

# Efficacy of Core Stability Exercise and Aerobic Exercise in Improve In Quality Of Life in Underweight Female with Primary Dysmenorrhea.-A Pilot Study

Sandhiya M\*1, Senthil Selvam P2 , B.Fouzia Banu 3

## Affiliation

1Assistant professor, Ph.D Scholar,School of Physiotherapy, VelsUniversity , Rajiv Gandhi salai, near navalur, Thalambur, OFF (OMR), Chennai-600130, Tamil Nadu, India 2Department of Physiotherapy ,

2. Professor, HOD, School of Physiotherapy, Vels University , Rajiv Gandhi salai, near navalur, Thalambur, OFF (OMR), Chennai-600130, Tamil Nadu, India 2Department of Physiotherapy ,

3. Post graduate Student, School of Physiotherapy, VelsUniversity , Rajiv Gandhi salai, near navalur, Thalambur, OFF (OMR), Chennai-600130, Tamil Nadu, India 2Department of Physiotherapy

## Abstract:

**Background:** Dysmenorrhea is one of the common gynecological disorder that affects women's Quality of Life. Study shows that core stability exercise increase blood flow to pelvis and decrease prostaglandin level which reduce pain in dysmenorrhea. Other studies shows that aerobic exercise reduce stress and improves relaxation thereby reduce in pain. So this current study is done to assess the efficacy of core stability exercise and aerobic exercise in improve in Quality of Life in underweight female with primary dysmenorrhea.

**Aim of the Study:** Evaluate the efficacy of core stability exercise and aerobic exercise in improve in Quality of Life in underweight female with primary dysmenorrhea.

**Research Design:** Experimental Design

**Methodology:** An experimental study was carried out among 30 female participants' age 18- 23 based on inclusion and exclusion criteria and divided into 2 groups. Group A received core stability exercise and Group B received aerobic exercise. Both groups were given exercise for 8 weeks. Pre and post interventions assessment was carried out by MOOS Menstrual Distress Questionnaire (MMDQ), SF 36 Questionnaire and Visual Analogue Scale (VAS).

**Result:** The inter-group analysis showed that Group A (core stability exercise) is significantly effective than Group B (aerobic exercise) in terms of improvement in the values of SF 36 Questionnaire scores and in terms of reduction in the values of MMDQ and VAS. **Conclusion:** This study concludes that Group A (**Core Stability Exercises**) is **significantly effective** than Group B (Aerobic Exercise) in terms of improvement in QUALITY OF LIFE of primary dysmenorrhea among underweight women.

**Keywords:** Primary dysmenorrhea, core stability exercise, aerobic exercise, MOOS Menstrual Distress Questionnaire (MMDQ), SF 36 Questionnaire and Visual Analogue Scale (VAS), Quality of Life.

## INTRODUCTION

Menstruation is a cyclic process that occurs in female reproductive system that lasts from 21 – 35 days with an average duration of 28 days. Menstrual cycle has two phases that lasts for 14 days each in a 28 days cycle.<sup>1</sup> they are Phase I – follicular or proliferative phase, Phase II – luteal or secretory phase<sup>1</sup>

Dysmenorrhea is the word arises from Greek word meaning difficulty or pain in monthly flow. Dysmenorrhea is one of the common gynecologic disorders that affects women's quality of life and social activities. It is the occurrence of dull or throbbing pain that usually centers in the lower mid abdomen, radiating toward the lower back or thighs during menstruation. The perception of pain and discomfort varies from person to

person for some pain may be mild for some women perceive severe pain which can significantly interfere with everyday activities for several days each month. Dysmenorrhea clinically divided into two types. Primary dysmenorrhea is one where there is no identifiable pelvic pathology. Secondary dysmenorrhea is always associated with some structural abnormality or pathology like fibroid and endometriosis.

