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Case report

Medical research

### Effect of pilates on pain and quality of life in females with primary dysmenorrhea

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#### ABSTRACT

##### Background and Aim

Dysmenorrhea is a gynecological disorder which is characterized by lower abdominal pain which may irradiate to thighs and top and bottom of the spine. Primary dysmenorrhea occurs when there is no identifiable pelvic disease and tends to occur within 12 months of menarche. This study was carried out to see the effect of Pilates on pain and quality of life in females with primary dysmenorrhea

##### Participants

40 subjects within the age group of 18-25 years with primary dysmenorrhea.

##### Intervention

Experimental group was given a structured 8 weeks (3sessions/week, 40mins/day) Pilate's protocol and control group was observed without exercises and lifestyle modifications

##### Outcome measure

Pain intensity was determined by Numerical Rating Scale and Quality of life was assessed by HRQOL SF-36 questionnaire.

##### Results

The results showed that there was highly significant change in pain intensity in experimental group (Pre: 7.15 and Post: 3.80), whereas no significant change was seen in control group (Pre: 6.85 and Post: 6.70). Also, significant changes were seen in all the eight domains of HRQOL SF-36 in experimental group as compared to control group.

##### Conclusion

Pilates reduces the pain as well as improves the Quality of Life in females with Primary Dysmenorrhea.

**Keywords:** Primary Dysmenorrhea, Pilates, Numerical Rating Scale, HRQOL SF-36

## INTRODUCTION

Dysmenorrhea is a gynaecological disorder which is characterized by lower abdominal pain which may irradiate to thighs and top and bottom of the spine [4].

This disease affects 60% of females, with systemic symptoms such as headache (60%), low back pain, nausea and vomiting (80%), diarrhoea (50%), irritability (30%) and adynamia (45%), among others [1].

Dysmenorrhoea can be classified into two subtypes. **Primary dysmenorrhoea** occurs when there is no identifiable pelvic disease and tends to occur within 12 months of menarche. **Secondary dysmenorrhoea** can occur many years after menarche and is associated with identifiable pelvic pathology, for example endometriosis.

The suggested physiological causes for dysmenorrhoea include the excessive production of uterine prostaglandins and the over production of vasopressin, a hormone which stimulates uterine muscular contractions [4].

Primary dysmenorrhea usually presents during adolescence, within three years of menarche. It is unusual for symptoms to start within the first six months after menarche. Affected women experience sharp, intermittent spasms of pain, usually centered in the suprapubic area. Pain may radiate to the back of the legs or the lower back. Systemic symptoms of nausea, vomiting, diarrhoea, fatigue, fever, headache or light-headedness are fairly common. Pain usually develops within hours of the start of menstruation and peaks as the flow becomes heaviest during the first day or two of the cycle. A focused history and physical examination are usually sufficient to make the diagnosis of primary dysmenorrhea. The history reveals the typical cramping pain with menstruation, and the physical examination is completely normal. Secondary causes of dysmenorrhea must be excluded [7].

## PATHOPHYSIOLOGY

The etiology of primary dysmenorrhoeal is not precisely understood, but most symptoms can be explained by the action of uterine prostaglandins, particularly  $\text{PGF2}_{\alpha}$ , the disintegrating endometrial cells release  $\text{PGF2}_{\alpha}$  as menstruation begins.  $\text{PGF2}_{\alpha}$  stimulates myometrial contractions, ischemia and sensitization of nerve

endings. Falling progesterone level during the luteal phase brings about these elevations, specifically of  $\text{PGF2}_{\alpha}$ . The role of prostaglandin synthesis inhibitors is in reducing painful symptoms accompanying menstrual discharge. The intensity of the menstrual cramps and associated symptoms of dysmenorrhea are directly proportional to the amount of  $\text{PGF2}_{\alpha}$  released. [12, 13] The levels of prostaglandin  $\text{F2}\alpha$  are especially high during the first two days of menstruation in women with severe primary dysmenorrhoea. Vasopressin and leukotriene concentrations have also been found to be higher in women with severe menstrual pains than in women who experience mild or no menstrual pain. The posterior pituitary hormone vasopressin may be involved in myometrial hyper sensitivity, reduced uterine blood flow, and pain in primary dysmenorrhea. Vasopressin role in the endometrium may be related to prostaglandin synthesis and release. [2] Dysmenorrhea can be treated by various pharmacological and non-pharmacological remedies.

