.¹⁰ Billing in 1943 proposed that women with primary dysmenorrhoea had contracted ligamentous bands in the abdomen so he proposed a series of stretching exercises which reported a high rate of symptomatic relief.³⁰ Later on, several observational studies reported that exercise is associated with reduced prevalence of dysmenorrhea.¹³ Golomb et al studied the effects of exercise therapy on the frequency of dysmenorrhoea and premenstrual problems in high school girls for more than 3 years and it showed positive significant results if are performed on daily basis but there was no differentiation for the type of dysmenorrhoea and specific protocol of exercises was also not mentioned.³¹ Several recent studies have confirmed the positive effects of stretching exercises on the intensity of dysmenorrhoea in high school and university student girls.^{8,21,32,33} Acute stretching suppresses sympathetic nervous activity and increases parasympathetic activity.³⁴

CONCLUSION

Stretching exercises performed before and during the menstruation are effective to improve pain and other symptoms of primary dysmenorrhoea. But stretching exercises during symptomatic phase are of less duration, so can be preferred to use. Life style changes, ethnicity and hereditary factors can affect the results and should further be studied in future.

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Address for Correspondence:

Dr Waqar Ahmed Awan, Assistant Professor, Isra Institute of Rehabilitation Sciences, Isra University, Islamabad Campus, Islamabad. **Cell:** +92-333-5348846

Email: wawan01@gmail.com

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