**Primary dysmenorrhea:** Primary dysmenorrhea (menstrual pain without organic disease). Prostaglandin F (PGF) is the main contributor to the cause of dysmenorrhea.<sup>2</sup> The time of the endometrial shedding during the beginning of menstruation is when the endometrial cells release PGF. Prostaglandin (PG) causes uterine contractions, and the intensity of the cramps is proportionate to the amount of PGs released after the sloughing process that started due to dropping hormonal surge.<sup>2,3</sup>

**Secondary dysmenorrhea:** Secondary dysmenorrhea (menstrual pain associated with underlying pelvic pathology). Secondary dysmenorrhea presentation is a clinical situation where menstrual pain can be due to an underlying disease, disorder, or structural abnormality either within or outside the uterus. There are many common causes of secondary dysmenorrhea, which include endometriosis, fibroids (endometriomas), adenomyosis, endometrial polyps, pelvic inflammatory disease, and maybe even the use of an intrauterine contraceptive device.<sup>2</sup>

Studies from India reported the prevalence rate primary dysmenorrhea range between 50 to 87.8%. In Tamil Nadu the prevalence rate is 72.6%.<sup>4,5</sup>

In Primary dysmenorrhea pain is usually felt over the supra pubic region and it may radiate to lower back and legs. It is also associated with nausea, vomiting, headache, abdominal distension, irritability and even diarrhea. Few studies says that lifestyle changes including nutrition, physical activity, stress, self-care influences the symptoms and severity of dysmenorrhea.<sup>6</sup> Some potential risk factors for dysmenorrhea are Early menarche, Prolonged or aberrant menstrual flow, Younger age, Low Body Mass Index, Smoking, Premenstrual somatic complaints, Pelvic Infections, Previous Sterilization, Psychological Disturbance, Genetic influence<sup>7</sup>

Women who are underweight have a higher incidence of dysmenorrhea compared to their healthy weight counterparts.<sup>8</sup> Emotional and behavioral problems may aggravate the menstrual problems and dysmenorrhea. Such as depression/anxiety are disclose to have a result on menstrual problems and dysmenorrhea.<sup>7</sup>

As a result of the negative effects of dysmenorrhea on an individual's psychological status, health related quality of life (QUALITY OF LIFE) may be disrupted among adolescent women. Moreover, primary dysmenorrhea is a habitual cause of sickness absenteeism by female in both classes and working environment.<sup>7,9</sup>

Proposed management to bring down the severity of pain in the primary dysmenorrhea include the use of contraceptive pills, calcium channel blockers, skin electrical stimulation, dietary supplementary, exercise and massage.<sup>10</sup>

During menstrual period, uterus contracts to help expel its lining. Hormone involved in pain and inflammation trigger the uterine muscle contractions. They constrict the blood vessels in uterus and make its muscle layer contract causing painful cramps.<sup>11</sup>

Dysmenorrhea pain eventuate when the uterus anguish from spasticity due to reduce the blood supply. The prostaglandins and inflammatory mediators in the uterus is thought to

be one of the primary cause of dysmenorrhea. The elevation in the amount of

prostaglandins lead to ischemia and uterine contraction.<sup>10</sup>

In some researchers, states that there is also linkage in level hormones such as progesterone, oestrogen and vasopressin. Reason for pain in dysmenorrhea higher in the level of prostaglandin and lower in the level of progesterone at the end luteal phase leads to stimulation of release of arachidonic acid from phospholipids along with activation of cyclooxygenase pathway.<sup>8, 10</sup>

These hormonal changes i.e increase in prostaglandins leads to uterine contraction, uterine ischemia and increased sensitivity to pain fibres and ultimately causes pelvic pain.<sup>4</sup> FUNCTIONS/PURPOSE OF HORMONES IN MENSTRUATION:

- Contraction and relaxation of smooth muscle
- Dilation and constriction of blood vessels
- Control of blood pressure
- Modulation of inflammation PHYSICAL ACTIVITY AND PROSTAGLANDIN

Physical activity get the blood circulating through out the body, reducing menstrual pain. During past 30 years, exercise and physical activity are also reflect on the preventing and managing the dysmenorrhea.<sup>6</sup>

According to Zahra Mohebbi Dehnavi et al., study which aimed to determine the effect of aerobic exercise on primary dysmenorrhea that results the use of regular aerobic exercise with moderate intensity can reduce or prevent the occurrence of certain menstrual disorders<sup>2</sup>. Aerobic exercise programs have shown physiological, psychological, and articular benefits in patients. Aerobic exercise stimulates the release of endorphins that relieve pain by inhibiting the pain pathways.<sup>10</sup> It also makes the patient more active, reducing the fear of moving (kinesiophobia) and increasing self-confidence. Aerobic exercise combined with other forms of therapy (flexibility, strength, and stabilization) would be beneficial in reducing the pain of patients. The regular and continuous exercises of aerobic exercise, early menstrual dysmenorrhea and severe menstrual bleeding can be controlled or preventing it. Regular and continuous aerobic exercises can control initial dysmenorrhea and severe menstrual bleeding. The effect aerobic training on menstrual cycle symptoms and women's psychological state, showed that regular aerobic exercise can increase relaxation in the mood and body. The improvement of the flow blood and increased mental and physical relaxation are one of the reasons for the effect of aerobic exercises on dysmenorrhea.

