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Original Article

Physiotherapy Section

Comparison of Core and Pelvic Floor Strengthening versus Yoga Poses for Primary Dysmenorrhea among Young Adult Females: A Comparative Experimental Study

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ABSTRACT

Introduction: Dysmenorrhea is the most common gynecological condition in women of reproductive age. Primary Dysmenorrhea involves pain in the lower abdomen and pelvis, with potential radiation to the inner thighs and legs, occurring without identifiable pelvic pathology. Additional symptoms may include stress, nausea, vomiting, headaches, and fatigue, primarily due to excess prostaglandin hormone production.

Aim: To compare the effects of physiotherapeutic pelvic floor and core strengthening exercises against yoga poses on primary dysmenorrhea in young adult females.

Materials and Methods: This comparative experimental study was carried out at the Department of Physiotherapy, Galgotias University, Uttar Pradesh, India from September to December 2023. Total 60 female subjects between the ages 18-25 years with clinically diagnosed primary dysmenorrhea with regular menstrual cycles were included. Participants were randomised to two groups (n=30 in each group). Group A engaged in core and pelvic floor strengthening exercises, and Group B practiced some specific yoga postures. Both interventions were implemented three times per week over eight weeks. Pre and post intervention measurements were made using the WaLIDD scale (Working ability, Location, Intensity, Days of pain, Dysmenorrhea) and EQ-5D-5L questionnaire to gauge the effect of pain and quality of life. Demographic data such as age, Body Mass Index (BMI), and menstrual history were observed. Statistics were conducted with the help of Statistical Package for Social Sciences (SPSS) version 22 IBM USA, using paired and independent t-tests. The p-value <0.05 was deemed to be statistically significant.

Results: The study results suggested a significant difference between the pre and post assessment of the WaLIDD and EQ-5D-5L scale in Group A ($p<0.05$) and similarly in Group B ($p<0.05$). But no significant difference was reported when group A and group B were compared.

Conclusion: The study concluded that both the physiotherapeutic pelvic floor and core strengthening exercises and yoga poses are significantly efficient at easing the signs and symptoms of primary dysmenorrhea in young adult females. Physiotherapeutic pelvic floor and core strengthening and yoga pose both can be used as non-pharmacological treatment for primary dysmenorrhea without any side-effects.

Keywords: Exercise therapy, Menstrual history, Quality of life

INTRODUCTION

Dysmenorrhea, or pain during menstruation, is the most prevalent gynecological condition among young adult females [1]. It is divided into two types based on pathophysiology: primary and secondary dysmenorrhea [2]. Primary dysmenorrhea occurs in 67% to 90% of individuals within the age group of 17-24 years. In India, among 1000 healthy females aged 11-28 years, the rate of primary dysmenorrhea is approximately 70.2% [3,4]. According to the World Health Organisation (WHO, 1992), dysmenorrhea is defined as painful menstruation and is categorised into primary, secondary, and unspecified dysmenorrhea [5,6].

Primary dysmenorrhea occurs during a normal ovulatory cycle without any pelvic disease and without the pain having a clear physiological cause. It is characterised as suprapubic pain that starts and stops abruptly, beginning a few hours before or just after the onset of menstrual bleeding [7]. The onset of pain follows a predictable pattern, typically starting just before or at the beginning of the menstruation cycle, arising in the lower abdomen and pelvis, and potentially radiating to the inner thighs, lower back, and legs [8]. The pain usually peaks between 24 and 48 hours into the menstrual cycle, when blood flow is at its maximum; it typically reduces after two or three days as blood volume decreases.

This condition is most common among those aged 16-25 years and is often taken too lightly. Many females consider the pain a normal part of the menstrual cycle and do not seek medical care, despite the significant discomfort they experience [7]. Overproduction of prostaglandin F2α (PGF2α) has been established as a key factor in primary dysmenorrhea. Consequently, the high production of prostaglandins causes the blood vessels supplying the uterus to constrict, leading to irregular contractions, ischemia, and intensified nerve terminal sensitivity. The premenstrual period is associated with lower levels of progesterone, resulting in the synthesis of prostaglandins from membrane phospholipids in endometrial cells, which further increases prostaglandin levels [9,10].

Due to the occurrence of menstrual pain, absenteeism from school and work occurs at a high rate, resulting in decreased quality of life. It also impacts daily activities, academic performance, socialization, and sleep due to a lack of concentration [11].

