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EFFECT OF EXERCISE IN PRIMARY DYSMENORRHEA - AN EVIDENCE BASED STUDY

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ABSTRACT
Background: Primary dysmenorrhea, prevalent in adolescent and young adult females, is marked by menstrual cramping without pelvic pathology. While NSAIDs are commonly used for relief, side effects and incomplete pain alleviation are frequent. Exercise is increasingly recognized as a beneficial non-pharmacological alternative, supported by evidence for its effectiveness in reducing pain and enhancing quality of life.
Methodology: An evidence-based study involved a thorough literature search across electronic databases like PubMed, PEDro, Google Scholar, and the Cochrane Library. Studies in English meeting specific inclusion and exclusion criteria were selected, focusing on randomized controlled trials, systematic reviews, and meta-analyses on therapeutic interventions. The data extracted included study design, interventions, outcome measures, and level of evidence, with methodological quality assessed using tools like the PEDro scale and evidence hierarchy.
Results: This review of nine randomized controlled trials demonstrated that various exercise interventions, such as aerobic activity, Zumba, and yoga, significantly alleviate menstrual pain intensity, as measured by the VAS scale. Most interventions occurred three times a week over four to eight weeks, with VAS scores dropping by up to three points, especially for aerobic and dance-based exercises.
Conclusion: The evidence strongly supports physiotherapy and conservative interventions as effective, safe, and non-pharmacological approaches for managing primary dysmenorrhea. Exercise-based programs, electro-physical agents, and self-care strategies significantly reduce menstrual pain and improve functional outcomes, supporting their integration into routine clinical practice.
Keywords: Primary dysmenorrhea, exercise therapy, Menstrual distress syndrome.

INTRODUCTION:
One of the most common gynecological disorders affecting teenage girls and young women is primary dysmenorrhea (PD). It is typified by persistent, cramping lower abdominal discomfort that happens during menstruation without any discernible pelvic pathology. The pain is frequently cyclical, starting just before or at the start of monthly bleeding and usually lasting 24 to 72 hours. Usually starting one to two years following menarche, primary dysmenorrhea coincides with the onset of ovulatory menstrual periods. [1, 2]. In contrast to secondary dysmenorrhea, which results from underlying pathological disorders like uterine fibroids or endometriosis, PD occurs in apparently healthy people and is consequently frequently underdiagnosed or

normalized. PD has a significant influence on the physical, mental, and social well-being of those who are affected, even though it is a benign disorder. It seriously disrupts day-to-day activities, resulting in absenteeism from school or college, poor academic performance, diminished engagement in physical activities, mental disorders, and social disengagement. [3]. Recurrent pain frequently causes adolescents and young women to feel frustrated and powerless, which over time can have a detrimental effect on their mental health and self-esteem. Depending on diagnostic criteria, age group, cultural perceptions of pain, and research methods, the prevalence of primary dysmenorrhea varies greatly throughout the world, from 45% to as high as 95%. And by the research, prevalence rates among teenage girls and college-age women in India range from 50% to 87%. [4, 5]. In addition to systemic symptoms such nausea, vomiting, headaches, diarrhoea, dizziness, and exhaustion, PD frequently manifests as cramping lower abdomen discomfort that may radiate to the lower back and legs. [6]. the primary cause of primary dysmenorrhea is the overproduction of endometrial prostaglandins, notably prostaglandin F2-alpha (PGF2α) and prostaglandin E2 (PGE2), during menstruation. These prostaglandins are released when endometrial cells degrade, resulting in increased ischemia and pain due to vasoconstriction, intense uterine contractions, and decreased blood flow to the uterus. [7] Research shows that women with pain during menstruation (PD) have significantly higher levels of certain chemicals compared to those without pain. The highest prostaglandin levels occur within the first 24 to 48 hours of menstruation, coinciding with maximum pain severity, which then declines as hormone levels decrease. [8]. Because they inhibit cyclooxygenase enzymes and decrease prostaglandin formation, nonsteroidal anti-inflammatory medications (NSAIDs) are regarded as first-line therapy [9]. NSAIDs side effects include nausea, gastrointestinal discomfort, renal failure, and, in certain situations, decreased efficacy after prolonged treatment. Weight gain, mood swings, irregular bleeding, and hormonal imbalance are among the negative effects of hormonal contraceptives. [10]. Investigating conservative, non-pharmacological treatments for primary dysmenorrhea is essential for physiotherapists. Therapeutic exercise is a cost-effective, non-invasive method that enhances endorphin release, improving pain tolerance and serving as a natural painkiller. [11]. Exercise alleviates pain by reducing inflammatory markers, enhancing blood circulation, and lowering sympathetic nervous system activity. It also positively affects psychological health by decreasing stress and depressive symptoms that can heighten pain perception. Exercise serves as a holistic approach to addressing pelvic discomfort, relieving muscle tension, and improving oxygen delivery. Research indicates that various exercise programs, including aerobic training, strength training, stretching, yoga, Pilates, and relaxation techniques, significantly reduce the intensity and duration of menstrual pain in women with primary dysmenorrhea (PD). [12, 13]. Aerobic exercise three times a week for 12 weeks significantly reduced pain intensity and improved physical and emotional functioning, according to a randomized controlled experiment by Kannan et al.It has also been demonstrated that yoga-based treatments that include poses like

