IJBPAS, December, 2026, 15(12): 5740-5750

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

EFFECT OF PHYSIOTHERAPY TRAINING ON PAIN & QUALITY OF LIFE IN MITTELSCHMERZ SYNDROME – AN EXPERIMENTAL STUDY

PRIYANKA P[1], RINKAL P[*2] AND GAURAV P[3]

1: MPT Scholar, Department of Physiotherapy, Ahmedabad Physiotherapy College, Parul University, Gujarat, India; **ORCID iD: 0009-0003-8783-4816**

2: Associate Professor, Master in Neuroscience, Department of Physiotherapy, Ahmedabad Physiotherapy College, Parul University, Gujarat, India; **Orcid Id: 0000-9479-0311**

3: Principal & Professor, Master in Neuroscience, Rita A. Patel Institute of Physiotherapy, CVM University, Gujarat, India. India; **Orcid Id: 0000-0002-7741-1786**

***Corresponding Author: Dr. Rinkal Parmar: E Mail: rinkal.parmar@paruluniversity.ac.in**

Received 18th May 2026; Revised 24th June 2026; Accepted 18th Aug, 2026; Available online 1st Dec. 2026

https://doi.org/10.31032/IJBPAS/2026/15.12.10637

ABSTRACT

Background: Mittelschmerz, commonly referred to as ovulation pain, affects approximately 15–40% of women and typically occurs around the mid-menstrual cycle, most frequently between the 7th and 24th days. The condition usually manifests a few years after menarche once regular ovulatory cycles are established. It is characterized by sudden unilateral lower abdominal pain, sometimes accompanied by mild lower back discomfort, which may persist until the onset of menstruation. Despite its prevalence, non-pharmacological approaches such as physiotherapy for the management of ovulation-related pain remain relatively underexplored.

Methods: This experimental study recruited 45 unmarried young adult females experiencing ovulation pain, selected according to predefined inclusion and exclusion criteria. The study was conducted over a 4-week period, during which participants underwent structured physiotherapy training. Outcome measures were assessed before and after the intervention using the Short Form-36 (SF-36) Quality of Life Questionnaire, Short Form McGill Pain Questionnaire (SF-MPQ), and the Menstrual Distress Questionnaire (MDQ) to evaluate changes in pain intensity, menstrual distress, and overall quality of life.

Results: Statistical analysis using a paired t-test revealed statistically significant improvements ($p < 0.05$) across all outcome measures following the physiotherapy intervention. The results indicate that

physiotherapy training contributed to a significant reduction in ovulation-related pain and menstrual distress, along with a notable improvement in quality of life among the participants.

Conclusion: The findings emphasize the clinical relevance of physiotherapy as a safe, non-invasive, and accessible therapeutic approach for managing Mittelschmerz syndrome. The ease of implementation and adherence to physiotherapy protocols further support its practicality in routine management. Additionally, the study highlights the broader benefits of exercise in enhancing both physical health and psychological well-being, advocating for its inclusion as part of a comprehensive management strategy for ovulation-related pain.

Keywords: Mittelschmerz, Short Form-36, Short Form McGill Pain Questionnaire, Menstrual Distress Questionnaire, Physiotherapy

INTRODUCTION

Mittelschmerz is a German for "middle pain," and it refers to abdominal pain that happens during ovulation. Women experiencing Mittelschmerz often feel a general discomfort or dull ache across the lower abdomen. Some individuals may experience more intense, sharp, or stabbing pain during ovulation **[1]**. The pain may extend or radiate toward the umbilicus. In addition to abdominal pain, some women may also feel discomfort or pain in the lower back. The pain is described as intermittent, meaning it comes and goes rather than being constant. Even when the left ovary is involved, the pain tends to concentrate on the right lower quadrant **[2]**. This phenomenon may be due to the anatomy of the reproductive organs. The pain often subsides or completely disappears when the person lies down. Pain typically lasts for a short duration, usually less than 24 hours **[3]**. Mittelschmerz symptoms may be due to following reasons as suggestion is that blood in the belly might cause stomach pain. But after injecting up to 0.3 cubic-meters of blood into the cul-de-sac (the space between the uterus and rectum) in a clean way, no bad effects were seen **[2]**. Possible reasons for the syndrome include painful contractions in the fallopian tubes, pressure from the growing follicle, or the follicle rupturing. The pre-ovulatory phase, marked by the appearance of Mittelschmerz, varies in duration from fourteen to twenty-five days since menstruation cycle begins **[4]**.

