

Evaluating The Effectiveness of Pelvic Clock Exercise Versus 90-90 Hemibridge with Ball and Balloon Techniques Along with Conventional Therapy on Pain and Quality of Life in Female College Students with Primary Dysmenorrhea

Arun Kumar S.¹, Manoj Abraham M.², Abinaya K.³

¹ Assistant Professor, KG College of Physiotherapy (Affiliated to The Tamil Nadu Dr. MGR Medical University), Coimbatore, Tamil Nadu, India

² Professor/Principal, KG College of Physiotherapy (Affiliated to The Tamil Nadu Dr. MGR Medical University), Coimbatore, Tamil Nadu, India

³ BPT Intern, KG College of Physiotherapy (Affiliated to The Tamil Nadu Dr. MGR Medical University), Coimbatore, Tamil Nadu, India

ABSTRACT

Background: Primary dysmenorrhea is a common gynecological condition in young women, characterized by cramping lower abdominal pain during menstruation. It begins in adolescence and adversely affects daily activities, academic performance, and quality of life. Associated symptoms include low back pain, fatigue, headache, nausea, and mood disturbances. Exercise therapy is widely used to reduce symptoms. This study aims to evaluate the effectiveness of pelvic clock exercise versus 90–90 hemibridge with ball and balloon technique, along with conventional therapy, on pain and quality of life.

Methods: A comparative study conducted on 30 female college students aged 18–25 years with primary dysmenorrhea. The subjects were divided into two groups. Group A received pelvic clock exercise with conventional therapy, Group B received 90–90 hemibridge with ball and balloon technique with conventional therapy. The treatment duration was 45-60 minutes, 3 times /weeks for 4 weeks. Pain was assessed by Visual Analogue Scale (VAS) and severity and quality of life were assessed by WaLIDD questionnaire before and after treatment.

Result: Using an unpaired comparison of post-test values showed significant improvement in Group B than Group A, with t-value of VAS scale is 5.136. and WaLIDD questionnaire is 4.431 respectively.

Conclusion: The study concludes that there is notable improvement in 90-90 hemibridge ball and balloon technique along with conventional therapy was found to be more effective in reducing pain and improvement in quality of life in individual with primary dysmenorrhea.

KEYWORDS: primary dysmenorrhea, pelvic clock exercise, 90–90 hemi-bridge technique, visual analogue scale, WaLIDD questionnaire.

INTRODUCTION

Primary dysmenorrhea is one of the most common gynecological conditions affecting women of reproductive age and is defined as painful menstruation in the absence of identifiable pelvic pathology.^(1,2) It typically begins after the establishment of ovulatory menstrual cycles and is characterized by cramping pain in the lower abdomen that may radiate to the lower back and thighs. The condition substantially affects quality of life, resulting in reduced academic performance, work absenteeism, and limitations in daily activities.^(3,4)

Globally, primary dysmenorrhea affects approximately 45–95% of women of reproductive age, with severe pain reported in 2–29% of cases.⁽⁵⁾ In India, the prevalence ranges from 50% to 87.8%, while studies from Tamil Nadu report a prevalence of nearly 80%, highlighting its significant public health burden.^(4,6)

The pathophysiology of primary dysmenorrhea is primarily attributed to excessive production of prostaglandins, particularly prostaglandin F_{2α} and prostaglandin E₂, during endometrial shedding. These mediators increase uterine contractions,

vasoconstriction, and ischemia, leading to pain.⁽⁷⁾ Additional factors such as altered pelvic biomechanics, lumbopelvic malalignment, spinal dysfunction, and increased pelvic floor muscle tension may further contribute to symptom severity by affecting pelvic alignment, neuromuscular function, and pain perception.^(8,9,10)

Risk factors include younger age, early menarche, nulliparity, low body mass index, positive family history, psychological stress, depression, prolonged or heavy menstrual bleeding, and irregular menstrual cycles.⁽¹¹⁾ Besides pelvic pain, women frequently experience fatigue, headache, nausea, gastrointestinal disturbances, back pain, sleep disturbances, anxiety, irritability, and depression, all of which negatively influence physical and psychological well-being.⁽¹²⁾