Pharmacological treatment for primary dysmenorrhea typically involves Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) or Oral Contraceptive Pills (OCPs) to alleviate symptoms. However, NSAIDs and OCPs have a variety of side effects, including breast tenderness, nausea, intermenstrual bleeding, and hearing and visual disturbances; approximately 20% to 25% of dysmenorrhea

cases are inadequately managed by NSAIDs alone. Therefore, an effective non-pharmacological treatment with no side effects would be more beneficial [12]. Physical exercise has been shown to exert a moderate to substantial influence on alleviating pain, mitigating menstrual symptoms, and enhancing sleep quality in individuals experiencing primary dysmenorrhea [13].

Additionally, physical exercise is widely recognized for its ability to enhance mood and increase pain thresholds, primarily through the release of endorphins, which are endogenous opioids. These biochemical changes contribute to the phenomenon often referred to as "runner's high," characterised by a sense of euphoria and reduced pain perception. The relationship between exercise, endorphin release, and mood improvement is complex and involves multiple physiological pathways [14]. Exercise has been shown to alleviate menstrual pain and enhance related symptoms, offering a non-pharmacological approach to managing dysmenorrhea. Various studies have demonstrated that both low and high-intensity exercises can significantly reduce menstrual pain intensity and improve mood during the menstrual cycle [15]. This effect is particularly pronounced in women who engage in regular physical activity compared to those who are sedentary. The following sections detail the findings from the relevant studies [9,16,17].

Exercises for the pelvic floor muscles have been shown in studies to increase women's quality of life, benefiting their physical, social, and mental functioning. When Pelvic Floor Muscle Training (PFMT) is performed regularly, it can enhance the function of pelvic floor muscles, reduce pain, and improve the quality of life for females with primary dysmenorrhea. Strengthening the pelvic floor, also known as Kegel exercises, increases blood flow to the rectal area and reduces pain. Some exercises that strengthen the pelvic floor muscles by activating the transverse abdominis include pelvic tilt, heel slides with core activation, heel drops with core activation, and more [18,19]. Regular practice of PFMT can significantly improve muscle tone, enhance neuromuscular control, and reduce pain, thereby improving overall quality of life. This section explores the benefits and applications of PFMT, drawing on insights from various research studies [20,21].

Yoga, a 3000-year-old tradition, is classified by the National Institutes of Health as a form of Complementary and Alternative Medicine (CAM). This ancient practice, originating from India, integrates physical postures, breathing techniques, and meditation to promote physical, mental, and spiritual well-being. Regular yoga practice is associated with numerous health benefits, including improved endurance, strength, flexibility, and mental health. It fosters qualities such as compassion, friendliness, self-control, and a sense of calmness, contributing to overall good health [22,23].

Yoga is recognised for its multifaceted benefits on both physical and mental health. It involves the integration of physical postures, breathing exercises, and meditation to enhance overall well-being. The practice of yoga is associated with improved muscle strength, flexibility, pain alleviation, and mental calmness, while also promoting stress reduction. These benefits are achieved through the modulation of the autonomic nervous system, specifically by reducing sympathetic nervous system activity and enhancing vagal activity, which contributes to relaxation and improved stress resilience [24-26].

Yoga has been shown to be an effective non-pharmacological intervention for reducing menstrual distress and pain intensity in individuals with primary dysmenorrhea, including nursing students. Various studies have demonstrated the benefits of yoga in alleviating symptoms associated with primary dysmenorrhea, highlighting its potential as a therapeutic modality [27,28]. Yoga asanas such as Matsyasana, Dhanurasana, Vajrasana, Bhujangasana, and Padmasana have been shown to significantly reduce psychological stress and pain in medical students suffering from primary dysmenorrhea. When practiced regularly, these asanas contribute to alleviating menstrual pain and improving overall well-being [29-31].

Limited research has been conducted comparing core-pelvic floor strengthening exercises and yoga pose interventions in alleviating symptoms associated with primary dysmenorrhea. Consequently, the aim of this study was to evaluate the relative efficacy of core-pelvic floor strengthening exercises in comparison to yoga poses in the context of primary dysmenorrhea. The primary objective was to compare the effectiveness of core-pelvic floor exercises versus yoga postures in reducing pain intensity in young women with primary dysmenorrhea. The secondary objective was to evaluate how both therapies affect the overall well-being of individuals, including their comfort, mood, and relationships, due to primary dysmenorrhea.

This study reports that the null hypothesis was rejected, as there was a statistically significant difference in efficacy between core-pelvic floor strengthening exercises and yoga postures. This suggests that one intervention may demonstrate greater effectiveness than the other in managing primary dysmenorrhea symptoms.