Core training has become a common exercise in rehabilitation as well as in fitness. Core stability, strength and endurance are the most important core abilities that ensure spine stability for force production and injury prevention. Core stability refers to the stability of the spine and determines the efficiency of biomechanical functions for maximizing force generation. Core strength refers to the muscular ability to stabilize the spine through contractile forces and intra abdominal pressure, activity controlling spine stability through co activation of the trunk muscles .core muscles allow optimal support, and move extremities.

The instability of core and lumbar can lead to injury and pain specifically during stressful times of the women body and one of these repetitive stressful times is dysmenorrhea and so it was believed that the purpose of core strengthening in concept of instability<sup>12</sup>. Core Stability Exercise strengthen and co-ordinate the muscles around the abdominal, lumbar, and pelvic regions. Proper core exercise may result in an improvement in core endurance, respiration, and movement efficiency. Surprisingly there are very few studies which determined to find out the relationship between

physical activity and primary dysmenorrhea severity. Hence the current study aims to find out the comparison between core stability and aerobic exercise in severity of primary dysmenorrhea among underweight women.

### **MATERIALS AND METHODS:**

Underweight female were recruited for the study. They were recruited based on the inclusion criteria and exclusion criteria. The inclusion criteria include girls with primary dysmenorrhea, age group 18-23, with regular menstrual cycle and BMI of <19. The exclusion criteria includes girls with secondary dysmenorrhea, married girls, under hormonal therapy, known uterine pathology and recent surgeries. The study was conducted in the physiotherapy clinic. The procedure was adequately explained to the participants before obtaining their informed consents. The participants agreed that they would not engage in any other exercises for the next 8 week period. The participants were randomly divided into 2 groups. Group A was given core stability exercise and Group B was given Aerobic exercise. All the participants were assessed pre and post intervention for SF 36, MMDQ, VAS. Data were analysed statically.

### **CORE STABILITY EXERCISE PROTOCOL**

<b>EXERCISE PROGRAM</b>	<b>REPS / TIME</b>	<b>SETS</b>
<b>Warm-up exercise</b>		
Dead Bug Exercise	30	1
<b>Fundamental Strength (week 1-3)</b>		
Crunch	20(wk1-2) / 25(wk 3)	3
Back Bridge	20(wk1-2) / 25(wk 3)	3
Plank	10s(wk1-2) / 15(wk 3)	3
Side Plank	15(wk1-2) / 30(wk 3)	3
<b>Stabilization (week 4-6 )</b>		
Crunch	30	3
Split Leg Bridge	20/side	3
Plank with BOSU	60 s	3
Side Plank with leg raise	30sec	3
<b>Functional Strengthening</b>		
Mountain Climber	30	3
Pallof Press	60	3
Split Leg Bridge	25	3
Plank variation	30s / type	2
<b>Cool - Down</b>		
Stretches	15sec	1

Core Stability Exercise for 8 weeks, three times a week and each session lasts for 30min including warm ups and cool down session.

## AEROBIC EXERCISE PROTOCOL

Aerobic exercise for 8 weeks, three times a week and each time for 30min. Each exercise stage included warming movements (head movements, shoulder rotation and balance) Aerobic exercise ( kinetic movements including rotation and elongation of the arms,upper rotation.) and cold movements ( resting and sitting movements to return to initial state.)

One time assessment was made of their menstrual pain severity and physical activity level. Menstrual pain severity was assessed using MMDQ it contains 47 items divided into 8 domains ( pain, concentration, behavioral changes, autonomic reaction, water retention, negative effect, arousal and control) the score interpreted as 0- no symptoms, 0-44 mild, 45- 94 moderate, 95-144 strong and 145-188 severe.