Exercise-based interventions that improve lumbopelvic alignment, core stability, and neuromuscular control have gained increasing attention in the management of primary dysmenorrhea. Pelvic Clock exercises enhance pelvic mobility, proprioception, and sensorimotor control, whereas the Hemibridge with Ball and Balloon technique facilitates diaphragmatic function, core muscle activation, spinal stabilization, and postural alignment. These approaches may reduce pain by correcting musculoskeletal dysfunction and improving pelvic stability.^(8,13)

The severity of primary dysmenorrhea can be assessed using validated outcome measures such as the Working Ability, Location, Intensity, and Days of Pain (WaLIDD) questionnaire and the Visual Analogue Scale (VAS). The WaLIDD questionnaire evaluates the multidimensional severity of dysmenorrhea based on functional impairment, pain location, intensity, and duration, while the VAS provides a reliable measure of pain intensity. These outcome measures are widely used to evaluate the effectiveness of therapeutic interventions in women with primary dysmenorrhea. Therefore, the present study aims to compare the effectiveness of Pelvic Clock exercises and the Hemibridge with Ball and Balloon technique in reducing pain severity and improving dysmenorrhea outcomes among women with primary dysmenorrhea.

OBJECTIVE OF THE STUDY

To determine the effect of pelvic clock exercise along with conventional therapy on pain and quality of life in female college students with primary dysmenorrhea.

To determine the effect of 90-90 hemibridge ball and balloon technique along with conventional therapy on pain and quality of life in female college students with primary dysmenorrhea.

To compare the effective of pelvic clock exercise versus 90-90 hemibridge with ball and balloon technique along with conventional therapy on pain and quality of life among female college students with primary dysmenorrhea.

MATERIALS

Study Design

The research was conducted using a pre-test and post-test experimental design to evaluate the effectiveness of two physiotherapy interventions in female undergraduate students with primary dysmenorrhea.

Study Setting

The study was carried out at the KG Physiotherapy and Rehabilitation Centre, Outpatient Department of KG College of Physiotherapy, KGiSL Campus, Coimbatore.

Study Duration

The total duration of the study was six months. Each participant received treatment sessions lasting 45 to 60 minutes, conducted three times per week for a period of four weeks.

Study Population

The study population consisted of female undergraduate students diagnosed with primary dysmenorrhea.

Sample Size

A total of 30 participants who satisfied the eligibility criteria were recruited using a convenience sampling technique. The participants were equally divided into two groups, with 15 subjects in each group.

Selection Criteria

Inclusion Criteria

Participants were included in the study if they met the following criteria: Female students aged between 18 and 25 years, Clinically diagnosed with primary dysmenorrhea, Willing to participate and provide informed consent, Not using any medication for menstrual pain during the study period, Reported an average menstrual pain score of 4 or more on the Visual Analogue Scale (VAS) during the previous three menstrual cycles, Scored greater than 4 on the WaLIDD Scale, confirming the presence of primary dysmenorrhea.

Exclusion Criteria

Participants were excluded if they had: Secondary dysmenorrhea, A recent history of pelvic or abdominal surgery, Any orthopedic, neurological, or gynecological condition affecting pelvic alignment or mobility, Hormonal medication use, Irregular menstrual cycles.

Procedure

Thirty female undergraduate students who fulfilled the inclusion criteria were recruited for the study after obtaining written informed consent. Before the intervention, each participant received a detailed explanation regarding the purpose and procedure of the study. The participants were allocated into two equal groups consisting of 15 subjects each using a convenience sampling method.

Group A performed Pelvic Clock Exercises in addition to conventional physiotherapy. The pelvic clock exercise focuses on controlled multidirectional pelvic movements designed to improve pelvic alignment, mobility, and neuromuscular control. Improved pelvic mechanics may help reduce musculoskeletal factors associated with menstrual pain.

Group B performed the 90–90 Hemibridge Ball and Balloon Technique together with conventional physiotherapy. This exercise was performed in a crook-lying position with the hips and knees flexed to 90 degrees. The technique emphasizes diaphragmatic breathing, activation of the core and pelvic floor muscles, and enhancement of lumbopelvic stability.

