

Efficacy of Core Muscle Strengthening in Women with Dysmenorrhea

Simran Sharma ¹, S. Jenifer Augustina ^{*2}

¹ Physiotherapy Student, Saveetha College Of Physiotherapy, Saveetha Institute Of Medical And Technical Science, Thandalam, Chennai – 602 105, Tamilnadu, India.

^{*2} Assistant Professor, Saveetha College Of Physiotherapy, Saveetha Institute Of Medical And Technical Science, Thandalam, Chennai – 602 105, Tamilnadu, India.

ABSTRACT

Introduction: Dysmenorrhea is characterized by pain in the lower abdomen and it is one of the most common complaints seen in women of reproductive age during menstruation. In Primary dysmenorrhea, the abdominal pain is not associated with any underlying pathology of the uterus and secondary dysmenorrhea is caused due to any pathology inside or outside the uterus. It can also lead to nausea, headache, fatigue and diarrhea. The aim of the study is to find the efficacy of core muscle strengthening in women with dysmenorrhea.

Method: The samples were selected according to the inclusion criteria and sectioned into groups with convenience sampling technique. Group A (n=30) was prescribed with heating pad and lower abdominal massage in circular motions and Group B (n=30) with core muscle strengthening exercises. The exercise regimen should be followed for a period of 3 months, 4 days a week (except for the first two days of menstruation). The duration of the exercises was 40 minutes per day, with a brief period of warm up and cool down respectively.

Results: Statistical Analysis was done for all collected data using Wilcoxon Signed-Rank Test and Paired t-test. The test shows a significant difference ($p < 0.01$) between the Groups A & B. Group B showed improvement compared to Group A.

Conclusion: The experimental study showed that strengthening abdominal muscles helps in reduction in intensity of pain or no pain at all and also improved the quality of life in women with dysmenorrhea.

KEY WORDS: Core muscle, Dysmenorrhea, Exercises, Menstrual pain, Physiotherapy.

Address for correspondence: Dr. S. Jenifer Augustina, M.P.T., Assistant Professor, Saveetha College Of Physiotherapy, Saveetha Institute Of Medical And Technical Science, Thandalam, Chennai – 602 105, Tamilnadu, India. **E-Mail:** Jenifer.augustina@gmail.com

Access this Article online	Journal Information
Quick Response code 	International Journal of Physiotherapy and Research ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr
	Article Information
	Received: 27 Feb 2022 Peer Review: 28 Feb 2022
	Accepted: 30 Mar 2022 Published (O): 11 Apr 2022 Published (P): 11 Apr 2022
DOI: 10.16965/ijpr.2022.116	

INTRODUCTION

Dysmenorrhea is characterized by pain in the lower abdomen and it is one of the most common complain seen in women of reproductive age during menstruation. It basically means painful menstruation restricting the daily activities in a reproductive women's life. It is classified into Primary, idiopathic or true dysmenorrhea and Secondary dysmenorrhea [1].

Primary dysmenorrhea is wherein the abdominal pain is not associated to any underlying pathology of the uterus and the pain is usually felt in the lower abdomen, spasmodic in nature [2]. The pain starts within 3 years of menarche and maybe seen as a sharp, intermittent spasm of pain, usually in the suprapubic region and can sometimes radiate to the back of the thigh. Systemic symptoms like nausea, vomiting,

headache, lightheadedness, fever, fatigue can also be noticed [3]. Secondary dysmenorrhea is the pain is associated to any underlying pathology, there may be presence of any fibroids, adenomyosis, pelvic inflammatory disease and endometriosis. Unilateral dysmenorrhea i.e., pain felt only on either right or left side usually occurs in a rudimentary horn of a bicornuate uterus [4]. The pain during menstruation is felt due to release of prostaglandins by the hormone progesterone in the endometrium during the ovulatory phase [4].

In primary dysmenorrhea the pain usually begins after few hours or just with the onset of the menstruation and may last from 48 to 72 hours (2-3 days). Prostaglandin synthase inhibitors, also called non-steroidal anti-inflammatory drugs (NSAIDs) are generally used to treat primary dysmenorrhea. Hormonal contraceptives are also used and are equally effective in treating primary dysmenorrhea but it is said that a combination of NSAIDs and Hormonal contraceptives are more effective and show better results in relieving when compared to usage of a single drug whereas for secondary dysmenorrhea NSAIDs and contraceptives are less likely to provide pain relief [5]. Secondary dysmenorrhea is supposed to be treated according to the underlying pathology which may also require any surgical intervention. Alternative or Non-pharmacological treatments include TENS, exercise, acupuncture, acupressure, massage therapy, heat pads. Exercise is an activity performed to develop or maintain fitness which requires physical exertion, is one of the non-pharmacological and effective ways of treating dysmenorrhea. The reduction of pain maybe due to the effect's hormonal changes in the uterine tissue or due to an increase in the endorphin levels. Core muscle strengthening focuses on isolated muscle group conditioning which will strengthen the small intrinsic musculature around the lumbar spine and provide lumbar stability. When these muscles are strong, they become capable of handling normal biomechanical forces even the stress of menstrual cramps which a women's body undergoes during the menstrual cycle [6]. Physicians ruling out the causes for dysmenorrhea said that majority of the cases were either due to poor posture, weak

abdominal musculature or poor circulation [7].