**Joseph Humbertus Pilates** has developed a series of exercises based on progressive movements the body is able to make, currently called Pilates. Pilates is a dynamic technique aiming at working strength, stretching and flexibility, concerned with maintaining physiological body curves with the abdomen as the strength centre, which constantly works during all Pilates exercises. The literature also points as advantages circulation stimulation and fitness improvement, which help to prevent injuries and provide pain relief, with excellent results. [22, 23]

## METHODOLOGY

The conducted study was experimental study with simple random sampling done of 40 subjects.

### Inclusion criteria

Females in age group of 18-25 years diagnosed with primary dysmenorrhea, regular menstrual cycle, willing to participate.

### Exclusion criteria

Females on Medications, Performing other type of physical activity like exercises, swimming, etc., Other Gynaecological disorders like PCOD and females with Irregular menstrual cycle.

## PROCEDURE

With the approval of Institutional ethical committee study was conducted.

The targeted population was medical students. The focus of the study was to find effect of Pilates on primary dysmenorrhea.

40 subjects were selected for the study according to the inclusion and exclusion criteria. They were evaluated by using self-made evaluation form diagnosing dysmenorrhea.

Written consent was obtained on the day of evaluation from the subjects. Subjects were randomly divided into experimental and control groups. Subjects were explained regarding questionnaire and were asked to fill the same for three consecutive menstrual cycles (24-36 hours before start of menstruation). Pre and post intervention readings were taken and documented.

Protocol was formed after conducting pilot study.

### Experimental group: (n=20)

A structured 8 weeks of Pilates exercise program (3days/week, 40mins/day) were given. Days of menstruation was excluded from exercise programme.

### The exercise programme was as follows

During 1<sup>st</sup> week all the subjects were made to practice lateral costal breathing and maintaining neutral pelvis.

During 2<sup>nd</sup> week the subjects practiced warm-ups (5 reps each)

Imprint and release, Hip rolls, Hip release, Arm circles, Scapular isolation, Camel stretch, Spinal rotation.

During 3<sup>rd</sup> week the subjects were made to perform warm-ups + Pilates according to the protocol (5 reps each)

Ab prep, one leg circle, Breast stroke prep, Superman, Half roll back

During 4<sup>th</sup> week-warmups+2<sup>nd</sup> week+3<sup>rd</sup> week + following exercises

Hundreds, Full breast stroke, half roll back with oblique, Spine twist, Scissors

During 5<sup>th</sup> 6<sup>th</sup> 7<sup>th</sup> and 8<sup>th</sup> weeks the subjects were made to perform all warm-ups and Pilates exercises practiced during first 4 weeks (8 reps each)

Hence progression was done.

At the end of session the subjects were asked to perform shavasana breathing exercises for relaxation.

### Control group: (n=20)

Control group was observed without exercises; with no lifestyle modifications

After the study was completed, the results noted, same protocol was given to this group.

## RESULTS AND GRAPHS

All the participants completed 24 sessions (3/week for 8 weeks). The following table represents data with NRS and quality of life. Descriptive statistics including p-value, standard deviation, mean calculated. Comparison of NRS and quality of life score within the groups was assessed with paired t-test. Comparison between NRS and quality of life scores of two groups was done using Mann Witney test.