Bhujangasana, Dhanurasana, and Vajrasana can reduce menstruation pain, control breathing, and encourage relaxation [14, 15]. According to Armour et al.'s comprehensive review and meta-analysis, physical exercise decreased menstrual pain severity by about 1.8 cm on a 10 cm VAS Scale, with discernible benefits shown within 4–8 weeks of intervention [16]. More recently, a 2023 network meta-analysis found that relaxation-based exercise regimens had the lowest dropout rates and the most pain relief, making them especially appropriate for teenagers and college students [17]. Evaluating physiotherapy-led therapies for self-management and long-term well-being is vital due to the rising incidence of primary dysmenorrhea among teenagers and young adults. This case study aims to assess the response of a young woman with primary dysmenorrhea to a structured physiotherapy-based exercise program regarding pain and related symptoms. [18]. People who suffer from dysmenorrhea have a much lower quality of life. Pain-related disruptions affect social and recreational activities, interpersonal connections, and productivity and performance at work and school [19]. During their reproductive years, menstruation discomfort affects about 75% of women, teenagers and young adults are especially susceptible [20]. The incidence of PD has steadily increased due to changes in modern living, increased scholastic pressure, psychological stress, and bad eating habits [21].

Primary dysmenorrhea is a common and often debilitating condition affecting a large proportion of adolescent and young adult females, particularly students. While pharmacological treatments such as NSAIDs offer temporary relief, many individuals either do not respond adequately or prefer non-drug alternatives due to cultural, personal, or health-related reasons.

Evidence are available on effect of exercise in primary dysmenorrhea. Exercise has been shown to reduce prostaglandin levels, improve blood circulation, and release endorphins, leading to natural pain relief. However, there is still limited awareness and application of physiotherapy-led interventions in managing dysmenorrhea, especially in developing countries like India.
So the need of the study is to find the evidence regarding effect of exercise in primary dysmenorrhea.

AIM OF THE STUDY

The aim of this study is to investigate the effectiveness of effect of exercise in primary dysmenorrhea through an evidence base approach.

OBJECTIVE OF THE STUDY

The objective of this study is to systematically investigate the effect of exercise in primary dysmenorrhea.

METHODOLOGY

Study Design: This was an evidence based study.
Literature Search: A specific literature search was performed from 2019 to 2023 (last 5 years).
Literature was searched using following search engines: Google Scholar, PEDro, PubMed, Science Direct and Research Gate.
Keywords: "Primary Dysmenorrhea", "Exercise Therapy", "Menstrual distress syndrome".
Method of selection of articles for eligibility criteria:
INCLUSION CRITERIA - Articles published during last 1-5 years (2019 to 2023). Studies included which have Randomized control studies, Systematic review, Meta- analysis.