Conventional Therapy Participants in both groups received the same conventional physiotherapy program. Each treatment session began with a 5-minute warm-up, followed by approximately 10 minutes of stretching exercises. The stretching program included: Knee-to-chest stretch Butterfly stretch Cat–camel stretch Cobra stretch Child's pose Hip flexor stretches the intervention program was conducted three times per week for four consecutive weeks, with each treatment session lasting between 45 and 60 minutes.

Materials

Treatment couch, Pelvic clock board or exercise mat with pelvic clock markings, Pillow or small cushion, Medium-sized exercise ball, Wall support, Balloon, Towel, Visual Analogue Scale chart, WaLIDD Scale questionnaire.

Outcome Measures

Visual Analogue Scale (VAS) for measuring pain intensity, WaLIDD Scale for assessing the severity of dysmenorrhea.

Statistical Analysis

An independent samples (unpaired) t-test was performed to compare the post-treatment outcomes between the two groups, whereas a paired samples t-test was used to assess the changes observed within each group from pre-intervention to post-intervention. Statistical significance was determined using a 5% significance level, and results with a 'p' value less than 0.05 were considered statistically significant.

RESULTS

A four-week randomized intervention comparing pelvic clock exercises combined with conventional therapy and the 90–90 hemi-bridge with ball and balloon technique combined with conventional therapy was conducted among 30 undergraduate female participants aged 18–25 years diagnosed with primary dysmenorrhea. No adverse events were reported during the study period, indicating that both interventions were safe and well tolerated.

Both groups demonstrated significant improvements in pain intensity and quality of life following the intervention. However, participants who received the 90–90 hemi-bridge with ball and balloon technique along with conventional therapy, showed greater improvements than those who performed pelvic clock exercises with conventional therapy. The mean post-intervention Visual Analogue Scale (VAS) improvement was higher in the 90–90 hemi-bridge group (4.33) compared with the

pelvic clock exercise group (3.40). Similarly, the mean post-intervention WaLIDD questionnaire score demonstrated greater improvement in the 90–90 hemi-bridge group (6.00) than in the pelvic clock exercise group (4.86). The differences between the groups were statistically significant ($p < 0.05$).

FIGURES & TABLES

Table -1. Age Classification

Age (Years)	Group A (n=15)	Group B (n=15)	Total (n=30)
18-21	9 (60%)	8 (53%)	17
22-25	6 (40%)	7 (47%)	13

Table-2. Comparison of Pre And Post Test VAS Values Scores

Group	Pre-test mean $\pm$ SD	Post-test mean $\pm$ SD	Mean difference	t-value
A	5.13 $\pm$ 0.743	3.4 $\pm$ 0.507	1.73	6.984
B	7.6 $\pm$ 1.21	4.33 $\pm$ 0.487	3.27	9.885

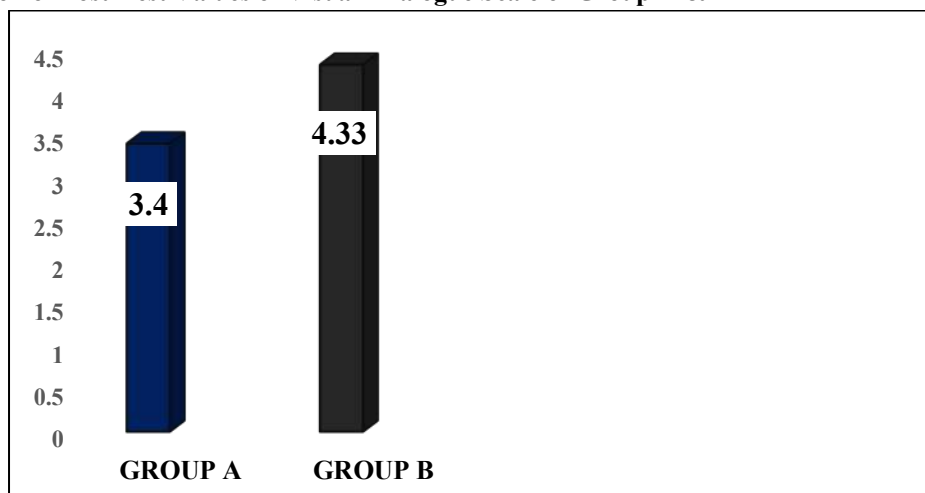
Table -3. Comparison PF Pre And Post Test Values of Wallid Questionnaire