The primary objective of this study was to find the efficacy of core muscle strengthening. Secondly was to reduce the intensity of pain and improve the quality of life in women with primary dysmenorrhea.

Need for the study: Dysmenorrhea may be normal to some women but few women experience severe pain during their menstrual cycle and it affects the quality of life leading to absenteeism from work activity and also affects their academics. The purpose of this study is to determine the effects of core muscle strengthening on women with dysmenorrhea and also improve the quality of life.

Having found the claims and few articles available suggesting that prescribing exercises to women with primary dysmenorrhea is one of the effective and non-pharmacological approaches to treat menstrual cramps. And also weakness of abdominal muscles can also lead to severe pain during menstruation.

Though exercises help in decreasing the pain, there are not many evidence available to prove its efficacy. This study focuses on strengthening the core muscles to reduce pain intensity and improving the overall quality of life of women with primary dysmenorrhea.

METHODOLOGY

Procedure: After finding the suitability as per the inclusion and exclusion criteria, subjects selected were requested to participate in the study.

A sample of sixty girls were selected, aged between 18-22yrs from Saveetha College of Physiotherapy, Chennai. Subjects those who were willing to participate were briefed about the study and the intervention after which their informed consent was taken via Google forms. The subjects were then divided into two groups. Group A (control group) and Group B (experimental group). Each group consisted of 30 participants. Demographic details along with WaLIDD score and 7-stage abdominal strength test to assess the intensity of pain and strength of abdominal muscles was done at baseline before the intervention and at the end of 12th week of intervention.

Subjects in Group A received Google forms wherein they had to answer questions to measure pre-test and post-test values using the WaLIDD score and Group B participants received the 7-stage abdominal strength test along with WaLIDD score to measure the pre- and post-test values.

GROUP A (Control group): In control group the participants were asked to use heating pads during the painful days of menstruation and self-massage in circular motions using the finger tips over the lower abdominal region for 15mins each side for the first 3 days. The subjects were asked to follow the protocol for a period of 12 weeks.

GROUP B (Experimental group)

Exercise protocol:

1. Bicycle crunches:

Position: Supine lying

Procedure: Lift one leg just off the ground and extend it out. Lift the other leg and bend the knee towards the chest twisting through the core so the opposite arm comes towards the raised knee. Elbows need not touch the knee instead focus on moving through the core while turning towards torso.

2. Abdominal curls:

Position: Crook lying

Procedure: Lie on the back with bent knees. Straighten the arms and hold them slightly off the ground with the palms facing downwards. Exhale and move the upper body towards the knees. Inhale and lower smoothly with an exhale.

3. Standing trunk rotation:

Position: Stride standing

Procedure: Stand with the legs wider than shoulder-width apart, then reach across body. Start with the body centered on the right leg, then push the right foot into the ground to shift the weight of the body to the left leg while rotating the abs and chest, keeping arms straighten directly ahead during the movement. Keep pushing off the right foot as the body shifts to the left hip and the arms and the trunk twist as far to the left as possible. Then push off the left foot and slowly twist the arms across the body to return the hands to the starting position.

4. Side bend:

Position: Standing

Procedure: Stand tall with feet and legs together and reach both arms straight up overhead and inhale simultaneously. Lower the right arm down the right side of the body and exhale while lengthening the left arm over the head, bending body gently to the right.

5. Pelvic bridging:

Position: Crook lying

Procedure: Bend the knees and position the feet firmly on the mat, ensuring that they are hip-width apart and spine in a neutral position. Allow the arms to rest by the side on the mat. Press the heel against the ground, activate the glutes and raise the pelvis off the floor until the body forms one straight line from chin to knee, resting on the shoulders. Inhale and lower the pelvis to return to the starting position.

6. Mountain climbers:

Position: Top press-up position

Procedure: Ask the subject to go into a top press-up position, supporting the weight of the body on hands and toes, with the arms and knees extended. Keeping the core braced and shoulders, hip and feet in straight line throughout, bring one knee towards the chest and return it back to the starting position. Repeat the movement to the opposite knee as well.

The above-mentioned exercises were to be followed for 3 months, 4 days a week expect for the first two days of menstruation. The duration of the exercises was 40 minutes per day, 20 repetitions x 3 sets and a period of 10-20 secs of rest between each exercise.