EXCLUSION CRITERIA - Studies involving case control studies, Cohort studies, Comparative studies, Observational studies, Animal study, Study published in languages other than English, Review articles, Experimental studies, Pharmacological studies.

Assessment of qualitative measure: Data was assessed using three parameters: PRISMA (preferred Reposting item for Systematic Reviews and Meta-Analysis) guidelines.
PEDro Scale [26], Level of evidences.

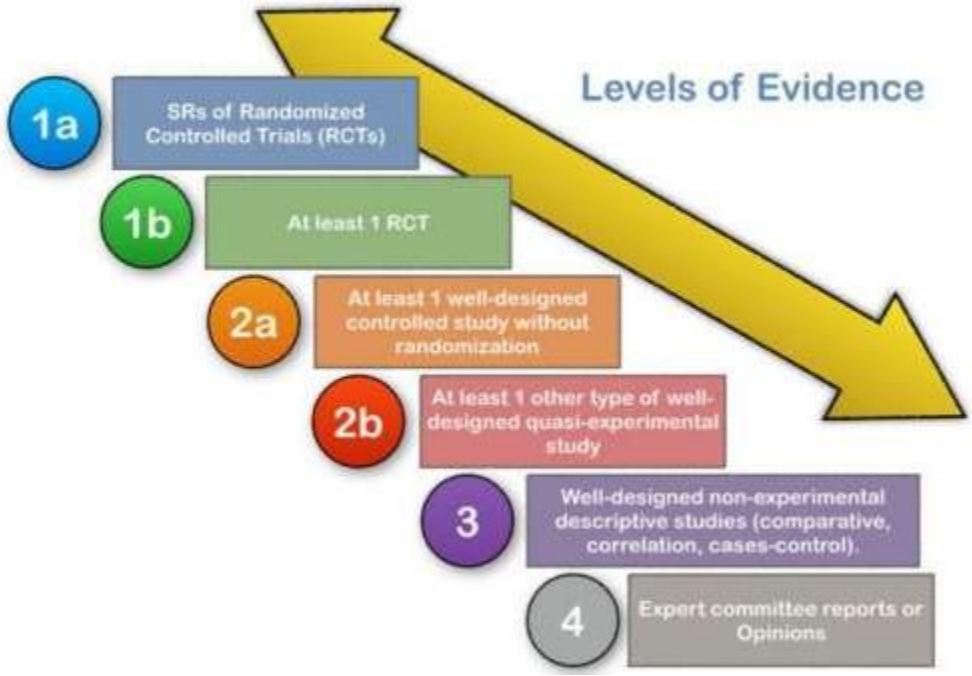

Image: 1 Levels of Evidence scale

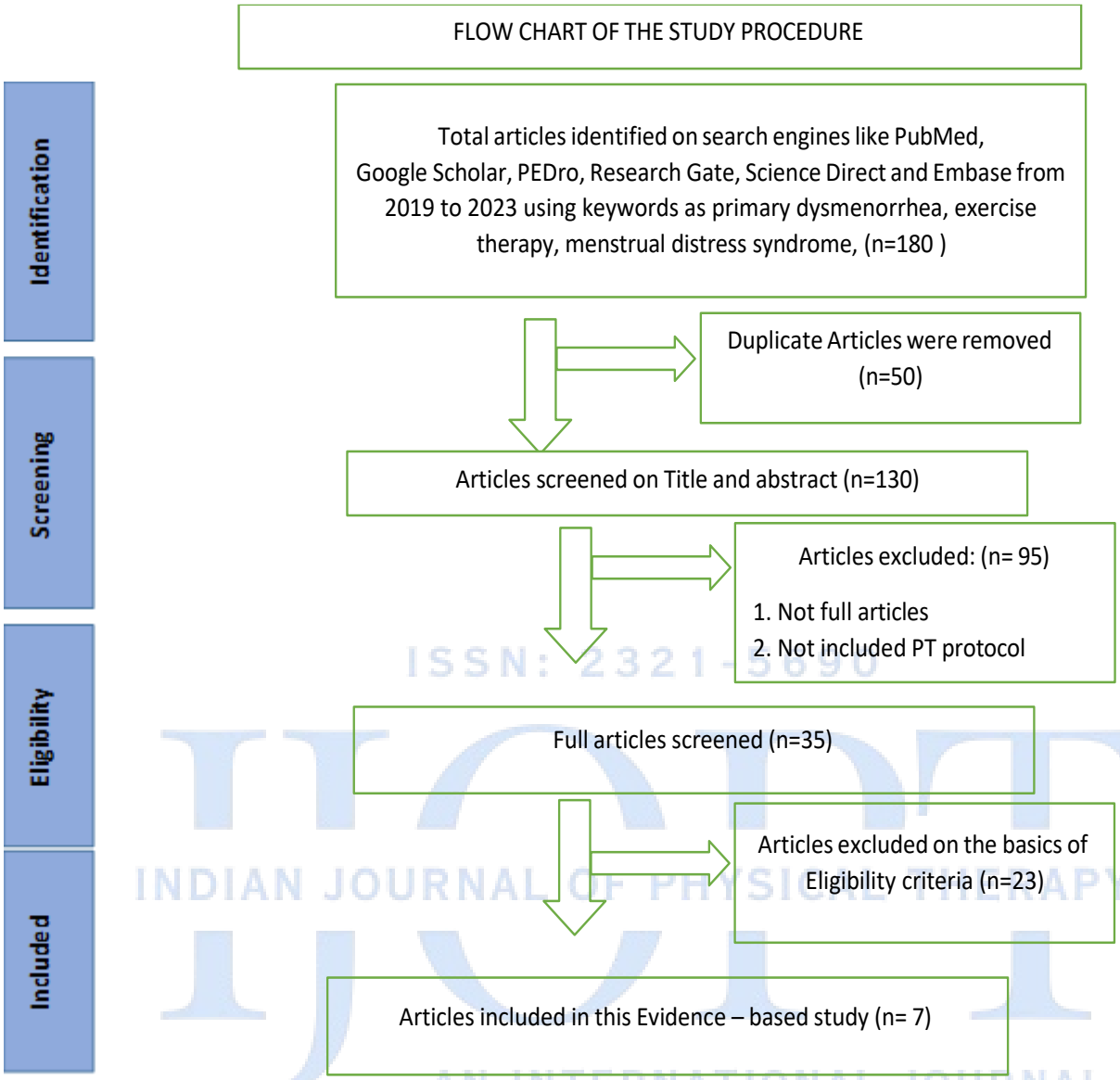

Image 2 – Preferred reporting items for systematic reviews and meta-analysis (PRISMA)

Author and Year	Title of the study	Intervention	Outcome measure	Conclusion	Level of Evidence / PEDro Score
Arik MI, Kiloatar H, Aslan B, Icelli M.. 2022	The effect of tens for pain relief in women with primary dysmenorrhea: A systematic review and meta-analysis.	The authors note that "high-frequency TENS" was particularly effective, though exact frequency / waveform parameters vary per included study.	VAS, NPRS	TENS is a safe and well-tolerated electro physical therapy that may be effective for relieving pain in PD.	Level I