Evaluation consists of QUALITY OF LIFE Questionnaire for pre test values , And then the participants of group A were given core stability training for 8 weeks. the participants of group B were given aerobics training for 8 weeks. And post test values was interpreted. The data were collected and documented for analysis

### DATA ANALYSIS:

Data analysis was done for intra group analysis by paired sample t- test

**TABLE: 1 Shows the pre - test and post - test values of outcome measures For ( Group A )**

OUTCOME	MEAN		STANDARD DEVIATION		t-VALUE	p-VALUE
	PRE	POST	PRE	POST		
SF36	33.27	70.80	8.28	8.40	-24.43	0.000
MMDQ	118.27	78.53	20.92	20.01	7.52	0.000
VAS	6.73	3.13	1.16	0.83	22.05	0.000

**TABLE: 2 Shows the pre - test and post - test values of outcome measures For ( Group B )**

OUTCOME	MEAN		STANDARD DEVIATION		t-VALUE	p-VALUE
	PRE	POST	PRE	POST		
SF36	33.20	41.80	8.26	7.66	-20.89	0.000
MMDQ	112.0	90.07	24.84	19.07	5.89	0.000
VAS	6.27	4.87	1.16	1.6	10.69	0.000

Data analysis was done for inter group analysis by independent sample test.

**TABLE :3 Shows the comparing effects of Group A and Group B**

OUTCOME	MEAN		STANDARD DEVIATION		t-VALUE	p-VALUE
	PRE	POST	PRE	POST		

SF36	37.533	8.600	5.951	1.595	18.19	0.000
MMDQ	-39.733	-22.133	20.464	14.545	-2.72	0.011
VAS	-3.600	-1.400	0.632	0.507	-10.51	0.000

## RESULTS AND INTERPRETATIONS

The **intra-group analysis** showed that both the treatments are effective in terms of improvement in the values of SF36 and reduction in the values MMDQ and VAS. However, the inter-group analysis showed that Group A (CSE) is significantly effective than Treatment-B(AE) in terms of improvement in the values of SF36 and in terms of reduction in the values of MMDQ and VAS.

The mean difference of the variables between pre test and post phase are shown in the form of table.

**Table 1.**

Core Stability Exercise in increasing the value of **SF36** ( $t = -24.43$ ,  $p = 0.000 < 0.05$ ). In addition, the mean value of SF36 has **increased** from 33.27 to 70.80, which confirms that Core Stability Exercise (CSE) is significantly effective in **increasing** the value of **SF36**. Core Stability Exercise in decreasing the value of **MMDQ** ( $t = 7.52$ ,  $p = 0.000 < 0.05$ ). In addition, the mean value of MMDQ has **decreased** from 118.27 to 78.53, which confirms that Core Stability Exercise (CSE) is significantly effective in **decreasing** the value of **MMDQ**. Core Stability Exercise in decreasing the value of **VAS** ( $t = 22.05$ ,  $p = 0.000 < 0.05$ ). In addition, the mean value of VAS has **decreased** from 6.73 to 3.13, which confirms that Core Stability Exercise (CSE) is significantly effective in **decreasing** the value of **VAS**.

**Table 2**

Aerobic Exercise in increasing the value of **SF36** ( $t = -20.89$ ,  $p = 0.000 < 0.05$ ). In addition, the mean value of SF36 has **increased** from 33.20 to 41.80, which confirms that Aerobic Exercise (AE) is significantly effective in **increasing** the value of **SF36**. Aerobic Exercise in decreasing the value of **MMDQ** ( $t = 5.89$ ,  $p = 0.000 < 0.05$ ). In addition, the mean value of MMDQ has **decreased** from 112.20 to 90.07, which confirms that Aerobic Exercise (AE) is significantly effective in **decreasing** the value of **MMDQ**. Aerobic Exercise in decreasing the value of **VAS** ( $t = 10.69$ ,  $p = 0.000 < 0.05$ ). In addition, the mean value of VAS has **decreased** from 6.27 to 4.87, which confirms that Aerobic Exercise (AE) is significantly effective in **decreasing** the value of **VAS**.

**Table 3**

There is **significant difference** between two Groups (A and B) Core Stability & Aerobic Exercise in terms of average increase in SF36 ( $t = 18.19$ ,  $p = 0.000 < 0.05$ ). In addition, the mean increase in the value of SF36 by (Group A) Core Stability Exercise (37.53) is greater than that of (Group B) Aerobic Exercise (8.60). Hence, we conclude that **Group A (CSE) is significantly effective than Group B (AE)** in terms of mean increase in the value of SF36. There is **significant difference** between Groups (A and B) Core Stability & Aerobic Exercise in terms of average reduction in MMDQ ( $t = -2.72$ ,  $p = 0.011 < 0.05$ ). In addition, the mean reduction in the value of MMDQ by (Group A) Core Stability Exercise (39.73) is greater than that of (Group B) Aerobic Exercise (22.13). Hence, we conclude that **Group A (CSE) is significantly effective than Group B (AE)** in

terms of mean reduction in the value of MMDQ. There is **significant difference** between two Groups (A and B) Core Stability & Aerobic Exercise in terms of average reduction in VAS ( $t = -10.51, p = 0.000 < 0.05$ ). In addition, the mean reduction in the value of VAS by (Group A) Core Stability Exercise (3.60) is greater than that of (Group B) Aerobic Exercise (1.40). Hence, we conclude that **Group A (CSE) is significantly effective than Group B (AE)** in terms of mean reduction in the value of VAS.