MATERIALS AND METHODS

This was a comparative experimental research study conducted at the Department of Physiotherapy, Galgotias University, Uttar Pradesh, India. The study took place from September to December 2023, amounting to a period of four months. Ethical clearance for the research was granted by the Institutional Ethical Committee at Galgotias University (IEC No: GU/IEC/2023/12/57). Written informed consent was obtained from all participants before they were included in the study.

Sample size calculation: The sample size was determined using G*Power software with an effect size of 0.8, an alpha level of 0.05, and a power value of 0.80, resulting in a minimum requirement of 26 participants per group. Considering potential dropouts, the final sample size was increased to 30 participants per group (n=60) [32].

Inclusion criteria: Healthy females aged between 18 to 25 years, having a regular menstrual cycle, experiencing primary dysmenorrhea, and available at the time of data collection.

Exclusion criteria: Females outside the 18-25 age group, those diagnosed with secondary dysmenorrhea, and married females.

All participants were screened using the WaLIDD scale (working ability, location, intensity, and days of pain), a valid and reliable tool for classifying the severity of dysmenorrhea. The scale is described in [Table/Fig-1] below [33].

Working ability	Location	Intensity (Wong-Baker)	Days of pain
0: None	0: None	0: Does not hurt	0: 0
1: Almost never	1: One site	1: hurts a little bit	1: 1-2
2: Almost always	2: 2-3 Sites	2: Hurts a little more-hurts even more	2: 3-4
3: Always	3: 4 Sites	3: Hurts a whole lot-hurts worst	3: ≥5

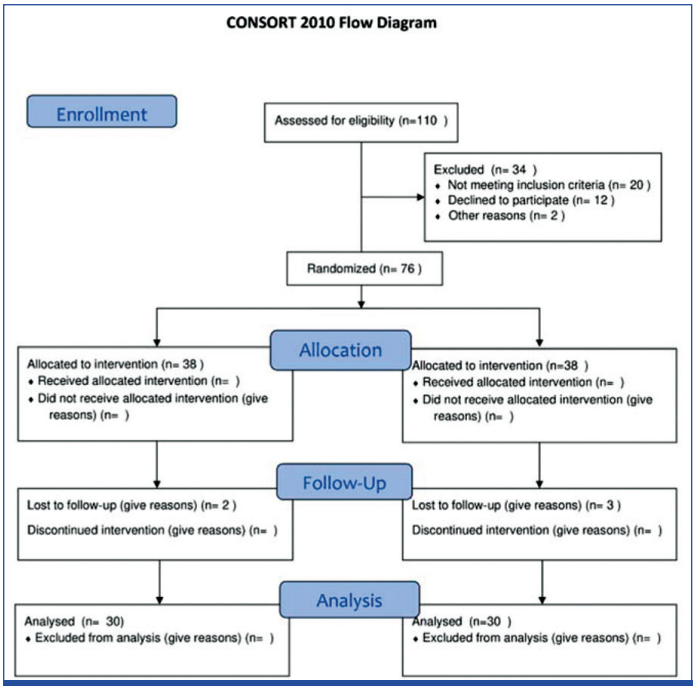
[Table/Fig-1]: WaLIDD scale variables [33].
Score: 0=without dysmenorrhea; 1-4=mild dysmenorrhea; 5-7=moderate dysmenorrhea; 8-12=severe dysmenorrhea

The Wong-Baker scale was reclassified to adjust to a four-level scale. The EQ-5D-5L scale was used to assess quality of life; it is also a valid and reliable tool [34]. The EQ-5D-5L scale measures the dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Scoring ranges from level 1 to level 5, where level 1=no problems in any dimension, level 3=moderate problems in all dimensions, and level 5=extreme problems in all dimensions.

Study Procedure

After screening, 60 eligible participants were randomly assigned to two equal groups (n=30 each) based on CONSORT guidelines depicted in [Table/Fig-2], using a simple random sampling method [35]. The CONSORT flow diagram shows this. Group A (n=30)

received a physiotherapeutic core-pelvic floor strengthening program for three days a week over eight weeks. Examples of exercises included pelvic bridges, static back exercises, pelvic tilts, heel slides with core activation, curl-ups, and Kegel exercises. Each exercise was performed for 10-12 repetitions in 2 sets, 2-3 times a day. Group B (n=30) engaged in yoga poses for the same frequency and duration (3 days a week for 8 weeks). The list of poses included Matsyasana (Fish Pose), Vajrasana (Thunderbolt Pose), Dhanurasana (Bow Pose), Apanasana (Knee-to-Chest Pose), and Shavasana. Each pose was maintained for five minutes, as demonstrated in [Table/Fig-3,4].