Group	Pre-test mean $\pm$ SD	Post-test mean $\pm$ SD	Mean difference	t-value
A	6.46 $\pm$ 0.516	4.86 $\pm$ 0.639	1.6	8.410
B	8.13 $\pm$ 0.743	6 $\pm$ 0.755	2.13	12.91

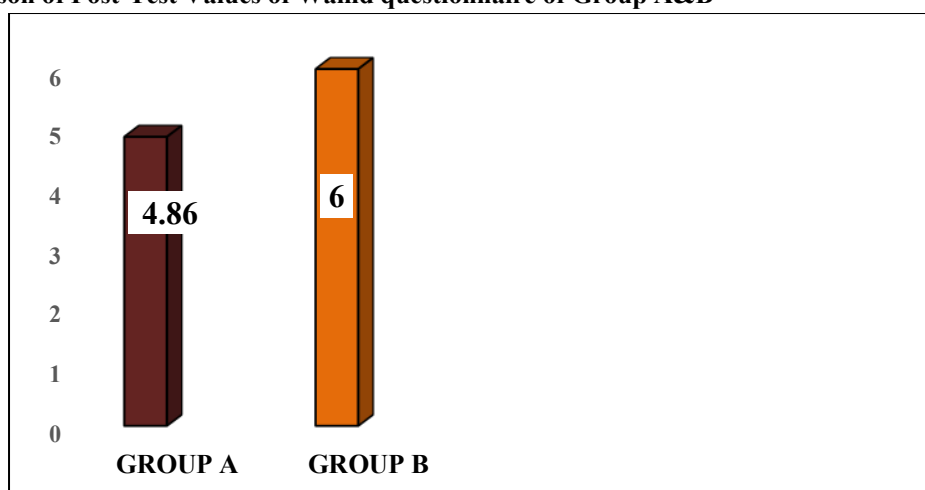
Table -4. Comparison of Post Test VAS and Wallid Scores between Groups

Outcome measure	Group A (Mean $\pm$ SD)	Group B (Mean $\pm$ SD)	t-value
VAS	3.4 $\pm$ 0.507	4.33 $\pm$ 0.487	5.136
WALLID	4.86 $\pm$ 0.639	6 $\pm$ 0.743	4.431

Graph-I. Comparison of Post-Test Values of Visual Analogue Scale of Group- A&B



Graph-II. Comparison of Post-Test Values of Wallid questionnaire of Group A&B



DISCUSSION

The present study compared the effects of pelvic clock exercises and the 90–90 hemi-bridge with ball and balloon technique, each combined with conventional therapy, in undergraduate women with primary dysmenorrhea. After four weeks, both groups demonstrated significant improvements in pain intensity (VAS) and quality of life (WALID) ($p < 0.05$). However, participants who performed the 90–90 hemi-bridge with ball and balloon exercise showed greater improvement, suggesting that combining breathing control with lumbopelvic stabilization may provide additional therapeutic benefits.

Primary dysmenorrhea is thought to result from several interacting mechanisms. Excessive prostaglandin release during menstruation can increase uterine contractility and reduce uterine blood flow, leading to pain.⁽¹⁴⁾ In addition, changes in pelvic movement patterns and reduced control of the trunk muscles may contribute to discomfort and difficulty performing daily activities.^(15,16) These factors indicate that physiotherapy interventions targeting pelvic mobility and trunk stability may help reduce symptoms.

The benefits observed with pelvic clock exercises may be related to improved pelvic mobility, movement awareness, and lumbopelvic coordination. Previous studies have reported that pelvic-focused exercise can enhance pelvic alignment, promote muscle relaxation, and reduce menstrual symptoms.^(17,18)

Greater improvement in the 90–90 hemi-bridge with ball and balloon group may be explained by the combined effects of trunk stabilization and diaphragmatic breathing. Coordinated activation of the diaphragm, abdominal muscles, and pelvic floor muscles can improve lumbopelvic stability, while controlled breathing may reduce pain by promoting relaxation and influencing pain-modulating mechanisms.⁽¹⁹⁻²²⁾ These findings are consistent with previous reports that diaphragmatic breathing and core stabilization reduce pain intensity and improve functional outcomes in women with primary dysmenorrhea.^(23,24)

Both interventions also improved WALID scores, indicating better quality of life following symptom reduction. Similar improvements have been reported in earlier exercise-based studies.⁽²⁵⁾ Although both treatment approaches were effective, the findings suggest that incorporating breathing exercises into lumbopelvic stabilization may provide greater clinical benefit. This study is limited by its small sample size, short intervention period, and reliance on self-reported outcome measures. Future research should include larger samples, longer follow-up, and objective assessments of muscle function and physical performance to confirm these findings.

