



## A Study To Compare The Effects Of Aerobic Exercise Versus Core Strengthening Exercise Among College Girls With Primary Dysmenorrhea

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### ABSTRACT

Dysmenorrhea means cramping pain accompanying menstruation. Prevalence and incidence of dysmenorrhea in Indian adolescent girls is about 70.2% and 33.5%. Primary dysmenorrhea is indicated by lower abdominal pain which may radiate to the thigh and lower back, causing nausea, vomiting, mood swings, headache, fatigue and diarrhoea. The objective of the study is to compare the effect of aerobic exercise versus strengthening of core muscles exercise among college going girls with primary dysmenorrhea. It is an experimental study conducted with 30 samples, ranging between the age group of 18-25 years, who were treated for a session of 40 min per day. The treatment was given for 3 days per week, which was continued for 8 weeks. The samples were selected according to the inclusion and exclusion criteria. Samples were randomly divided into two groups, namely Group A and Group B, where Group A consists of 15 samples and B consists of 15 samples. Group A was trained with aerobic exercise and Group B was trained with core strengthening with a mini stability ball. Both groups were trained for 40 mins per day for 3 days per week for 8 weeks. The training was not given during the period of the menstrual cycle. The study showed that pain intensity was decreased significantly in both the groups with Group A at  $p=0.0001$  and Group B at  $p<0.0001$  with MMDQ and Group A at  $p=0.0006$  and Group B at  $p=0.0025$  with VMSS. Hence, this study concluded that core strengthening exercise is more effective in reducing pain intensity. Hence, it can be used as one of the alternate therapies for pain relief in primary dysmenorrhea.

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### INTRODUCTION

Adolescent stage is characterized by sudden tremendous change physical, endocrinal, emotional and mental growth. A major physiological change in an adolescent girl is the menarche and the following menstrual cycle (Suzzane *et al.*, 2018).

The prevalence of primary dysmenorrhea is 16% – 91% of women, out of which 2% – 29% suffers from severe pain. Prevalence of primary dysmenorrhea in Indian female population is about 70.2%. The incidence of dysmenorrhea among Indian ado-

lescent girls is 33.5% (Suzzane *et al.*, 2018).

Dysmenorrhea is further classified into primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea can be indicated by lower abdominal pain which may radiate to the thigh and lower back, causing nausea, vomiting, mood swings, headache, fatigue and diarrhea. The main cause of menstrual pain could be due to ischemia. Uterine contractions are caused due to the release of prostaglandin during menstruation.

Hence, the blood supply to the uterine muscles gets constricted, leading to muscle spasm, resulting in increased tension. This in turn, produces ischemia of muscles leading to cramps. Secondary dysmenorrhea is characterized by dull ache associated with infertility and menstrual disorder caused by endometriosis, pelvic inflammatory disease, adenomyosis and fibroids (Shreeyadilipberde *et al.*, 2019; Sutar *et al.*, 2016).

The exact etiology of the primary dysmenorrhea is not known, but most of the clinical symptoms are considered to be due to the action of uterine prostaglandins, particularly prostaglandin F2 alpha released by endometrial cells during menstruation. It stimulates myometrial contractions, ischemia and sensitization of nerve endings. The severity of the menstrual cramps and associated symptom of dysmenorrhea is directly proportional to the amount of prostaglandin F2 alpha, which is higher during the first two days of menstruation in women with severe primary dysmenorrhea. Vasopressin and leukotriene concentrations have been found to be higher in women with severe menstrual pain than for those who experience mild or no menstrual pain. The posterior pituitary hormone namely the vasopressin may be responsible for myometrial hypersensitivity, reduced uterine blood flow, and pain in primary dysmenorrhea (De Sanctis *et al.*, 2015; Munawar *et al.*, 2013).

The clinical symptoms of primary dysmenorrhea can be commonly relieved by non-steroid anti-inflammatory drugs [NSAIDS] and analgesics. Out of which, few of which causes the side effects such as nausea, breast tenderness, intermenstrual bleeding, dizziness, drowsiness, hearing and visual disturbances. Bed rest, exercise, application of heat packs and alternative treatment like yoga plays an important role in the treatment for primary dysmenorrhea, Physiotherapy treatment of TENS, MWD, SWD, Pilates, and connective tissue massage, acupressure etc (Kaur *et al.*, 2014; Saleh and Mowafy, 2016).

Aerobic exercises prove more beneficial, as they improve pelvic organ functioning by adjusting metabolism, hydroelectric balance, hemodynamic

conditions and blood flow. Aerobic exercise causes the release of endorphins which increases the pain threshold by activating the prostaglandin synthesis inhibitors and decreasing short term depression. It increases concentration and improves mood and behaviour (Shreeyadilipberde *et al.*, 2019; Sutar *et al.*, 2016).

The strengthening of core muscles allows the small intrinsic musculature surrounding the lumbar spine to improve performance and functional stability (Ponmathi and Kiranmayi, 2016; Tharani *et al.*, 2018).

### Aim of the study

The aim of the study is to compare the effects of aerobic exercise versus core strengthening exercise among college going girls with primary dysmenorrhea.