[Table/Fig-2]: Flow diagram.

[Table/Fig-3]: Pelvic floor strengthening group (Group A).

[Table/Fig-4]: Yoga exercises group (Group B).

The addition of pelvic floor strengthening exercises may help manage primary dysmenorrhea, as new evidence links pelvic floor function to pain during menstruation. Dysmenorrhea is primarily caused by prostaglandins in the uterus; however, weak or tight pelvic muscles may make the discomfort more noticeable. This treatment is becoming increasingly popular for providing relief from primary dysmenorrhea symptoms without medication [30,36].

Asana yoga poses, particularly Matsyasana, Vajrasana, Dhanurasana, Apanasana, and Shavasana, have been noted for their ability to relieve dysmenorrhea. Historically, these poses were used to improve general health, but new research reveals how they help with relaxing the pelvic floor, strengthening the core, managing autonomic functions, and reducing menstrual pain. Studies show that yoga asanas offer several benefits, including decreased pain and reduced stress, which are particularly helpful for women with dysmenorrhea [28,30,37].

STATISTICAL ANALYSIS

The statistical analysis was performed using SPSS version 22 (IBM, USA). The data were normally distributed, as assessed through the Shapiro-Wilk and Kolmogorov-Smirnov tests, and significance was set at ($p>0.05$) [38]. Demographic variables were reported as (Mean±SD). The baseline pre and post intervention values were compared using the WaLIDD scale and the EQ-5D-5L scale. Comparisons of the outcome measures (WaLIDD scale and EQ-5D-5L scale) for both groups were statistically analysed using a t-test.

RESULTS

All 60 randomly selected participants were assigned to two groups: Group A (Core Pelvic Floor Strengthening Group) and Group B (Yoga Group). The demographic details (age, weight, height, and BMI) of participants in both groups are listed in [Table/Fig-5].

Groups	Age (years) (Mean±SD)	Weight (kg) (Mean±SD)	Height (cm) (Mean±SD)	BMI (KG/m^2) (Mean±SD)
Group A	20.07±1.33	53.57±9.24	160.58±8.10	20.68±3.42
Group B	20.13±1.10	60.90±6.12	161.79±6.19	23.32±2.65

[Table/Fig-5]: Demographic details of the participants of both the groups.

WaLIDD Scale Scores

Group A and Group B both showed significant improvements in reducing values (mean±SD) for working ability, location of pain, intensity of pain, and days of pain on the WaLIDD scale at ($p=0.001$), as listed in [Table/Fig-6].

In Group A, the mean±SD of pre-working ability (1.43±0.67) improved post-intervention to (0.27±0.45). Similarly, the location of pain reduced from (1.67±0.60) to (0.40±0.49), intensity of pain reduced from (2.77±0.97) to (0.40±0.49), and days of pain also decreased from (1.33±0.54) to (0.57±0.77). In Group B, the mean±SD of pre-working ability (1.73±0.78) improved post-intervention to (0.50±0.73). Likewise, the location of pain reduced from (1.50±0.50) to (0.37±0.55), intensity of pain decreased from (2.10±0.80) to (0.47±0.13), and days of pain also reduced from (1.67±0.60) to (0.43±0.67).

EQ-5D-5L Scale

Group A and Group B both showed significant improvements in mean±SD for mobility, self-care, usual activities, pain/discomfort, and anxiety/depression on the EQ-5D-5L scale at ($p=0.001$), as listed in [Table/Fig-7]. In Group A, the mean±SD of pre-mobility (2.40±0.89) improved post-intervention to (1.30±0.46). Similarly, self-care improved from (2.50±0.82) to (1.17±0.37), usual activities improved from (2.17±0.87) to (1.10±0.30), pain/discomfort reduced from (3.97±0.99) to (1.40±0.62), and anxiety/depression reduced from (2.50±0.97) to (1.20±0.40). In Group B, the mean±SD of pre-mobility (2.93±1.17) improved post-intervention to (1.23±0.50). Likewise, self-care improved from (2.93±1.17) to (1.33±0.54), usual activities improved from (3.37±1.09) to (1.40±0.56), pain/discomfort decreased from (3.74±0.98) to (1.50±0.68), and anxiety/depression reduced from (3.00±1.11) to (1.20±0.40).