Regular physical exercise is widely recognized for its beneficial effects on both physical and psychological health. One of the primary mechanisms through which exercise reduces pain is the release of endorphins, often referred to as “feel-good” hormones. These endogenous opioids act as natural analgesics and mood enhancers, thereby decreasing the perception of pain while promoting a sense of well-being. In addition to this, regular physical activity

contributes to hormonal regulation, particularly influencing the synthesis and secretion of estrogen and progesterone, which play crucial roles in maintaining menstrual cycle regularity and overall reproductive health. Exercise has also been associated with the stimulation of naturally occurring anti-inflammatory substances, which may help counteract persistent inflammation linked to several health conditions, including circulatory system disorders and certain chronic diseases **[1]**. Beyond its physiological benefits, exercise also contributes significantly to cardiovascular and mental health. Regular physical activity enhances blood circulation, helps in reducing blood pressure, and improves overall cardiac function. Moreover, exercise has been shown to reduce the levels of stress hormones while simultaneously improving psychological health outcomes, including reductions in anxiety and depressive symptoms, thereby supporting overall emotional well-being **[4]**. Mittelschmerz (ovulation pain) is quite as common but this condition has never been treated in past. There is currently inadequate evidence in the literature that significantly makes advancement and reduces the symptoms of pain that young women suffer in every mid cycle. Therefore, the purpose of the present study was to check the effect of physiotherapy training on pain and quality of life in Mittelschmerz syndrome.

MATERIALS AND METHODS

This study was designed as an experimental study using a random sampling technique. The study population consisted of unmarried females aged between 17 and 28 years who reported ovulation pain. The sample size was determined based on feasibility and availability of participants, consistent with similar experimental studies in physiotherapy using paired comparisons. From a total population of 150 unmarried females**,** 45 participants meeting the eligibility criteria were selected for the study. The duration of the intervention was four weeks**.**

Participants were included in the study (1) if they experienced premenstrual syndrome (PMS) persistently for at least three months, (2) reported a pain intensity of 4 or more on the Visual Analog Scale (VAS) at any point during the menstrual cycle within the previous three months**,** (3) had regular menstrual cycles ranging from 24 to 35 days for at least the past 12 months, (4) only females aged between 17 and 28 years were considered eligible for participation.[5] Participants were excluded (1) if they had undergone any surgical procedure within the previous six months, (2) presented with musculoskeletal disorders, (3) or had chronic gynecological conditions such as ovarian cysts or endometriosis**.** (4) Individuals receiving hormone therapy were also excluded from the study **[5]**.

Participants underwent a pre-test evaluation of pain using MDQ and SF-MC Gill Pain Questionnaire. Evaluation of physical and mental health was performed using SF-36 Health Survey - Quality of Life. Each session lasted for 30 minutes. After completing the entire treatment program, a post-assessment was conducted at 4 weeks. Evaluation of pain and physical/mental health was performed using the same tests (MDQ, SF-MC Gill Pain Questionnaire, and SF-36 Health Survey).

The Menstrual Distress Questionnaire (MEDI-Q) is a validated tool used to assess menstrual-related distress in women of reproductive age. It consists of 25 items evaluating symptoms such as pain, physical discomfort, psychological changes, and gastrointestinal disturbances. Each item assesses the frequency and severity of symptoms and their impact on daily functioning and quality of life during the menstrual phase compared with the premenstrual and intermenstrual phases **[6]**.

The Short Form-36 Health Survey (SF-36) is a widely used questionnaire for assessing health-related quality of life. It consists of 36 items that evaluate eight domains: physical functioning, role limitations due to physical problems, role limitations due to emotional problems, social functioning, mental health, energy/vitality, bodily pain, and general health perception. An additional single item assesses changes in health over the past year. The scores for each domain are converted to **a** 0–100 scale, where 0 represents the worst health status and 100 represents the best health status **[7]**. The Short Form McGill Pain Questionnaire (SF-MPQ) is a commonly used tool for assessing pain intensity and quality. It consists of 15 pain descriptors, including 11 sensory descriptors and 4 affective descriptors**,** each rated on a 4-point scale (0 = no pain, 1 = mild, 2 = moderate, 3 = severe). Pain scores are calculated by summing the intensity values for sensory, affective, and total pain descriptors**.** The questionnaire also includes the Present Pain Intensity (PPI) index and a Visual Analogue Scale (VAS) to measure overall pain intensity **[8, 9]**.

