

# To Compare the Effectiveness of Pilates and Chair Aerobics on Menstrual Symptoms in Females with Primary Dysmenorrhea - A Pilot Study

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## ABSTRACT

**Background:** Dysmenorrhea means painful menstruation which categorized into 2 types – primary and secondary. Generally primary dysmenorrhea characterized by the abdominal pain, lower back pain and presence of other menstrual symptoms, and without underlying cause. Secondary dysmenorrhea occurs due to the presence of some underlying pelvic pathology. Primary dysmenorrhea is common in adolescent female and affects the physical as well as mental health in individual. It is moderate intensity aerobic exercise and performed in sitting position. Pilates exercise which is focus on core muscles activation and also strengthen the core. Exercise only which may be useful in clinical practice.

**Objective:** To compare the effect of pilates and chair aerobics on menstrual symptoms by using NPRS for intensity of pain, Menstrual symptom questionnaire for menstrual symptom, for quality-of-life SF 36 in females with primary dysmenorrhea.

**Methodology:** 24 females were included in this study as per inclusion criteria and divided into 2 groups i.e. group A [pilates] and group B [chair aerobic]. Intervention was given for 4 days/week for 8 week.

**Result:** Data were analyzed by SPSS 21 t – test [paired and unpaired] were applied. Statistically significant improvements were observed in both groups but more pronounced in group B[NPRS – P value 0.0022, MSQ – P value 0.0031, SF 36 – P value 0.001] compare to group A.

**Conclusion:** Chair aerobics is more effective in reducing pain, menstrual symptom and improves quality of life in female with primary dysmenorrheal.

**Keywords:** Pilates, Chair aerobics, Primary dysmenorrhea, Menstrual symptom.

## INTRODUCTION

Dysmenorrhea literally means painful menstruation. But a more realistic and practical definition includes cases of painful menstruation of sufficient magnitude so as to incapacitate day-to-day activities<sup>[1]</sup> Dysmenorrhea is Greek word meaning that means difficulty or pain in monthly flow.

In female reproductive system Menstruation is occurs, it is cyclic process that that lasts form 21 – 35 days with an average duration of 28days. Menstrual cycle includes two

phases that lasts for 14 days each in a 28 days cycle. they are Phase I – follicular or proliferative phase, Phase II – luteal or secretory phase. Dysmenorrhea is one of the common gynecological disorders that affects women's quality of life. In which female may experience 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 individually, which can significantly

interfere with everyday activities for several days each month.

Clinically dysmenorrhea has divided into two types. Primary dysmenorrhea in which there is no identifiable pelvic pathology and characterised by the lower abdominal pain which radiate to thighs, lower back. Accompanied problems may be vomiting, mood swings, headache, fatigue, nausea and diarrhoea. Causes: Excessive myometrial contractions, ischemia excessive prostaglandin production.<sup>[2][3]</sup> Secondary dysmenorrhea occurs due to some underlying structural abnormality or pathology like fibroid and endometriosis and characterised by variable dull aching sensation that may associated with dyspareunia, infertility and menstrual disorder. Causes: Endometriosis, Pelvic inflammatory disease, adenomyosis, fibroids.<sup>[2][3]</sup>

Studies from India reported the prevalence rate primary dysmenorrhea range between 50 to 87.8%.<sup>[2]</sup>

The American Association of Obstetricians and Gynecologists recommends to do exercise in menstruation. Exercise decreases the effects of dysmenorrhea through reducing the sympathetic system activity. Exercise directly affects the level of steroids in the circulatory system like endorphin which is effective in reducing the pain. Stress may cause of contraction in the uterus by the sympathetic system. Exercise is effective in reducing the symptoms that occur during the menstrual cycle and changing the mood. In a review that examined 2 observational studies and 4 randomized controlled studies, it was concluded that exercise reduced symptoms in dysmenorrhoea. They also observed that people who exercised more than 3 times a week compared to sedentary patients had fewer symptoms during the menstrual period.<sup>[4]</sup>

Pilates exercises are based on three major principles: breathing, isolation of muscles that are exercised regularly utilising a series of regulated movements. Pilates exercises concentrate on strengthening the core

muscles, which include the back, muscles surrounding the pelvis, and the buttocks, in order to delay the start of low back pain during menstruation.<sup>[5]</sup> Pilates stabilization can increase active and passive lumbopelvic stability brought on by engaging the deep anterior abdominal wall muscles during training and helps lessen menstrual tiredness.<sup>[6]</sup>

Chair aerobics are aerobic workouts done while listening to music and moving your upper and lower body under the guidance of an instructor while seated in a straight-back chair. Chair-based exercise has unique advantages as a training technique because it stabilises the lower spine by providing a fixed base and allows for a greater range of motion by providing points of leverage and support; it also minimises load-bearing and lessens balance issues in people with particularly poor mobility.<sup>[7]</sup>

## **NEED OF THE STUDY**

There is a dearth of literature on that compares pilates and chair aerobics, so this study is aimed to determine the effect of pilates and chair aerobics exercise in college going female students with primary dysmenorrhea.