### Objectives

1. To evaluate the effect of aerobic exercise with primary dysmenorrhea.
2. To evaluate the effect of core strengthening exercise with primary dysmenorrhea.
3. To compare the effects of aerobic exercise versus core strengthening exercise among college going girls with primary dysmenorrhea.

### Need of the study

Various studies conducted in India infers that primary dysmenorrhea is associated with several physical and emotional distress. Hence, this study focuses on the importance of dealing with the ill effects of such distress through aerobic and core strengthening exercise.

### Background

Core strengthening exercise reduces pain intensity and duration of primary dysmenorrhea. Hence, it can be used as one of the therapies for pain relief in dysmenorrhea (Saleh and Mowafy, 2016). The core strengthening exercises were significantly effective in reducing the quality of pain and hence, improves the quality of life in females suffering from primary dysmenorrhea (Shreeyadilipberde *et al.*, 2019). Aerobic exercise is one of the effective, inexpensive and non-pharmacological measure to reduce the primary dysmenorrhea symptoms among adolescent girls. The study concluded that aerobic exercise has a greater effect in reducing the symptoms of primary dysmenorrhea during menstruation among young girls (Sindhuja *et al.*, 2017).

## MATERIALS AND METHODS

**Study design-** Quasi-experimental

**Sample technique-** Sample random technique

**Sample size -** 30 females

**Study duration -** 8 weeks

**Study setting-** College girls

### Inclusion criteria

1. Clinically diagnosed patients with primary dysmenorrhea
2. Ranging within the age group of 18 to 25 years
3. Girls with the score of the BMI ranging between 18.5-24.9 kg/m<sup>2</sup>
4. Cycle duration between 25 to 40 days
5. Moos Menstrual Distress Questionnaire Score (Moderate = 48-94 & strong = 95-144)

### Exclusion criteria

1. Pelvic inflammatory disease
2. Secondary dysmenorrhea
3. Any previous gynecological surgeries
4. Non cooperative girls
5. Habitual smoking or consumption of alcohol

### Outcome measures

1. Verbal multidimensional scoring system (VMSS)
2. Moos Menstrual distress questionnaire (MMDQ)

### Materials used

Mini Stability Ball

### Procedure

The 30 samples, who fulfilled the inclusion and exclusion criteria were recruited for the study. The procedure was adequately explained to the participants before obtaining consent from them. The training program was conducted for 8 weeks, with an exercise protocol of 40 min per day for 3 days per week. Participants were divided into two groups A and group B, respectively. Participants of the Group A were trained aerobic exercise and group B were trained with core strengthening exercise.

### Group A (Aerobic Exercises)

Warm up- 10 minutes

Walking

Stretching 5 min, 3 repetitions.

1. Pectoralis stretching
2. Triceps stretching
3. Iliopsoas stretching
4. Hamstring and calf stretching

Aerobic exercise:20 min

1. Bicycling: 10min
2. Step up-down: 10 min

Strengthening exercise for 5 min for the following group of muscles namely

1. Shoulder flexor group of muscles
2. Shoulder adductor group of muscles
3. Shoulder internal rotator group of muscles
4. Shoulder external rotator group of muscles

Cool Down- 5 minutes (Still Pose)

### Group B (Core Strengthening Exercise)- 3 - 4 Repetition

Group B intervention with mini stability ball by 3 levels.

#### Level 1 (3 exercises)

1. The subject was instructed to sit on the floor with 90 degrees of knee flexion with the hips initially at 110 degrees of flexion. The trunk was extended slightly and the mini stability ball was placed at the level the sacrum. The posture was maintained for 1 second
2. The exercise was repeated first with the trunk rotated 35 degrees to the right and then to the left.

#### Level 2 (there are 5 exercises)

1. The subject was instructed to sit on the floor with 90 degrees of knee flexion with the hips initially at 110 degrees of flexion. The hands are held in the air, parallel to the floor with the back resting against the mini stability ball. The position is maintained for 1 second
2. The exercise was repeated with the trunk rotated 35 degrees, first to the right and then to the left.

3. The subject was instructed to sit on the mini stability ball with knees and hips at the angle of 90 degrees flexion with the legs parallel to the floor. The legs were then, alternatively extended to touch the floor with toes pointed, the hands rest at the sides

### Level 3 (there are 3 exercises)

1. The subject was instructed to sit on the floor with the ball behind her back with hip at an angle of 110 degrees and knees at 75 degrees. The hands were placed behind the head. As one leg was flexed, the opposite elbow touches the knee, this was performed on one side of the body and then the repeated on the other side

2. The first exercise was repeated, but the movement was performed in rapid repetitions.

3. The hands were placed on the floor with the shoulder abducted to 45 degrees to the side of the body for support and placing the ball between the knees, with the hips and knees at 90 degrees. The hips were slowly rotated to the right and then to the left through a full range of motion.

## RESULTS AND DISCUSSION

The intensity of pain was decreased significantly in both groups with Group A at  $p < 0.0001$  and Group B at  $p < 0.0001$  with MMDQ and Group A at  $p < 0.0006$  and Group B at  $p < 0.0025$  with VMSS. Both groups showed a significant effect on primary dysmenorrhea among college girls.