WaLIDD	Group A				Group B			
Variables	Pre-mean±SD	Post-mean±SD	T Value	p-value	Pre-mean±SD	Post-mean±SD	T Value	p-value
Working ability	1.43±0.67	0.27±0.45	7.00	0.001	1.73±0.78	0.50±0.73	9.95	0.001
Location of pain	1.67±0.60	0.40±0.49	9.37	0.001	1.50±0.50	0.37±0.55	7.99	0.001
Intensity	2.77±0.97	0.40±0.49	10.65	0.001	2.10±0.80	0.47±0.13	10.52	0.001
Days of pain	1.33±0.54	0.57±0.77	4.89	0.001	1.67±0.60	0.43±0.67	8.26	0.001

[Table/Fig-6]: Comparison of Group A and B on WaLIDD scale.

EQ-5D-5L	Group A				Group B			
Variables	Pre-mean±SD	Post-mean±SD	T Value	p-value	Pre-mean±SD	Post-mean±SD	T value	p-value
Mobility	2.40±0.89	1.30±0.46	5.85	0.001	2.93±1.17	1.23±0.50	8.56	0.001
Self-care	2.50±0.82	1.17±0.37	7.91	0.001	2.93±1.17	1.33±0.54	7.26	0.001
Ususal activities	2.17±0.87	1.10±0.30	7.43	0.001	3.37±1.09	1.40±0.56	10.42	0.001
Pain/discomfort	3.97±0.99	1.40±0.62	15.03	0.001	3.74±0.98	1.50±0.68	11.76	0.001
Anxiety/depression	2.50±0.97	1.20±0.40	6.54	0.001	3.00±1.11	1.20±0.40	9.27	0.001

[Table/Fig-7]: Comparison of Group A and B on EQ-5D-5L scale.

DISCUSSION

The findings of the present study indicate that physiotherapeutic core-pelvic floor strengthening exercises and yoga poses are both highly effective and equally beneficial in reducing symptoms of primary dysmenorrhea. Pain intensity, pain location, and duration of pain in primary dysmenorrhea were reduced on the WaLIDD scale, with improvements in mobility, working ability, self-care, usual activities, and overall quality of life reported on the EQ-5D-5L scale in young adult females with primary dysmenorrhea. These findings correlate with the study conducted by Saleh SH et al., (2016), which highlighted the role of core strengthening exercises in primary dysmenorrhea [39].

Core strengthening exercises are essential for conditioning the small, deep muscles surrounding the lumbar spine, which enhances stability and overall functionality [40]. These exercises specifically target and isolate certain muscle groups, increasing both strength and endurance, allowing the body to better manage everyday physical demands. When these muscles are properly strengthened, they provide added support, especially during times of increased physiological stress, such as during the menstrual cycle [39].

Similarly, the study conducted by Karimi E et al., (2021) highlighted the role of pelvic floor muscle exercises, including Kegels, bridges, and pelvic rotations. These exercises enhance pelvic mobility and pelvic muscle strength in primary dysmenorrhea. Furthermore, they help increase blood flow to the pelvic area and lower prostaglandin levels in the uterus, which can reduce pain and muscle tightness [41]. In this study, both core-pelvic floor strengthening and yoga poses effectively reduced symptoms of primary dysmenorrhea. The findings align with the study by Carroquino-Garcia P et al., (2019), which stated that therapeutic exercises are beneficial for young women in reducing the intensity and duration of pain associated with primary dysmenorrhea [5].

Additionally, this study demonstrated an improvement in the quality of life for young females with primary dysmenorrhea when either core-pelvic floor strengthening or yoga poses are performed. This aligns with the research conducted by López-Liria R et al., (2021), which reported that yoga, isometric, and stretching techniques significantly reduce the symptoms of primary dysmenorrhea [7].

Shahrjerdi S et al., (2019) proved in their study that core stability exercises are effective in decreasing pain intensity, duration, and drug consumption [42]. This study also incorporated pelvic floor exercises in conjunction with core strengthening. The combination of core-pelvic floor exercises further reported a reduction in pain intensity and duration, as well as an improvement in the overall quality of life for women experiencing primary dysmenorrhea. Similarly, Sandhiya M et al., (2021) stated that when pelvic floor strengthening exercises and stretching exercises are combined to treat primary dysmenorrhea, it results in a reduction of primary dysmenorrhea pain and an improvement in the quality of life for young women in the 18-25 age group [18]. Similar results to this study were shown in the research done by Berde D et al., (2019), which reported that core strengthening exercises are significantly more effective than chair aerobic exercises in treating primary dysmenorrhea [43]. Parikh H et al., (2021) also demonstrated that core strengthening exercises are more effective than moist pack therapy in reducing pain in women with primary dysmenorrhea [44]. In the current study, yoga poses also showed significant improvement in reducing the symptoms of primary dysmenorrhea in young adult females. The study by Agre S et al., (2021) reported that yoga is more effective in alleviating dysmenorrheal-related distress, as yoga treats an individual as a whole and brings harmony to the body and mind instead of targeting a particular organ. Yoga asanas strengthen the muscles around the lower abdomen and pelvis, improve flexibility and mobility, and decrease cramps. The breathing patterns performed during yoga promote local relaxation and a general sense of well-being [45].