## **AIM AND OBJECTIVES**

### **AIM**

To compare pilates versus chair aerobics in college going female students with primary dysmenorrhea.

### **OBJECTIVES**

1. To determine the effect of pilates on primary dysmenorrhoea by Numeric Pain Rating Scale (NPRS).
2. To determine the effect of pilates on primary dysmenorrhea by Menstrual Symptom Questionnaire (MSQ).
3. To determine the effect of chair aerobics on primary dysmenorrhea by Numeric Pain Rating Scale (NPRS).
4. To determine the effect of chair aerobics on primary dysmenorrhea by Menstrual Symptom Questionnaire (MSQ).

5. To determine the effect of chair aerobics on primary dysmenorrhea by Quality of life (SF - 36).
6. To determine the effect of pilates on primary dysmenorrhea by Quality of life (SF -36)
7. To compare the effect of pilates versus chair aerobics on primary dysmenorrhea.

## **HYPOTHESIS**

### **NULL HYPOTHESIS**

There is no significant difference between pilates and chair aerobics on primary dysmenorrhea.

### **ALTERNATE HYPOTHESIS**

There is significant difference between the effect of pilates and chair aerobics on primary dysmenorrhea.

## **MATERIALS & METHODS**

**Study settings:** KSPR, KPGU Vadodara.

**Study population:** College going female students with primary dysmenorrhea

**Proposed sample size:** The proposed calculated sample size is 24 (12 in each group). The sample size is calculated using G-power 3.1.9.4.

**Sampling method:** Simple random sampling.

**Study duration:** The study was conducted after 10-12 months of ethical approval.

**Study design:** Interventional comparative study.

### **Inclusion criteria:**

- 1) 18 to 30 years old females having complain of dysmenorrhea since recent 6 months with frequency of 3-4 times.
- 2) Regular menstrual cycles of 24-35 days.
- 3) Spinster

### **Exclusion criteria:**

- 1) Professional athletes
- 2) Taking oral contraceptive pills.
- 3) Known musculoskeletal disorder
- 4) History of gynaecological surgeries in last 6 months.

### **Materials to be used:**

Pen

Paper  
Mat  
Chair

## **PROCEDURE:**

After obtaining ethical approval 24 females were included in this study as per inclusion criteria. Written informed consent was obtained from each female prior to study procedure. The demographic detail, patient history, past medical history, and other parameters was taken in assessment form.

All individuals were received treatment 4 days / week for 8 week to assess pain intensity (NPRS) and quality of life (SF-36), menstrual symptom questionnaire (MSQ). Treatment protocol was given before and after the menstrual cycle. they were assigned into 2 groups by using 1:1 method.

Group A – Females received pilates (N=12)

Group B – Females received chair aerobics (N=12)

**Group A: Pilates** (position of patient: supine lying)

- 1) Single leg stretch
- 2) Spine stretch
- 3) Hundred
- 4) Spine twist
- 5) Leg circles
- 6) Shoulder bridging
- 7) Repetition: 10 times (2 set)

**Group B: Chair aerobics** <sup>[3]</sup>

- 1) Knee Lift
  - 2) Diagonal Toe Touch
  - 3) Lunges
  - 4) Punches
  - 5) Flick Kicks
  - 6) Half Jack
  - 7) Criss-Cross (along with arm movement)
- Repetition: 10 times (2 set)

## **OUTCOME MEASURES**

- Numeric pain rating scale (NPRS)
- Menstrual symptom questionnaire (MSQ)
- SF 36 questionnaire

## STATISTICAL ANALYSIS

Descriptive statistical analysis obtained by using frequency, percentage, mean, SD, median and IQR. Paired t – test was used for the comparison of pre and post data within the group. Unpaired t – test was used for the comparison of data between group A and group B. All the statistical analysis was performed by using IBM SPSS version 29.0.0.