Before the commencement of exercises a brief period (5-7mins) of warm up including jumping jacks, high leg kicks, lunges and stretching. After following the core muscle exercise regimen, a cool down period of 5min including light jogging, low leg licks, upper body and back stretch and relaxing positions. The subjects were asked to perform the exercises at their own comfortable and preferable timings, but 1hr before any meal and 1.5hrs after any meal and were advised to follow the exercises every alternative day and terminate the exercise in case of severe pain, discomfort or uneasiness.

For the follow-up, Google forms were sent every week to all the participants asking for their demographic details, last menstruation, number of days they performed the exercises and was there any change in intensity of pain and quality of life and pre- & post-test measurements were taken at first and the last week to interpret the overall result.

Data Collection Procedure: This is an experimental study with two groups one being the experimental and the other control. The subjects were selected according to the inclusion and exclusion criteria and informed consent was obtained from all the subjects. Subjects were assigned into the two groups using a lottery method. Each group consists of 30 subjects. Data was collected prior to the exercises to obtain a baseline reading and post-exercise values were obtained.

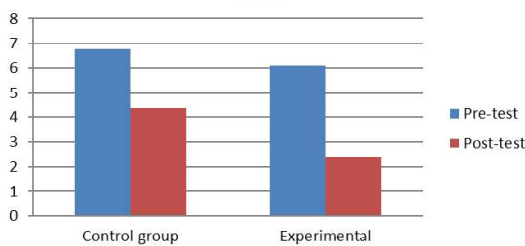
RESULT

The collected data was tabulated and analyzed using descriptive and inferential statistics. To all parameters mean and standard deviation (SD) was calculated. Wilcoxon Signed-Ranked Test and Paired t-test was used to compare the effectiveness of the treatment measures between the groups pre- & post-strengthening.

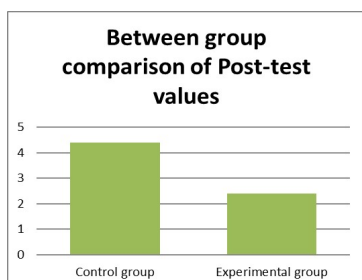
Table 1: WalIDD score post-test of Group A & B.

	n	Mean (W)	SD	Z value	Sig.
Group A & B (Post- test)	30	232.5	48.6	-4.0005	0.00001

Mean comparison of Pre- & Post-test



Graph 1: Mean comparison of Pre- & Post-test.



Graph 2: Between group comparison of Post-test values.

Table 2: 7 Stage Abdominal Strength Test.

	n	Mean	SD
Pre-test	30	4.5	0.97379
Post-test	30	6.8	1.0635

DISCUSSION

Dysmenorrhea is considered to be one of major problem faced by women of reproductive age. It not only causes pain but also affects the overall quality of life, leading to absenteeism from school/college/work. This study focuses on training the core muscles. Especially muscles of the abdomen i.e. rectus abdominus, transverse abdominus, and external obliques since few articles suggested that weakness of the abdominal core can also be the reason for dysmenorrhea.

Dysmenorrhoea is a modifiable condition [18]. French L. Estimated that age above 20 years young age and nulliparity are associated with dysmenorrhoea. Most of the risk factors are attempts to lose weight, depression or anxiety, disruption of social networks, heavy menses, and smoking [19]. Other than using pharmacological therapies, Non-Pharmacological therapies like massage, yoga, exercise, and nutritional interventions may provide benefits without side effects were to be improved and limited evidence was found on it [20]. Obesity and inappropriate diet is another risk factor noted for dysmenorrheal [21].

Dysmenorrhea is a significant symptom for a large proportion of women of reproductive age; however, severe pain limiting daily activities is less common [22]. TENS can provide a safe and effective non-medical means of pain relief for dysmenorrhoea [23]. Physical activity and relaxation techniques can be implemented during primary dysmenorrhoea which helps in reducing pain and depression. Progressive relaxation exercises are an effective method for reducing dysmenorrhea when they are performed regularly [24]. Low-intensity exercise such as stretching, core strengthening, and high-intensity exercise such as aerobic exercise helps in decreasing dysmenorrhoea during menstruation [25]. A three to eight weeks combined exercise program has an effect in managing symptoms associated with primary dysmenorrhoea [26]. Curl-up repetitions have revealed increased

endurance in abdominal muscles [27]. Core stability is essential for proper load balance within the spine, pelvis, and kinetic chain. The so-called core is the group of trunk muscles that surround the spine and abdominal viscera. Abdominal, gluteal, hip girdle, paraspinal, and other muscles work in concert to provide spinal stability [28].

Kegel's exercises-15 minutes, 3 sessions for 8 weeks regimen has an effect on improving causes for primary dysmenorrhoea [29].