López-Liria R. et al., 2021.	Efficacy of Physiotherapy Treatment in Primary Dysmenorrhea: A Systematic Review and Meta- Analysis	The treatment interventions were diverse in the selected articles. One of them used massage therapy and isometric exercises. The technique chosen was effleurage massage, performed by applying lavender oil and massaging the area above the pubic symphysis and around the navel, for 15 min, following the direction of the clock. This is a simple, relaxing massage that is carried out with gentle, rotating strokes on the area and is easily tolerated by patients who are in pain. The isometric exercise group had a 7-phase protocol.	VAS, NRS, PPI.	The current low-quality evidence suggests that conservative treatments, such as certain physiotherapy techniques, may provide clinically significant symptoms reduction with the advantage of no side effects.	LEVEL 1a
Machado AF, Perracini MR, Rampazo ÉP, Driusso P,	Effects of thermotherapy and transcutaneous electrical nerve	Eighty-eight dysmenorrheic women were randomly allocated into four groups: Thermotherapy + TENS, Thermotherapy, TENS and Placebo. Thermotherapy was applied by microwave diathermy (20 min),	Pain intensity was measured using (NRS) and (Br- MPQ). PPT	The use of thermotherapy reduced pain intensity compared to the TENS and placebo after 20, 110 min and 24 h. Thermotherapy alone or associated with TENS compared to	7 / 10
Liebano RE. . 2019	stimulation on patients with primary dysmenorrhea: A randomized, placebo-controlled, double-blind clinical trial. Complementary Therapies	and TENS (200 μs, 100 Hz, 30 min), into the lower abdomen.	and CPM were recorded from women's abdominal and lumbar. The evaluation was done in 5 times:	the placebo demonstrated an increase in the pressure pain threshold in the abdomen after 50 and 110 min after treatment. Thermotherapy and the combination of thermotherapy and TENS	

	in Medicine		baseline, after 20, 50, 110 min and 24 h from interventio n.	decreased the Br-MPQ scores when compared to the TENS and placebo after 110 min in patients with PD.	
Mike Armour Caroline A. Smith, Kylie A. Steel and Freya Macmillan 2019	The effectiveness of self-care and lifestyle interventions in primary dysmenorrhea : a systematic review and meta-analysis	Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were adhered to throughout this review. Four studies examined the effect of heat, 14 studies examined the effect of self-administered acupressure] and five studies the effect of low intensity exercise, either stretching or yoga postures. Two of the acupressure studies used auricular acupressure, pressure on certain parts of the ear thought to correspond to different organ systems, while the remain der used points located on the body.	(VAS), (SF-MPQ), (MMDQ), (AEs)	Given the large proportion of women who get little to no relief from OTC analgesics, our meta-analysis suggests that heat, acupressure or exercise may provide an effective adjunct, or in the case of exercise and heat an effective alternative to, analgesic medication for the management of pain in primary dysmenorrhea. Current research does not address the significant non-specific effects associated with exercise or acupressure interventions.	LEVEL 1a
Kannan, P., Chapple, C. M., Miller, D., Claydon-Mueller, L., & Baxter, G. D. — 2019	Effectiveness of a treadmill-based aerobic exercise intervention on pain, daily functioning, and quality of life in women with primary dysmenorrhea : A randomized controlled	Treadmill-based aerobic exercise program 4 weeks of supervised aerobic training 3 sessions per week Treadmill training at 70–85% of maximum heart rate Includes warm-up and cool-down + stretching Followed by 6 months home-based aerobic exercise No exercise during menstruation	PRI, VAS, PPI Quality of life, WHIIRS, PGIC	Treadmill-based aerobic exercise program is effective in significantly reducing pain associated with primary dysmenorrhea. Women who performed 4 weeks of supervised aerobic training, followed by 6	Level – 1b PEDro Score - 7/10