Graph 1: Pain Intensity

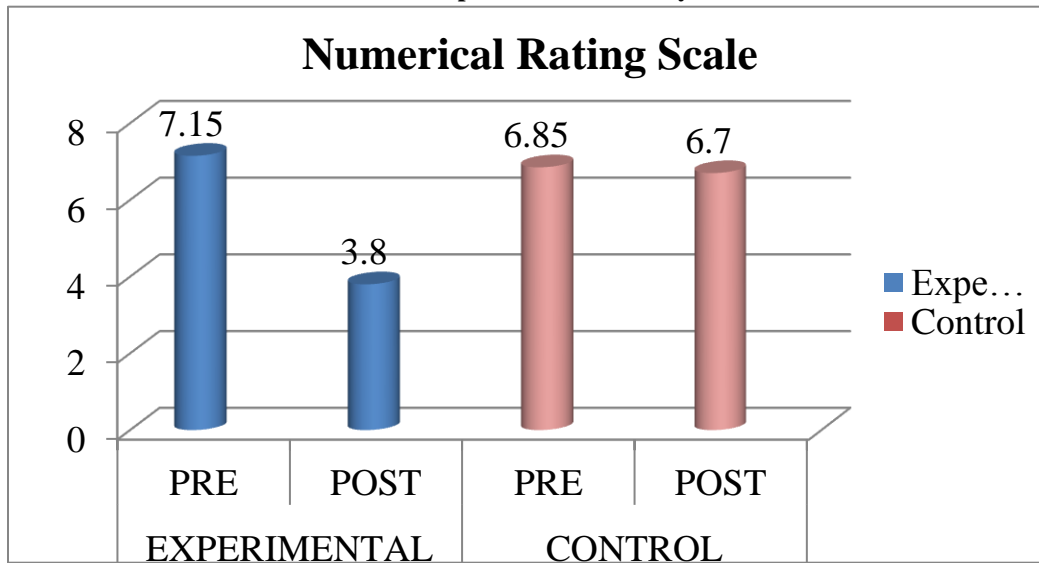
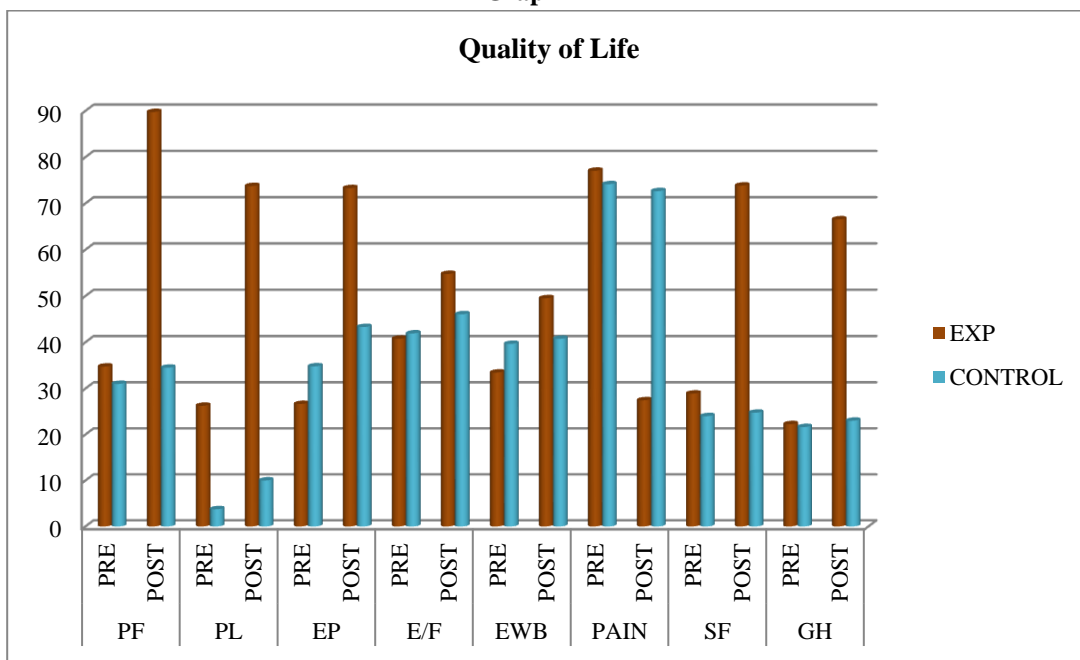


Table 1

GROUPS	MEAN		STANDARD DEVIATION		P-VALUE	SIGNIFICANCE
	PRE	POST	PRE	POST		
EXPERIMENTAL	3.80	7.15	1.182	0.768	0.0479	Extremely significant
CONTROL	6.70	6.85	1.08	1.129	0.2527	Not significant

Graph 2



When the eight domains of the SF-36 were compared, all domains showed significant

improvement in experimental group (p-value: <0.0001\*).

## DISCUSSION

The present study aimed at finding out the effects of Pilates in reduction of Pain and improvement in Quality of Life in females with primary dysmenorrhea. The results of the present study showed there was significant difference in Pain intensity and Quality Of Life after eight weeks of treatment between the groups (Experimental group and Control group) in females with primary dysmenorrhea.