Data normality was assessed using the Shapiro–Wilk test. As the data followed a normal distribution, parametric analysis was applied. Pre- and post-intervention outcomes were compared using the paired t-test. A p-value of <0.05 was considered statistically significant.

Intervention Protocol

Participants underwent a structured physiotherapy exercise program for duration of four weeks, with each session consisting of specific exercises aimed at reducing ovulation-related pain and improving overall well-being. The intervention began with Jacobson's Progressive Relaxation Exercise for 5 minutes to promote relaxation and reduce muscle tension **[10]**. This was

followed by isometric abdominal exercises **[11]** performed with a 5-second hold for 10 repetitions to enhance core muscle activation and stability. Subsequently, participants performed unilateral knee-to-chest exercises **[11]**, maintaining each position for 5 seconds with 10 repetitions, to facilitate gentle stretching of the lower back and pelvic region. This was followed by the butterfly pose (adductor stretch) **[11]**, held for 30 seconds and repeated three times, to improve flexibility of the hip adductors and pelvic musculature. Participants then performed the prone on hands exercise **[11]**, holding the position for 5 seconds for 10 repetitions, which helps in stretching the abdominal muscles and promoting spinal extension. This was followed by the child's pose **[12]**, maintained for 40 seconds with two repetitions, to encourage relaxation and stretching of the lower back and pelvic muscles. Each session concluded with Jacobson's Progressive Relaxation Exercise for 5 minutes to facilitate overall relaxation **[11]** During episodes of ovulation pain, participants were advised to adopt prone positioning with the application of a hot pack and child's pose with a hot pack, each maintained for 10 minutes, to help alleviate pain and provide muscular relaxation.



Figure 1: Jacobson Relaxation

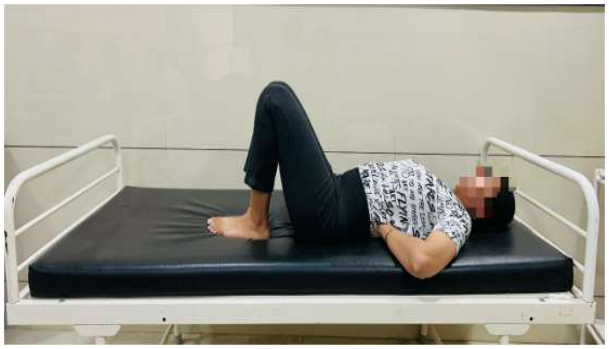


Figure 2: Isometric Abdominal Exercise



Figure 3: Unilateral Knee To Chest



Figure 4: Butterfly Pose

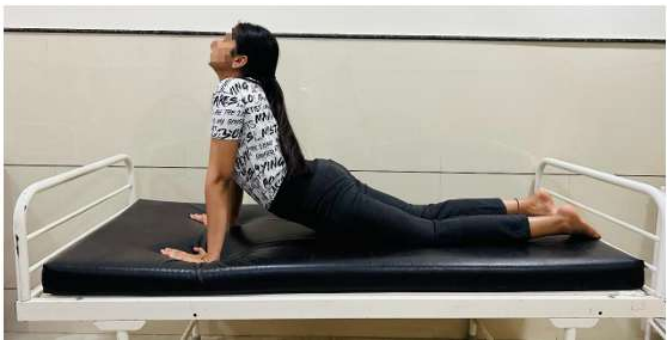


Figure 5: Prone on hand



Figure 6: Child pose



Figure 7: Prone Lying

RESULTS

Normality of the data distribution was assessed Shapiro-Wilk test, along with visual inspection of histograms and Q-Q plots, was employed to confirm that the data followed a normal distribution. A total of 45 participants aged between 17–28 years were included in the study. The mean age of participants was **20.42 ± 1.84 years**. All outcome measures were analyzed using descriptive and inferential statistics.