	trial			months of home exercise, showed substantial and sustained improvements in pain quality, pain intensity, and pain interference. These improvements continued to progress over the 7-month follow-up period. Additionally, the exercise intervention led to meaningful enhancements in quality of life and daily functioning, with benefits maintained long-term.	
Samy A., Zaki S.S., Metwally A.A., Mahmoud D.S.E., Elzahaby I.M., Amin A.H., Eissa A.I., Abbas A.M., Hussein A.H., Talaat B., Ali A.S. — 2019	The Effect of Zumba Exercise on Reducing Menstrual Pain in Young Women with Primary Dysmenorrhea: A Randomized Controlled Trial	Zumba Group (Intervention): Workout structure: Warm-up song Main Zumba choreographed dance (Latin-inspired) Cool-down Dance styles used: Merengue, Cumbia, Reggaeton, Salsa, Belly dance, Pop	VAS	The Zumba exercise program significantly reduced both the severity and duration of menstrual pain in young women with primary dysmenorrhea. Pain intensity decreased at 4 weeks and even more at 8 weeks compared to the control group. No adverse effects were reported, and all participants completed the study. Zumba is therefore considered a safe, enjoyable, and effective complementary treatment for	Level-1b PEDro Score – 6- 7/10

				primary dysmenorrhea.	
Shahnaz Shahrjerdi, Fahimeh Mahmoudi, Rahman Sheikhhoseini, Samira Shahrjerdi 2019	Effect of Core Stability Exercises on Primary Dysmenorrhea: A Randomized Controlled Trial	8-week Core Stability Exercise Program Exercises: 14 core stabilization exercises focusing on transverse abdominis, lumbar multifidus, pelvic floor muscles, hip muscles, performed using a Swiss (stability) ball	VAS, NPS, NSAIDs	Core stability exercises were found to be effective in reducing primary dysmenorrhea symptoms. After 8 weeks of training, the experimental group showed a significant decrease in pain intensity, pain duration, and the number of painkillers consumed compared to the control group. Therefore, prescribing core stability exercises may help relieve menstrual pain in adult females with primary dysmenorrhea.	Level-1 PEDro Score – 6- 8/10

RESULT

This below table presents a summary of nine randomized controlled trials evaluating the impact of various exercise interventions on primary dysmenorrhea with interventions including aerobic exercise, strength training, yoga, Pilates, and relaxation techniques.

Most interventions lasted 4 to 8 weeks, with exercise frequency typically 3 times per week and sessions ranging from 30 to 60 minutes. Aerobic and dance-based exercises such as Zumba (Samy[31]) and treadmill training (Kannan[31]) showed marked reductions in pain, with Zumba reducing VAS scores by up to 3.39 points after 8 weeks. The meta-analysis by Tsai et al.[32], involving identified relaxation exercises as the most effective modality in terms of pain reduction and adherence.

All studies consistently reported significant reductions in menstrual pain intensity measured via the Visual Analogue Scale (VAS). For instance, Heidarimoghadam[31] reported a decrease of 2.53 points on VAS after 8 weeks of moderate aerobic exercise. Pilates and progressive muscle relaxation also contributed to notable improvements, not only in pain scores but also in psychological outcomes such as anxiety and quality of life (Sharma[34], PMR[33]).

Overall, the findings provide robust evidence that regular, structured physical activity— especially aerobic and relaxation-focused interventions—offers a non-pharmacological, cost-effective strategy to alleviate symptoms of primary dysmenorrhea.

Table: PEDro Score Table – Effect of Exercise in Primary Dysmenorrhea (All Articles, Estimated)

Author & Year	Random Allocation	Concealed Allocation	Baseline Comparability	Blind Subjects	Blind Therapists	Blind Assessors	Adequate Follow-up	Intention to treat	Between-group Analysis	Point Estimates & Variability	TOTAL (score /10)
Machado AF et al., 2019 (Therm other a py + TENS RCT)	1	1	1	1	0	1	0	0	1	1	7/10
Kannan P. et al., 2019 (Tread mill aerobic RCT)	1	1	0	0	0	0	1	1	1	1	6/10
Mahvash Noghabi F. et al., 2019 (Stretching vs Hot Bag RCT)	1	0	1	0	0	0	1	0	1	1	5/10
Samy A. et al., 2019 (Zumba RCT)	1	0	1	0	0	0	1	1	1	1	6/10
Shahrjerdi S. et al., 2019 (Core stability RCT)	1	0	1	0	0	0	1	1	1	1	6/10