Table 1 showing the pre-test scores and post-test scores of MMDQ of Group A and Group B subjects. Table 2 showing the pre-test scores and post-test scores of VMSS of Group A and Group B subjects. Table 3 showing the pre-test and post-test scores of MMDQ and VMSS of Group A and Group B subjects.

Pain is one of the important factors which makes dysmenorrhea more stressful. Various studies were conducted to replace medications with physical exercise in the management of primary dysmenorrhea. This study was conducted to evaluate the effect of physical exercises in relieving the pain of primary dysmenorrhea through aerobic exercise or core strengthening.

The objective of this study was to compare the effectiveness of aerobic exercise versus core muscle strengthening exercise in primary dysmenorrhea. The study was conducted with 30 samples divided into 2 groups, namely Group A and B. Aerobic exercise was given for Group A and core strengthening exercises was trained for Group B. Prior consent was taken. The treatment protocol was carried out for 40

min per day. It was continued for 3 days per week for 8 weeks. The outcome measures of this study were MMDQ and VMSS. The exercise program used was home based and therefore, easy for the subjects to perform.

(Sutar *et al.*, 2016) showed that the main cause for menstrual pain is ischemia and uterine contractions caused due to the release of prostaglandins during menstruation. Hence the blood supply to the uterine muscles gets constricted, leading to a muscle spasm resulting in increased tension. This in turn, produces ischemia of muscles leading to cramps. Research has proved that women who has taken part in regular, moderate aerobic exercise had less pain during menstruation than women who doesn't take part in exercise during menstruation. Aerobic exercises increase the release of endorphins by the brain, which leads to a rise in the pain threshold. Thus the exercise has an analgesic effect against pain by increasing the blood circulation leading to pain reduction in primary dysmenorrhea (Shreeyadilipberde *et al.*, 2019). (Petrofsky *et al.*, 2007) suggested that the seven inch mini stability ball has been used to strengthen the core muscle and reduce back pain (Petrofsky *et al.*, 2007). (Rajalaxmi *et al.*, 2016) showed that core strengthening proves effective in relieving the pain during primary dysmenorrhea (Clark and Michael, 2004) stated that training of the core musculature had been proved to be very important in both reduction and prevention of low back pain (Kaur *et al.*, 2014).

(Donchin *et al.*, 1990) stated that increasing the strength and flexibility of the core muscles could increase the trunk flexion and extension which would lead to a decrease in chronic low back pain (Kaur *et al.*, 2014).

The results of this study showed that there was a significant effect in both group A and B subjects, in reducing the intensity of pain and improving the quality of life after 8 weeks of intervention. Both the outcome measures MMDQ and VMSS of this study revealed a greater prognosis after the exercise interventions. Though the statistical analysis of VMSS and MMDQ showed no difference or almost had the same effect in the improvement of reduction of pain and menstrual symptoms. However, it is, interpretation of results showed that the group B subjects, who were trained with core strengthening exercise showed better improvement in both MMDQ and VMSS than group A, who were trained with aerobic exercise in the improvement of reduction of menstrual symptoms. The improvement may be due to the increase in blood flow and metabolism of the uterus during exercise, which may be effective in the

**Table 1: pre-test scores and post-test scores of MMDQ of Group A and Group B subjects**

MMDQ			Mean Scores	S D	T -Value Scores	P- Value Scores
GroupA	Pre- Scores	Test	85.16	13.08	9.844	0.0001
	Post- Scores	Test	62.53	15.57		
GroupB	Pre Scores	-Test	73.13	10.41	24.38	<0.0001
	Post-Test Scores		41.67	66.19		

**Table 2: pre-test scores and post-test scores of VMSS of Group A and Group B subjects**

VMSS			Mean Scores	S D	T -Value Scores	P-Value
Group A	Pre-Test Scores		2.200	0.560	10.58	0.0006
	Post-Test Scores		0.8667	0.7432		
Group B	Pre-Test Scores		2.000	0.6547	11.50	0.0025
	Post -Test Scores		0.4667	0.6399		

**Table 3: pre-test and post-test scores of MMDQ and VMSS of Group A and Group B subjects**

Outcome Measure			Mean	S D	T- Value	P- Value
MMDQ	Post-Test Scores-A		62.53	15.57	9.844	0.0001
	Post -Test Scores- B		41.67	0.7432		
VMSS	Post-Test Scoresa		0.8667	0.6547	11.50	0.0025
	Post-Test Scores B		0.4667	0.6399		

reduction of dysmenorrheal symptoms.

Thus, it is evident that core strengthening exercise strengthens the core muscles and reduces the pain in the abdomen, low back and thighs. Hence it improves the quality of life.

### CONCLUSIONS

The study concluded that both aerobic exercises and core strengthening exercise are significantly effective. But, however, it is, interpretation of results showed that the group B subjects, who were trained with core strengthening exercise showed better improvement in both MMDQ and VMSS than group A, who were trained with aerobic exercise in the

improvement of reduction of menstrual symptoms.

### Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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