Table 1: Comparision and Analysis of Pre-Post Outcomes Measures – SF 36, MEDI-Q and SF MPQ With Paired T Test

OUTCOMES		MEAN	SD	T TEST	P VALUE
SHORT FORM 36	PRE	0.47	0.1223	0.000306	0.05
	POST	0.44	0.10589		
MENSTRUAL DISTRESS QUESTIONNAIRE	PRE	25.22222	14.14	0.002099	0.05
	POST	20.92308	9.579387		
SHORT FORM MC GILL PAIN QUESTIONNAIRE	PRE	5.444444	1.865422	0.014722	0.05
	POST	4.666667	1.522558		

Table 1 demonstrates the comparison of pre- and post-intervention scores using the paired t-test. The results showed a statistically significant improvement across all outcome measures. The quality of life, assessed using SF-36, improved **from 0.47 ± 0.12 to 0.44 ± 0.10 (p = 0.000306)**. Similarly, menstrual distress measured by MEDI-Q decreased from **25.22 ± 14.14 to 20.92 ± 9.57 (p = 0.002099)**. Pain intensity, evaluated using SF-MPQ, also showed a reduction from **5.44 ± 1.86 to 4.66 ± 1.52**, which was statistically significant **(p = 0.014722)**. These findings indicate that the intervention was effective in improving

quality of life and reducing pain and menstrual distress.

DISCUSSION

The present study aimed to evaluate the effectiveness of physiotherapy training on pain and quality of life in individuals with Mittelschmerz syndrome. The results demonstrated a statistically significant reduction in pain intensity and menstrual distress, along with improvement in quality of life following a 4-week intervention program.

The reduction in pain intensity, as measured by the Short Form McGill Pain Questionnaire (SF-MPQ), suggests that physiotherapy interventions are effective in alleviating ovulation-related pain. This finding is consistent with the work of **Melzack [8]**, who established SF-MPQ as a reliable and sensitive tool for detecting changes in pain intensity. Additionally, previous studies have shown that exercise interventions, including stretching and relaxation techniques, can significantly reduce menstrual pain by improving circulation and reducing muscle tension **[10, 13**]. The significant decrease in Menstrual Distress Questionnaire (MEDI-Q) scores indicates an overall reduction in menstrual-related symptoms. This aligns with the findings of **Cassioli *et al*. [6]**, who reported high reliability and validity of MEDI-Q in assessing menstrual distress. Furthermore, study **Demiralp Ovgun C *et al*. [14]** have demonstrated that physiotherapy interventions, including myofascial release, relaxation techniques, and hot pack application, effectively reduce symptoms associated with premenstrual syndrome.

The improvement in quality of life, as measured by the Short Form-36 (SF-36), highlights the broader benefits of physiotherapy. These findings are supported by **Jenkinson *et al*. [9, 7]**, who emphasized the reliability of SF-36 in evaluating both physical and mental health outcomes. Exercise-based interventions have been shown to enhance overall well-being by improving functional capacity and reducing psychological distress, which is consistent with the results of the present study.

The role of relaxation techniques, particularly Jacobson's Progressive Muscle Relaxation, may have contributed significantly to the observed improvements. Studies by **Ibrahim *et al*. [15]** and **VR Sonia [16]** have reported that relaxation techniques effectively reduce pain intensity and improve quality of life in women with menstrual disorders. These techniques likely act by reducing stress, decreasing muscle tension, and enhancing endorphin release.

Additionally, the beneficial effects of exercise observed in this study are supported by research conducted by **Nikita Mathur [17]** and **Banafsheh Mohammadi *et al*. [18]**, which demonstrated that regular physical activity significantly reduces

menstrual symptoms and improves overall health outcomes. These studies suggest that exercise plays a key role in modulating hormonal balance and reducing inflammation, thereby contributing to pain relief.

The statistically significant results ($p < 0.05$) obtained using paired t-test further confirm the effectiveness of the intervention. The findings are in agreement with earlier studies on stretching and physiotherapy interventions, which have consistently shown improvements in pain and quality of life among females experiencing menstrual-related symptoms **[10, 13]**.

Future Prospects

Future studies should include larger sample sizes and longer follow-up periods to enhance statistical power and assess long-term treatment effects. Inclusion of diverse populations with varying pain severity and demographics can improve generalizability. Comparative research on different physiotherapy interventions, alone or combined with standard care, is recommended to determine relative effectiveness. These efforts may support more tailored and effective management of Mittelschmerz pain.

CONCLUSION

Our study has explored the effects of Physiotherapy training on Mittelschmerz Syndrome, which is the pain some women experience during ovulation. This study has found that exercise reduce this pain and improve both physical and emotional well-being in women. Exercise has shown a numerous benefit for overall health, including hormonal regulation; improve quality of life, stress reduction, and mood improvement. This study provides evidence that exercise specifically helps alleviate Mittelschmerz Syndrome, it offers a practical and natural approach for women experiencing this discomfort.