## DISCUSSION:

There are numerous researches conducted across the world which showed high rate of menstrual pain that has become a constant strain and burden to lead a healthy life style efficiently and causes hindrance in Quality of Life. There is a need to provide facilities to the females in order to help them to deal with menstrual issues.

Various medication, meditation technique proved to be beneficial to deal with pain, stress, depression, and other menstruating problems. Physical Exercise is one of the major treatment which emerged to be advantages and being used.

Pain in general is disabling and makes dysmenorrhea and irritating factors in females. Prevalence of dysmenorrhea in Indian females is 70%. Therefore the present study is about the 'Efficacy of core stability exercise in improving quality of life in underweight female adults with primary dysmenorrhea' was conducted to see the effects of exercise on relieving pain and compare both treatment protocols i.e., core stability exercise and aerobic exercise.

Moon Jeong Kim et al., considered that spinal misalignment resulted in changes in the lumbar pelvis in the saggital plane which induced locational change of uterus. This caused increased tension of soft tissue including ligaments, tendons and muscles, So correction of movement of lumbar pelvis and SI joint and surrounding round muscles. This study more focused on finding out the efficacy of core stability in improving QUALITY OF LIFE in underweight female adults with primary dysmenorrhea.<sup>11</sup>

The current study result shows that the core stability and aerobic exercise was effective in quality of life of underweight female adults with primary dysmenorrhea. But in comparatively core stability is more effective than the aerobic exercise. Due to weakness of lumbar spine there is pain in abdomen, low back and thighs which are same areas affected by dysmenorrhea. Core strengthening strengthens musculature around lumbar spine and reduces pain in dysmenorrhea and improving quality of life. Berkiye Kirmizigil et al., concluded that in primary dysmenorrhea, increases in prostaglandin levels leads to increase in uterine contractions and results in ischemia. 8 week therapy increased the blood flow in the pelvis and decreased the prostaglandin levels.<sup>12</sup> Zahra mobebbi Dehnri et al., states that dysmenorrhea results from decreased blood flow to uterus and increased uterine muscle contraction which is nerve mediated sympathetic nervous system.<sup>13</sup>

So aerobic exercise improves relaxation and reduce stress by release of endorphins, increased blood flow and increases the activity of parasympathetic nervous system which reduces the severity of dysmenorrhea. The mean difference of the variables between pretest and post phase are shown in the form of table.

In this study the primary dysmenorrhea and quality of life was analyzed. As no study has yet evaluated specifically the physical activity level and menstrual symptoms severity in young females related to quality of life. Comparison SF 36, Moos Menstrual Distress Questionnaire, Visual Analog Scale between two groups was done to find out the effectiveness of the exercises. The statistical analysis revealed that there is **significant difference** between two treatments (A and B) in terms of average increase in SF36 ( $t =$

18.19,  $p = 0.000 < 0.05$ ). There is **significant difference** between two treatments (A and B) in terms of average reduction in MMDQ ( $t = -2.72$ ,  $p = 0.011 < 0.05$ ). There is **significant difference** between two treatments (A and B) in terms of average reduction in VAS ( $t = -10.51$ ,  $p = 0.000 < 0.05$ ). Hence, we conclude that **Group A (CSE) is significantly effective than Group B (AE)** in terms of mean reduction in the value of VAS.

Thus this shows pain intensity has increase in both groups. Aerobic exercises is to improve the cardiovascular fitness and also helps to reduce pain by release of endorphins by the brain which leads to rise in the pain threshold.<sup>12</sup> But in Core Strengthening exercises the focus is concentrated on the core muscles itself which thus helps to reduce pain more effectively.<sup>9</sup>

### CONCLUSION:

Hence, we conclude that Group A (**Core Stability Exercises**) is **significantly effective** than Group B (Aerobic Exercise) in terms of improvement in QUALITY OF LIFE of primary dysmenorrhea among underweight women.

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