CONCLUSION

The results of this study indicate that a four-weeks of physiotherapy programme incorporating pelvic clock exercises and the 90–90 hemi-bridge ball and balloon technique improved pain levels and quality of life in women with primary dysmenorrhea when combined with conventional treatment. Post-intervention analysis showed statistically significant improvements in pain scores measured using the Visual Analogue Scale (VAS) and quality of life assessed using the WALID scale in both groups ($p < 0.05$). These findings indicate that the interventions contributed to reduced menstrual pain and improved physical functioning, daily activity participation, and overall well-being.

The outcomes of this study are consistent with previous research demonstrating the benefits of pelvic mobility exercises, core stabilization training, and breathing-based interventions in managing symptoms associated with primary dysmenorrhea. Although both interventions were effective, the 90–90 hemi-bridge ball and balloon technique produced greater improvement compared with pelvic clock exercises.

The enhanced outcomes may be related to the combined effect of diaphragmatic breathing, deep core muscle activation, and improved lumbopelvic stability, which may influence pain modulation and functional recovery. The statistical findings support the rejection of the null hypothesis and acceptance of the alternative hypothesis, indicating that both exercise interventions were effective in improving pain and quality of life in women with primary dysmenorrhea.

Therefore, pelvic clock exercises and the 90–90 hemi-bridge ball and balloon technique may be considered effective physiotherapy approaches when combined with conventional therapy for the management of primary dysmenorrhea.

REFERENCES

1. Burnett M. Ligne directrice No. 345: Dysménorrhée primaire. *Journal of Obstetrics and Gynaecology Canada*. 2025 May 1;47(5):102841.
2. Jarrell J, Arendt-Nielsen L. Allodynia and dysmenorrhea. *Journal of Obstetrics and Gynaecology Canada*. 2016 Mar 1;38(3):270-4.
3. Fernandez H, Barea A, Chanavaz-Lacheray I. Prevalence, intensity, impact on quality of life and insights of dysmenorrhea among French women: A cross-sectional web survey. *Journal of Gynecology Obstetrics and Human Reproduction*. 2020 Dec 1;49(10):101889.
4. Devi B, Sherpa MS, Karki MP, Lepcha MN, Cintury MS, Chettri MN. Prevalence of Dysmenorrhea and Factors Associated with its Intensity and Duration among Female Students. *Educational Administration, Theory and Practice*. 2024;30(3):943-55.
5. Itani R, Soubra L, Karout S, Rahme D, Karout L, Khojah HM. Primary dysmenorrhea: pathophysiology, diagnosis, and treatment updates. *Korean journal of family medicine*. 2022 Mar 17;43(2):101.
6. Belayneh W, Kassaye Z, Arusi T, Abera N, Hantalo A, Melkamu B, Gutulo M. Prevalence of dysmenorrhea and associated factors and its effect on daily academic activities among female undergraduate students of 50 Hawassa University College of Medicine and Health Sciences, Hawassa, Ethiopia. *Frontiers in Reproductive Health*. 2023 Dec 15; 5:1244540.