ACKNOWLEDGEMENTS

The authors would like to thank all the participants for their cooperation and willingness to take part in this study. The authors also acknowledge the support and guidance provided by faculty members during the course of this research. No external funding was received for this study.

REFERENCES

[1] McSweeney DJ, Wood FO, Acute abdominal conditions following ovulation and its sequelae, New England Journal of Medicine, 222(5), 1940, 174–179.

[2] Diddle AW, Relation of intermenstrual symptoms and signs to ovulation as determined by basal body temperatures, American Journal of Obstetrics and Gynecology, 56(3), 1948, 537–540.

[3] Hann LE, Hall DA, Black EB, Ferrucci JT Jr, Mittelschmerz:

Sonographic demonstration, JAMA, 241(25), 1979, 2731–2732.

[4] Steinberg H, Sykes EA, Introduction to symposium on endorphins and behavioral processes: Review of literature on endorphins and exercise, Pharmacology Biochemistry and Behavior, 23(5), 1985, 857–862.

[5] Fukuda M, Fukuda K, Yding Andersen C, Byskov AG, Does corpus luteum locally affect follicular growth negatively?, Human Reproduction, 12(5), 1997, 1024–1027.

[6] Cassioli E, Rossi E, Melani G, Faldi M, Rellini AH, Wyatt RB, Oester C, Vannuccini S, Petraglia F, Ricca V, Castellini G, The menstrual distress questionnaire (MEDI-Q): Reliability and validity of the English version, Gynecological Endocrinology, 39(1), 2023, 2227275.

[7] Brazier JE, Harper R, Jones NM, O'Cathain A, Thomas KJ, Usherwood T, Westlake L, Validating the SF-36 health survey questionnaire: New outcome measure for primary care, BMJ, 305(6846), 1992, 160–164.

[8] Melzack R, The short-form McGill pain questionnaire, Pain, 30(2), 1987, 191–197.

[9] Jenkinson C, Coulter A, Wright L, Short Form-36 (SF-36) health survey questionnaire: Normative data for adults of working age, BMJ, 306(6890), 1993, 1437–1440.

[10] Karthika SR, Suresh Kumar S, Effects of stretching exercises and walking in premenstrual syndrome, Journal of Pharmaceutical Negative Results, 2022, 7.

[11] Kisner C, Colby LA, Borstad J, Therapeutic Exercise: Foundations and Techniques, 7th ed., F.A. Davis Company, Philadelphia, 2012.

[12] Vaghela N, Mishra D, Sheth M, Dani VB, To compare the effects of aerobic exercise and yoga on premenstrual syndrome, Journal of Education and Health Promotion, 8, 2019, 199.

[13] Aher J, Rajole K, A cross-sectional study of the prevalence of dysmenorrhea among adolescent girls, Sch J App Med Sci, 4(3), 2016, 421–423.

[14] Demiralp Ovgun C, Tuzun EH, Effect of progressive muscle relaxation technique and myofascial release technique on premenstrual symptoms, blood circulation, and quality of life in women with premenstrual syndrome: A single-blind randomized controlled study,

Medicine (Baltimore), 102(27), 2023, e34223.

[15] Ibrahim H, Abd-Elrahman Kandeel H, Mohamed Amin S, Nicola Ghattas V, Effect of Jacobson's relaxation technique versus warm compresses on pain intensity, fatigue, and quality of life among nursing students with primary dysmenorrhea, Egyptian Journal of Health Care, 14(1), 2023, 1122–1137.

[16] Aneesha VB, A study to assess the effectiveness of Jacobson progressive muscle relaxation exercise on premenstrual syndrome among women attending gynecology OPD in KG Hospital, Coimbatore (Doctoral dissertation), KG College of Nursing, Coimbatore.

[17] Mathur N, Effectiveness of exercise in menstruation symptoms in late adolescents (17–20 years of age), Inericom, 5(2), 2020, 5.

[18] Mohammadi B, Azamian Jazi A, Fathollahi Shourabeh F, Effect of aerobic exercise training and detraining on menstrual disorders in non-athlete students in Lorestan universities, Internal Medicine Today, 18(2), 2012, 5–12.