The mean baseline value for pain in experimental group was  $7.150 \pm 1.18$  and in control group was  $6.650 \pm 1.089$ . After intervention the mean value of pain among participants in experimental group was  $3.80 \pm 0.7678$  and control group was  $6.70 \pm 1.12$ .

The results of present study also showed significant difference in all the domains of HRQOL SF-36 (quality of life) in experimental group.

Numerical rating scale was used to measure the pain intensity before and after eight weeks of intervention.

The mean baseline value for pain in experimental group was  $7.150 \pm 1.18$  and after intervention the mean value of pain among participants in experimental group was  $3.80 \pm 0.7678$ . The Experimental group showed marked reduction of pain after the eight weeks of intervention.

The physiological basis for dysmenorrhea is associated with increased levels of prostaglandins, which results in uterine contraction and ischemia. Falling progesterone level during the luteal phase leads to these elevations, specifically of PGF<sub>2</sub> $\alpha$  and PGE<sub>2</sub>. The role of prostaglandin synthesis inhibitors is in reducing painful symptoms accompanying menstrual discharge. It seems that women who exercise have a reduced incidence of dysmenorrhea. These may be due to exercises have hormonal effects on the lining of the uterus, or increased level of circulating endorphins. The severity of dysmenorrhea decreased with decreasing duration of menstruation. Regular exercise results in release of endorphins hormones in brain that raise the pain threshold and improves mood of exercising subjects. Physical activities increase blood flow to the uterus so improved blood flow to the pelvis relieves ischemia and ultimately reduces the pain [3].

These patients may have increased their pain threshold due to the adjustment of endogenous pain control mechanisms. The body would start to secrete more neurotransmitters, such as nor epinephrine, serotonin, enkephalin and dopamine, which would act to inhibit and control pain [19].

The mean baseline value for pain before intervention was  $6.650 \pm 1.089$  and after intervention was  $6.70 \pm 1.12$ . Control group (sedentary lifestyle) showed no improvement in pain reduction during menstruation.

HRQOL SF-35 was used to measure Quality Of Life before and after eight weeks of intervention.

Eight domains (physical functioning, role limitation due to physical problems, role limitation due to emotional problems, energy/fatigue, emotional wellbeing, social functioning, pain and general health) showed significant improvement after eight weeks of intervention in experimental group.

The findings of the above study are in accordance with study done by Abbaspour Z, Rostami M, Najjar Sh. In that study physical exercise reduces the symptoms of primary dysmenorrhea thereby improving Quality of life in females with dysmenorrhea [18].

Pilates exercises belong to a group of Body-Mind Exercises, where the focus is on controlled movement, posture, and breathing. Pilates improves mental and physical wellbeing, increases flexibility and strengthens muscles through controlled movements. According to Pilates principles like centering, precision, concentration, breathing it basically acted on each and every body part of the participants like physical as well as psychological. It had shown highly significant changes in concentration, negative affect and behavioural change.

As one of its principles is concentration naturally the participants were concentrating on exercise session fully. So Pilates helped them to get deviated from their pain and suffering and engaged them in learning some new technique of exercise.

Exercises increased blood flow to the pelvic organs thereby causing wash out of the waste products pain and blood clots which formed in menstruation. It decreased pain and discomfort of menstruation. Exercises release endorphins in the blood which improved mood of the participants. Most study results are similar to those obtained in our study with Pilates, which would improve pelvic

blood flow, decreasing muscle stresses, providing the stretching of all involved structures with consequent pain relief [2, 3].

The current study showed that there was a significant improvement in Pain as well as Quality Of Life in experimental group ( $p < 0.01$ ) after eight weeks of intervention as compared to control group.

## CONCLUSION AND CLINICAL SIGNIFICANCE

The present study concludes that Pilates can be effective treatment for relieving pain and quality of life in females with primary dysmenorrhea. The experimental group showed significant difference in NRS scores and quality of life statistically post intervention. Our findings showed that exercises can help to reduce pain and improve physical symptoms which overall improves quality of life of females with primary dysmenorrhea. Hence, with this outcome measure taken into consideration Pilates can be

implemented as an adjunct to the treatment in patients with primary dysmenorrhea.

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