Prabhu S et al., (2019) reported the effectiveness of yoga asanas in reducing menstrual pain in primary dysmenorrhea [3]. These findings align with the current study's results. Similarly, Goudar A et al., (2020) also reported that yoga poses are beneficial in reducing menstrual symptoms in the age group of 20-23 years [25]. The study conducted by Rakhshaee Z et al., (2011) highlighted that yoga poses such as cobra pose, cat pose, and fish pose are effective in reducing the symptoms of primary dysmenorrhea and can be used as a non-pharmacological intervention [26]. Agre S et al., (2021) compared the effects of lower limb and abdominal isometric exercises versus yoga asanas on primary dysmenorrhea and reported that yoga asanas are more effective in reducing the distress of primary dysmenorrhea [45]. In the current study, core-pelvic floor strengthening exercises were compared with yoga poses, proving that both interventions are equally effective in reducing the symptoms of primary dysmenorrhea and improving the overall quality of life.

Rajbhar SR et al., (2021) also reported that yoga plays a role in reducing the duration and intensity of pain, alleviating stress, and improving overall quality of life, making it a safe option for alleviating symptoms of primary dysmenorrhea in young adult females [46]. These findings align with the current study, which reported that both core-pelvic floor strengthening and yoga poses are effective in reducing the symptoms of primary dysmenorrhea in young adult females. Finally, a comparison between both groups—core-pelvic floor strengthening exercises and yoga poses—indicates that both interventions could be used as adjunct non-pharmacological treatments for primary dysmenorrhea without any side effects.

Limitation(s)

The limitation of the study is that no biofeedback tool was used in the current study, which could be incorporated in future research. This study was conducted among an urban population, and the outcomes have been minimally studied in the rural population, where results may differ.

CONCLUSION(S)

The results of the current study highlight the significant benefits of both physiotherapeutic core-pelvic floor strengthening protocols and yoga poses, which reduce symptoms and improve the overall quality of life for females experiencing primary dysmenorrhea. These approaches focus on non-invasive, non-pharmacological methods, providing a better alternative to traditional treatments without the risks associated with medication or their side effects. By performing these physiotherapy techniques and yoga poses, women can experience not only a reduction in menstrual pain but also improvements in physical mobility, emotional well-being, and daily functioning. The findings suggest that these interventions are effective long-term solutions for managing primary dysmenorrhea, further empowering women to maintain a higher quality of life and actively participate in their usual activities during menstruation.

REFERENCES

[1] Bitzer J. Dysmenorrhea, Premenstrual Syndrome, and Premenstrual Dysphoric Disorder. In Springer, Cham; 2014. p. 15-24. Available from: https://link.springer.com/chapter/10.1007%2F978-3-319-03494-2_3.

[2] Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, et al. The revised International Association for the Study of Pain definition of pain: Concepts, challenges, and compromises. Pain. 2020;161(9):1976-82. Available from: https://doi.org/10.1097/j.pain.0000000000001939.

[3] Prabhu S, Nagrale S, Shyam A, Sancheti P. Effect of yogasanas on menstrual cramps in young adult females with primary dysmenorrhea. Int J Physiother Res. 2019;7(4):3129-34.

[4] Omidvar S, Bakouei F, Amiri FN, Begum K. Primary dysmenorrhea and menstrual symptoms in indian female students: Prevalence, impact and management. Glob J Health Sci. 2015;8(8):53632. Available from: https://pubmed.ncbi.nlm.nih.gov/27045406/.

[5] Carroquino-Garcia P, Jiménez-Rejano JJ, Medrano-Sanchez E, de la Casa-Almeida M, Diaz-Mohedo E, Suarez-Serrano C. Therapeutic exercise in the treatment of primary dysmenorrhea: A systematic review and meta-analysis. Phys Ther. 2019;99 (10):1371-80.