7. Molla A, Duko B, Girma B, Madoro D, Nigussie J, Belayneh Z, Mengistu N, Mekuriaw B. Prevalence of dysmenorrhea and associated factors among students in Ethiopia: A systematic review and meta-analysis. *Women's Health*. 2022 Feb; 18:17455057221079443.
8. Shivalkar A, Pandit U. Effects of pelvic clock exercise on pelvic alignment in females with primary dysmenorrhoea. *Age*. 2024; 22:1-965.
9. Wang J, He X, Zhu C, Ding H, Feng G, Yang X, Liu L, Song Y. The relationship between Spino-pelvic alignment and primary dysmenorrhea. *Frontiers in surgery*. 2023 Feb 8; 10:1125520.
10. Kim MJ, Baek IH, Goo BO. The effect of lumbar-pelvic alignment and abdominal muscle thickness on primary dysmenorrhea. *Journal of Physical Therapy Science*. 2016;28(10):2988-90.
11. Kavitha P, Neelambikai N. Prevalence of dysmenorrhea among women in the reproductive age group in Peelamedu area in Coimbatore, Tamil Nadu. *National Journal of Physiology*. 2016 Jun 1;4(1):9-13.
12. Itani R, Soubra L, Karout S, Rahme D, Karout L, Khojah HM. Primary dysmenorrhea: pathophysiology, diagnosis, and treatment updates. *Korean journal of family medicine*. 2022 Mar 17;43(2):101.
13. A Comparitive Study Between Balloon Blowing Exercise In 90/90 Hemibridge Position with Ball and Core Strengthening Exercises on Chronic Low Back Pain in Adults Dr.Gunarathna.K. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
14. Iacovides S, Avidon I, Baker FC. What we know about primary dysmenorrhea today: A critical review. *Hum Reprod Update*. 2015;21(6):762-78.
15. Wang H, Li X, Zhang Y, et al. Sagittal spino-pelvic alignment in women with primary dysmenorrhea. *Spine J*. 2023;23(1):45-52. 54
16. Choi H, Lee J, Kim S. Core muscle function and its relationship to primary dysmenorrhea in young women. *J Phys Ther Sci*. 2021;33(4):278-85.
17. Shivalkar A, Pandit U. Effects of pelvic clock exercise on pelvic alignment in females with primary dysmenorrhoea. *J Med Pharm Allied Sci*. 2024;13(5):6752–6754. doi:10.55522/jmpas. V13I5.6701.
18. Saikia B, Bhavani BB, Logambal K, Karpagam S. Impact of pelvic rocking exercise on dysmenorrhea among adolescent girls. *Int J Reprod Contracept Obstet Gynecol*. 1770.ijrcog20241071. 2024;13(5):1228–1233. doi:10.18203/2320
19. Lee K. The relationship of trunk muscle activation and core stability: A review. *Int J Environ Res Public Health*. 2021;18(23):12804
20. Jafari H, Courtois I, Van den Bergh O, Vlaeyen JWS, Van Diest I. Pain and respiration: a systematic review. *Pain*. 2017;158(6):995-1006.
21. Wahyuni W, Maghfiroh F. The effect of deep breathing exercise in minimizing pain level of primary dysmenorrhea. *Int J Health Sci (Qassim)*. 2023;6(S3):8828.
22. O'Brien Physical Therapy. The Link Between Breathing Techniques and Pain Relief. *O'Brien Physical Therapy*; 2025
23. Janssens L, McConnell AK, Pijnenburg M, Claeys K, Goossens N, Lysens R, et al. Inspiratory muscle training affects proprioceptive use and low back pain. *Med Sci Sports Exerc*. 2015;47(1):12–19 .
24. Shahrjerdi S, Hosseini RS. Effect of core stability exercises on primary dysmenorrhea: a randomized controlled trial. *J Modern Rehabil*. 2019;13(2):113–122.
25. Ortiz MI, Cortés-Márquez SK, Romero-Quezada LC, Murguía-Cánovas G, Jaramillo-Díaz AP. Effect of a physiotherapy program in women with primary dysmenorrhea. *Eur J Obstet Gynecol Reprod Biol*. 2015; 194:24 29 55 55. Zeind Cs, CarvalhoMG, Cheng JW, Zaiken K, LaPointe T. A

Cite this Article: Arun Kumar S., Manoj Abraham M., Abinaya K. (2026). Evaluating The Effectiveness of Pelvic Clock Exercise Versus 90-90 Hemibridge with Ball and Balloon Techniques Along with Conventional Therapy on Pain and Quality of Life in Female College Students with Primary Dysmenorrhea. International Journal of Current Science Research and Review, 9(9), pp. 5111-5117. DOI: <https://doi.org/10.47191/ijcsrr/V9-i9-27>