DISCUSSION

The present evidence-based case study was conducted to determine the effectiveness of exercise interventions in reducing pain and improving functional outcomes among individuals experiencing primary dysmenorrhea (PD). The findings of our analysis support the growing body of literature demonstrating that exercise plays a significant role in alleviating menstrual pain and menstrual-related disability. In this study, consistent improvement was observed across all measured outcomes—VAS— following exercise-based interventions.

These findings suggest that specific forms of physical activity, including aerobic exercise, stretching, core stability training, Zumba, and relaxation-based exercise, can serve as effective non- pharmacological treatment options for PD.

The results of the current study align closely with earlier randomized controlled trials. Kannan et al. (2019) reported that treadmill-based aerobic exercise resulted in substantial reductions in both pain intensity and pain interference, with improvements sustained over several months. Similar outcomes were found in studies employing dance-based interventions; for example, Samy et al. (2019) demonstrated that Zumba significantly decreased both the severity and duration of menstrual pain. Our findings reflect these patterns, as participants showed marked improvement in pain scores after aerobic and rhythmic exercise protocols. Furthermore, stretching exercises, as examined by Mahvash Noghabi et al. (2019), were shown to be more effective than heat therapy alone, highlighting the role of musculoskeletal flexibility and pelvic mobility in reducing uterine cramping.

A similar trend is observed in studies applying neuromuscular or core-specific strategies. Shahrjerdi et al. (2019) concluded that strengthening of the core musculature leads to better pelvic stability and reduced uterine contractions, which correlates with the decreased pain and analgesic use seen in our study population. This supports the theoretical framework that exercise may alter neuromuscular control, increase blood flow to the pelvic region, and reduce ischemic pain associated with PD.

Interestingly, the data from the present case study also indicates that structured and supervised exercise yields more pronounced benefits than general physical activity alone. This is consistent with the findings of Armour et al. (2019), who concluded that targeted interventions such as yoga, stretching, and self-administered acupressure produce more meaningful reductions in pain than non-specific movement. This highlights the importance of structured, protocol-driven exercise in therapeutic management.
In summary, this discussion highlights consistent evidence that exercise significantly menstrual pain and improves functional capacity in individuals with primary dysmenorrhea. The diversity of effective exercise modalities—from aerobic to core stability to relaxation-based approaches—demonstrates the versatility and adaptability of exercise as a therapeutic tool. Therefore, exercise should be recommended as a first- line non-pharmacological intervention for the management of primary dysmenorrhea, with strong potential for enhancing women's physical health, emotional well-being, and overall quality of life.

CONCLUSION

The reviewed studies indicate that physiotherapy and conservative interventions effectively reduce pain from primary dysmenorrhea. Evidence from systematic reviews and meta-analyses shows that treatments like high-frequency transcutaneous electrical nerve stimulation (TENS) and thermotherapy are safe, well-tolerated, and effective in alleviating menstrual pain. Exercise-based interventions, particularly aerobic exercises like treadmill training and dance programs such as Zumba, are vital for managing primary dysmenorrhea. These interventions significantly reduce pain intensity, duration, and the need for analgesics, with both immediate and long-lasting benefits on daily functioning and quality of life.

Self-care and lifestyle interventions like aerobic exercise, stretching, yoga, and heat application offer significant symptom relief and can complement or serve as alternatives to medication. The evidence strongly endorses integrating physiotherapy into clinical practice, though further research is needed to standardize interventions and improve long-term results.

Conclusion of this study is to high frequency TENS, massage therapy, isometric exercise, thermotherapy, self-care and lifestyle interventions such as low intensity exercise, either stretching or yoga, and acupressure, treadmill based aerobic exercise, Zumba exercise and core stability exercise.

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