[6] International Classification of Diseases. 10th revision, 5th ed. Geneva: World Health Organization. 2016;3(2).

[7] López-Liria R, Torres-álamo L, Vega-Ramírez FA, García-Luengo AV, Aguilar-Parra JM, Trigueros-Ramos R, et al. Efficacy of physiotherapy treatment in primary dysmenorrhea: A systematic review and meta-analysis. Int J Environ Res Public Health. 2021;18(15):7832.

[8] Iacovides S, Avidon I, Baker FC. What we know about primary dysmenorrhea today: A critical review. Hum Reprod Update. 2015;21(6):762-78.

[9] Mahvash N, Eidy A, Mehdi K, Zahra MT, Mani M, Shahla H. The effect of physical activity on primary dysmenorrhea of female University students. World Appl Sci J. 2012;17(10):1246-52.

[10] Sher L. The endogenous euphoric reward system that reinforces physical training: A mechanism for mankind's survival. Med Hypotheses. 1998;51(6):449-50. Doi: 10.1016/s0306-9877(98)90064-0. PMID: 10052863.

[11] Guimarães I, Póvoa AM. Primary dysmenorrhea: Assessment and treatment. Revista Brasileira de Ginecologia e Obstetricia. Georg Thieme Verlag. 2020;42:501-07.

[12] Kannan P, Claydon LS. Some physiotherapy treatments may relieve menstrual pain in women with primary dysmenorrhea: A systematic review. J Physiother. 2014;60(1):13-21.

[13] Kirmizigil B, Demiralp C. Effectiveness of functional exercises on pain and sleep quality in patients with primary dysmenorrhea: A randomized clinical trial. Arch Gynecol Obstet. 2020;302(1):153-63.

[14] Cohen E, Ejsmond-Frey R, Knight N, Dunbar RIM. Rowers' high: Behavioural synchrony is correlated with elevated pain thresholds. Biol Lett [Internet]. 2010;6(1):106-08. Available from: https://www2.southeastern.edu/Academics/Faculty/mrossano/gradseminar/evo of ritual/behavioral syncrony rowers.pdf.

[15] Seales P, Seales S, Ho G. Exercise for dysmenorrhea. Am Fam Physician. 2021;103(9):525-26. Available from: https://www.aafp.org/afp/2021/0501/p525.html.

[16] Choi PYL. Physical exercise and the psychology of the menstrual cycle. Doctoral thesis (Ph.D.). London: University College; 1993. Available from: https://discovery.ucl.ac.uk/id/eprint/10104734/.

[17] John N, Sr R. Effectiveness of pelvic rocking exercise on Dysmenorrhoea among adolescent girls. Int J Med Heal Res. 2019;5:61-71.

[18] Sandhiya M, Kumari P, Arulya A, Senthil Selvam P, Manoj Abraham M, Palekar TJ. The effect of pelvic floor muscles exercise on quality of life in females with primary dysmenorrhea. Ann Romanian Soc Cell Biol. 2021;25(6):3111-17.

[19] Jorge CH, Bø K, Catai CC, Brito LGO, Driusso P, Tennfjord MK. Pelvic floor muscle training as treatment for female sexual dysfunction: A systematic review and meta-analysis. Am J Obstet Gynecol. 2024 ;231(1):51-66.e1.

[20] Hauwaert R, Tomé A, Almeida R, Vilela F, Coutinho AL, Alpoim D, et al. Physical exercise and pelvic floor muscle training. Adv Educ Technol Instr Des B Ser. 2024;169-202.

[21] Gul S, Rafiq MK, Gul S, Ibad S, Saifullah SM, Ara F. The effect of pelvic floor muscle training in conservative treatment of pelvic organ prolapse. Biol Clin Sci Res J. 2024;2024(1):1105.

[22] Jabir PK, Sailesh KS. Yoga and physiology: An update. J Biochem Biotech. 2017;1(1):20. Available from: https://www.alliedacademies.org/articles/yoga-and-physiology-an-update.pdf.

[23] Henry NI. The health benefits of Yoga. J Consum Health Internet. 2003;7(2):75-80. Available from: https://www.tandfonline.com/doi/abs/10.1300/J381v07n02_08.

[24] Purshotam. Role of yoga in daily life for health and fitness: An analysis. Int J Sport Heal Phys Educ. 2023;5(1):98-99.

[25] Goudar A. Effect of yoga practices on dysmenorrhea. Int J Yogic Hum Mov Sports Sci. 2020;5(2):151-53.