## RESULT

Table 1 & 2 depicts pre – post mean and SD values of outcomes in group A & B. Table 3

shows the comparison of post intervention parameters [mean & SD] of the group A and group B after 8 weeks of intervention. The mean value of NPRS in Group A was  $4.50 \pm 0.78$  and in Group B was  $3.26 \pm 0.90$ . The mean value of MSQ in Group A was  $45.23 \pm 6.23$  and in Group B was  $40.21 \pm 5.97$ . The mean value of SF 36 in Group A was  $55.49 \pm 4.78$  and in Group B was  $60.80 \pm 7.51$ . Statistically significant improvements were observed in both groups but more pronounced in group B [NPRS – P value 0.0022, MSQ – P value 0.0031, SF 36 – P value 0.001] compare to group A.

**Table 1: Intra Group Comparison of Outcome measures in Group A [Pilates]**

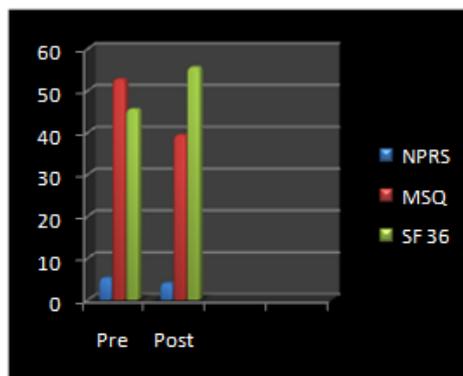
PARAMETERS	Pre-Mean & SD	Post Mean & SD	t – value	p – value
NPRS	5.22 ± 1.15	4.00 ± 0.78	7.123	< 0.0001
MSQ	52.68 ± 7.13	39.36 ± 6.23	9.88	< 0.0001
SF 36	45.54 ± 6.43	55.54 ± 4.78	10.78	< 0.0001

**Table 2: Intra Group Comparison of Outcome measures in Group B [Chair aerobic]**

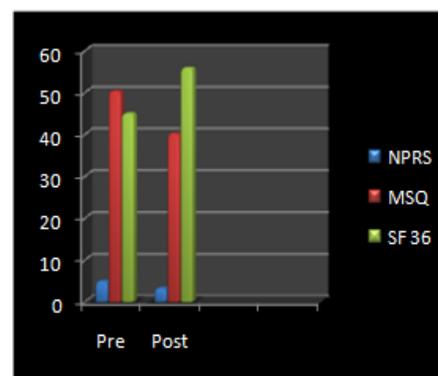
PARAMETERS	Pre-Mean & SD	Post Mean & SD	t – value	p – value
NPRS	4.96 ± 1.29	3.29 ± 0.90	9.81	< 0.0001
MSQ	50.32 ± 8.66	40.21 ± 5.97	10.00	< 0.0001
SF 36	45.00 ± 7.20	55.86 ± 7.51	18.28	< 0.0001

**Table 3: Data represent comparison of post intervention parameters of the group A and group B after 8 weeks**

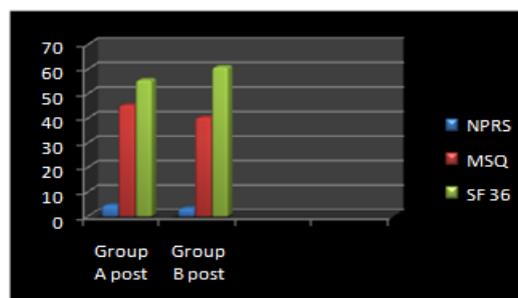
PARAMETERS	Group A Mean & SD	Group B Mean & SD	t – value	p – value
NPRS	4.50 ± 0.78	3.26 ± 0.90	3.15	0.0022
MSQ	45.23 ± 6.23	40.21 ± 5.97	3.07	0.0031
SF 36	55.49 ± 4.78	60.80 ± 7.51	4.35	0.0001



Graph 1: Intra Group Comparison of Group A



Graph 2: Intra Group Comparison of Group B



Graph 3: Data represent comparison of post intervention parameters of the group A and group B

## DISCUSSION

The study was designed to compare the effectiveness of pilates and chair aerobics on menstrual symptoms in females with primary dysmenorrhea. It included 18 to 30 years old 24 female with primary dysmenorrhea. Based on the statistical analysis of this study showed that chair aerobics were significantly effective in reducing the intensity of pain, menstrual symptoms, and also improves quality of life in females suffering from primary dysmenorrhea.