Heating pad and lower abdominal massage did show a significant effect but it was temporary. The participants said that the pain occurred with the same intensity and there was no change or very little change observed during their next cycle. However, core muscle strengthening can help reduce the pain intensity along with this lifestyle modifications like quit smoking, minimal intake of alcohol, healthy diet, and regular physical activity can be advised for a healthy lifestyle.

CONCLUSION

From the results obtained in the study, it can be concluded that Heating pad and lower abdominal massage does show a significant effect but it is temporary and does not have any impact on the quality of life. On the other hand, Core muscle strengthening of abdominal muscles when used for relieving Primary Dysmenorrhea provided a significant effect and when prescribed for a longer duration of time can provide permanent relief from pain, strengthen the abdominal muscles and help in improving the posture and also leads to a better quality of life in women.

AUTHOR CONTRIBUTIONS:

D. Simran Sharma: Study conception, Design, Acquisition of data, Analysis and Interpretation of data and Drafting of manuscript.

S. Jenifer Augustina: Analysis and interpretation of data and Critical revision.

Conflicts of interest: None

REFERENCES

[1]. Malhotra N, Malhotra J, Saxena R, Bora NM. Jeffcoate's principles of gynaecology. JP Medical Ltd; 2018 Aug 16.
 [2]. Golomb LM, Solidum AA, Warren MP. Primary dysmenorrhea and physical activity. *Medicine and science in sports and exercise*. 1998;30(6):906-9.

[3]. Coco AS. Primary dysmenorrhea. *American family physician*. 1999 Aug 1;60(2):489.
 [4]. Padubidri VG, Daftary SN. *Shaw's Textbook of Gynecology E-Book*. Elsevier Health Sciences; 2014;11.
 [5]. Novak E. *Berek & Novak's gynecology*. Lippincott Williams & Wilkins; 2007.
 [6]. Saleh HS, Mowafy HE, El Hameid A. Stretching or core strengthening exercises for managing primary dysmenorrhea. *J Women's Health Care*. 2016; 5(295): 2167-0420.
 [7]. Denniston HD. The relation of abdominal strength to dysmenorrhea. *Research Quarterly. American Physical Education Association*. 1933;4(3):76-7.
 [8]. De Sanctis V, Soliman A, Bernasconi S, Bianchin L, Bona G, Bozzola M, Buzi F, De Sanctis C, Tonini G, Rigon F, Perissinotto E. Primary Dysmenorrhea in Adolescents: Prevalence, Impact and Recent Knowledge. *Pediatric endocrinology reviews: PER*. 2015;13(2):512-20.
 [9]. French L. Dysmenorrhea. *Am Fam Physician*. 2005;71(2):285-291.
 [10]. Osayande AS, Mehulic S. Diagnosis and initial management of dysmenorrhea. *Am Fam Physician*. 2014;89(5):341-346.
 [11]. Hong Ju, Mark Jones, Gita Mishra, The Prevalence and Risk Factors of Dysmenorrhea, *Epidemiologic Reviews*, 2014;36(1):104–113.
 [12]. Mannheimer, Jeffrey S.; Whalen, Eileen C. The Efficacy of Transcutaneous Electrical Nerve Stimulation in Dysmenorrhea, *The Clinical Journal of Pain*: 1985;1(2):75-84.
 [13]. Çelik AS, Apay SE. Effect of progressive relaxation exercises on primary dysmenorrhea in Turkish students: A randomized prospective controlled trial. *Complementary Therapies in Clinical Practice*. 2021 Feb 1;42:101280.
 [14]. Seales P, Seales S, Ho G. Exercise for Dysmenorrhea. *American Family Physician*. 2021;103(9):525-6.
 [15]. Kirmizigil B, Demiralp C. Effectiveness of functional exercises on pain and sleep quality in patients with primary dysmenorrhea: a randomized clinical trial. *Archives of gynecology and obstetrics*. 2020 Jul;302:153-63.
 [16]. Rutkowska-Kucharska A, Szpala A. The use of electromyography and magnetic resonance imaging to evaluate a core strengthening exercise programme. *Journal of back and musculoskeletal rehabilitation*. 2018 Jan 1;31(2):355-62.
 [17]. Akuthota V, Ferreiro A, Moore T, Fredericson M. Core stability exercise principles. *Current sports medicine reports*. 2008 Jan 1;7(1):39-44.
 [18]. Çelik AS, Apay SE. Effect of progressive relaxation exercises on primary dysmenorrhea in Turkish students: A randomized prospective controlled trial. *Complementary Therapies in Clinical Practice*. 2021 Feb 1;42:101280.
 [19]. Nasri M, Barati A, Ramezani A. The effects of aerobic training and pelvic floor muscle exercise on primary dysmenorrhea in adolescent girls. *Journal of Clinical Nursing and Midwifery*. 2017;5(3).