[26] Rakhshaee Z. Effect of Three yoga poses (cobra, cat and fish poses) in women with primary dysmenorrhea: A randomized clinical trial. J Pediatr Adolesc Gynecol. 2011;24(4):192-96.

[27] Yang NY, Kim SD. Effects of a yoga program on menstrual cramps and menstrual distress in undergraduate students with primary dysmenorrhea: A single-blind, randomized controlled trial. J Altern Complement Med. 2016;22(9):732-38.

[28] Aksu A, Yilmaz DV. The effect of yoga practice on pain intensity, menstruation symptoms and quality of life of nursing students with primary dysmenorrhea. Health Care Women Int. 2024;01-15.

[29] Nag U, Dip P, Kodali M. Effect of yoga on primary dysmenorrhea and stress in medical students. IOSR J Dent Med Sci. 2013;4(1):69-73.

[30] Sarva T, Mohapatra A, Subudhi GK. Turning cramps into comfort: A review of yogas role in alleviating primary dysmenorrhea and promoting reproductive health. Int J Sci Technol Eng. 2025;13(1):1242-49.

[31] Sawant S, Deshmukh PR. Effects of yogasanas along with pranayama on pain and severity in primary dysmenorrhea in adult young females: Interventional study. Int J Heal Sci Res. 2023;13(6):195-202. Available from: https://doi.org/10.52403/ijhsr.20230633.

[32] Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behav Res Methods. 2009;41(4):1149-60. Available from: https://doi.org/10.3758/BRM.41.4.1149.

[33] Teherán AA, Piñeros LG, Pulido F, Mejía Guatibonza MC. WaLIDD score, a new tool to diagnose dysmenorrhea and predict medical leave in University students. Int J Womens Health. 2018;10:35-45.

[34] Oemar M, Janssen B. EQ-5D-5L User Guide. 2019.

[35] Calvert M, Blazeby J, Altman DG, Revicki DA, Moher D, Brundage MD. Reporting of patient-reported outcomes in randomized trials: The CONSORT PRO extension. JAMA. 2013;309(8):814-22.

[36] Anisa MV. The effect of exercises on primary dysmenorrhea. J Majority. 2015;4(2):60-65. Available from: https://juke.kedokteran.unila.ac.id/index.php/majority/article/download/527/528.

[37] Anisha A. Yogasanas in spasmodic dysmenorrhoea w.s.r to udavartha yonivyapath. Int J Ayurveda Pharma Res. 2023;10(2):69-73. Available from: https://doi.org/10.47070/ijapr.v10i12.2587.

[38] Masuadi E, Mohamud M, Almutairi M, Alsunaidi A, Alswayed AK, Aldhafeeri OF. Trends in the usage of statistical software and their associated study designs in health sciences research: A bibliometric analysis. Cureus. 2021;13(1):e12639.

[39] Saleh SH, Mowafy HE, Abd El Hameid AA. Stretching or core strengthening exercises for managing primary dysmenorrhea. J Womens Heal Care. 2016;05(01):295.

[40] Zierle-Ghosh A, Jan A. Physiology, Body Mass Index. In StatPearls. StatPearls Publishing. 2023.

[41] Karimi E, Kamali A, Ghasem B. The effect of kegel exercises on pain and quality of life in girls aged 18 to 25 years with primary dysmenorrhea. J Mot Behav Sci. 2021;4:299-307.

[42] Shahrjerdi S, Mahmoudi F, Sheikhhoseini R, Shahrjerdi S. Effect of core stability exercises on primary dysmenorrhea: A randomized controlled trial. J Mod Rehabil. 2019;113-22.

[43] Dilip Berde S, Saurabh Yadav T, Meghasham Gosavi P, Shreenivas Gijare S. Effect of core strengthening exercises & chair aerobic exercises in primary dysmenorrhoea. Int J Heal Sci Res. 2019;9:77.

[44] Parikh H, Khokhar SM, Kazi SA. Comparitive study of effect of moist pack v/s effect of core strengthening exercises in primary dysmenorrhea for three consecutive months. Indian J Physiother Occup Ther. 2021;15(4):32-38.

[45] Agre S, Agrawal R, Zehra AM. Comparative effect of lower limb and abdominal isometric exercises and yoga poses on primary dysmenorrhea. Indian J Public Heal Res Dev. 2021;12(4):356-63.

[46] Rajbhar SR, Singh R, Sangada M. Effect of yoga on primary dysmenorrhoea among adolescent girls – A literature review. J Pharm Res Int. 2021;33(74B):157-61.

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