Paired t - test was used to analyse the effect of chair aerobics exercises in primary dysmenorrhoea and showed that there was extremely significant reduction in NPRS score ( $p < 0.0001$ ). and also, MSQ score ( $p < 0.0001$ ) and improved the quality of life. Chair aerobics is low-intensity exercise done while seated that mainly uses the aerobic energy-generating mechanism. Prostaglandins are released during menstruation, which results in uterine contractions. As a result, the blood supply to the uterine muscles is limited, causing the muscles to spasm and raising tension. This causes muscular ischemia, which results in cramping. Studies have demonstrated that women who engage in consistent, moderate-intensity aerobic exercise during their menstrual cycle experience reduced levels of pain and behavioural abnormalities. The brain releases more endorphins during aerobic activity, which raises the pain threshold. Exercise therefore reduces discomfort in primary dysmenorrhea by improving blood circulation, which has an analgesic impact.<sup>[8]</sup>

Paired t - test was used to analyse the effect of pilates exercises in primary dysmenorrhoea and showed that there was extremely significant reduction in NPRS score ( $p < 0.0001$ ). and also, MSQ score ( $p < 0.0001$ ) and improved the quality of life. Pilates exercise an increase in the lumbopelvic muscles' active stability under the impact of the transverse abdominal and external oblique muscles is likely to have lessened the effects of the Pilates

stabilisation exercise. It also activates the contraction of the pelvic floor muscles and which leads to increase blood flow in the pelvis and to decrease prostaglandin F<sub>2α</sub> level.<sup>[9]</sup>

Shreeya Dilip Berde et al [2019] conducted a study on “Effect of Core Strengthening Exercises & Chair Aerobic Exercises in Primary Dysmenorrhoea” This study concluded that core strengthening exercises were significantly effective in reducing the quality of pain and improving the quality of life in females suffering from primary dysmenorrhoea.<sup>[3]</sup>

Mayuri T Gotpagar et al [2020] conducted a study on “Effect of Bosu Pilates on Primary Dysmenorrhoea in adolescent girls” and concluded that there was significant effect of bosu pilates on primary dysmenorrhoea in adolescent girls.<sup>[10]</sup>

Asma Qamar et al [2022] conducted a study on “Effects of High Intensity Aerobics and Pelvic Clock Exercises in Primary Dysmenorrhoea” Outcome measures were calculated by visual analog scale VAS, DASS 21 and self-administered questionnaire for dysmenorrheal symptoms and concluded that that high intensity aerobics had given more efficient results rather than pelvic clock exercises.<sup>[11]</sup>

Begum Kara Kaya et al [2022] conducted a study on “Comparing the Cognitive Functioning Effects of Aerobic and Pilates Exercises for Inactive Young Adults: A Randomized Controlled Trial” study concluded that, there was a significant pre-to post-exercise difference for participants in both groups.<sup>[12]</sup>

Asmaa M. Elbandrawy et al [2021] conducted a study on “Comparison between the effects of aerobic and isometric exercises on primary dysmenorrhoea” Participants were assessed using the plasma progesterone levels, visual analogue scale (VAS), and modified menstrual symptom questionnaire (MSQ). The study concluded that regular aerobic and isometric exercises are effective, safe, reducing menstrual pain and improving menstrual symptoms.<sup>[13]</sup>

Pooja Soni et al [ 2021] conducted a study on “Effectiveness of Pilates and Self-Stretching Exercise on Pain and Quality of Life in Primary Dysmenorrhea” - A Comparative Study “. The study concluded that Pilates and Self-stretching both interventions are effective in relieving pain and improving quality of life in primary dysmenorrhea. Pilates was found superior to Self-stretching in relieving pain.<sup>[14]</sup>

Luana Brito dos Santos et al [2021] conducted a study on “Association among dysmenorrhea and activity limitation and participation restrictions in adult women: a cross-sectional study, Brazil -2”. Pain and level of physical activity, which was assessed, respectively, by the numerical pain rating scale and International Physical Activity Questionnaire (IPAQ), short version. The study revealed that the Severe dysmenorrhea was associated with higher scores of disabilities assessed by the WHODAS 2.0, especially in mobility, and participation domains.<sup>[15]</sup>

## CONCLUSION

The present study concluded that both pilates and chair aerobics are effective in reducing the menstrual symptoms and pain also improves the quality of life. But chair aerobics is more effective in reducing pain, menstrual symptom and improves quality of life in female with primary dysmenorrheal.

**Clinical implication:** Chair aerobics as moderate intensity exercise can be used in regular bases to improve the quality of life and menstrual symptom in females with primary dysmenorrhea.

## Declaration by Authors

**Ethical Approval:** Approved

**Acknowledgement:** None

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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