

A COMPARATIVE STUDY ON THE EFFECTIVENESS OF CORE STRENGTHENING EXERCISE VERSUS SWISS BALL EXERCISE IN THE MANAGEMENT OF PRIMARY DYSMENORRHEA

Arulmozhe A.^{1*}, Sakshi Kumari¹, Arthi T.², Mercy Clara², Dr. B. S. Santhosh Kanna³

¹Associate Professor, College of Physiotherapy, NIEPMD(D), Govt. of India.

¹BPT Intern, College of Physiotherapy, NIEPMD(D), Govt. of India.

²Associate Professor, College of Physiotherapy, NIEPMD(D), Govt. of India.

²Professor, College of Physiotherapy, NIEPMD(D), Govt. of India.

³Principal, College of Physiotherapy, NIEPMD(D), Govt. of India.

Affiliated to The TN. Dr. M.G.R. Medical University.

Article Received on 04 March 2026,
Article Revised on 24 March 2026,
Article Published on 01 April 2026,

<https://doi.org/10.5281/zenodo.19413490>

*Corresponding Author

Arulmozhe A.

Associate Professor, College of
Physiotherapy, NIEPMD(D), Govt.
of India.



How to cite this Article: Arulmozhe A.^{1*}, Sakshi Kumari¹, Arthi T.², Mercy Clara², Dr. B. S. Santhosh Kanna³ (2026). A Comparative Study On The Effectiveness Of Core Strengthening Exercise Versus Swiss Ball Exercise In The Management Of Primary Dysmenorrhea. World Journal of Pharmaceutical Research, 15(7), 1490-1498. This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Background: Dysmenorrhea is a common gynecological problem that affects women's quality of life and day-to-day activities. Primary dysmenorrhea (PD) is characterized by cramping lower abdomen pain that may radiate to the lower back and upper thigh. Associated complaints include stress, depression, headache, and diarrhoea. The overall prevalence of primary dysmenorrhea is about 60% - 90%. There are many conservative treatments for primary dysmenorrhea conditions, but the most effective one is not yet known. **Purpose of the study:** To compare the effect of strengthening exercises and gym ball/Swiss ball exercises in the management of primary dysmenorrhea (PD). **Methodology:** After obtaining informed consent, a baseline assessment was conducted. 20 females with PD were recruited and conveniently divided into two groups, Group A and Group B. Group A will be provided with gym ball

exercises for 10 s hold × 12 times/set × 3 sets/day × 3 days/week × 12 weeks. While Group B received a set of strengthening exercises for 10 s hold × 20 min/set × 3 sets/day × 3 days/week × 12 weeks. **Result:** Pain intensity and level of distress were significantly reduced in both

Groups (Swiss ball and Core strengthening). But no significant differences between MOOS and VAS reading of post-tests in both intervention Groups. **Conclusion:** Swiss ball exercise and core strengthening exercises seem to be easy, non-pharmacological methods for managing primary dysmenorrhoea.

KEYWORDS: Primary dysmenorrhoea, core strengthening exercises, gym ball, pain, VAS, MDQ.

INTRODUCTION

Primary Dysmenorrhea is the presence of painful cramps in the lower abdomen that occur during menstruation^[1] without any organic pathology.^[2] Pain usually occurs within hours of the onset of menstruation and is most severe on the first and second days of menstruation. This is because the release of prostaglandins increases during this period.^[3] Prostaglandins, especially PGF₂, which stimulate myometrium contraction, reduce uterine blood flow, and cause uterine hypoxia. Hypoxia is the cause of spasmodic pain. Factors that aggravate pain include uterine extroversion, lack of exercise, and psychological and social stress.^[4] Pain and distress are the main causes of sleep disorders, loss of concentration in performance, and absence from school (72.5%), University (74.9%), and job in primary dysmenorrhea.^[5] The academic impact was significant, with 20.1% reporting dropping out or dropping out of college due to dysmenorrhea and 40.9% reporting that class performance or concentration was negatively affected.^[5] Dysmenorrhea is often relieved with medications such as nonsteroidal anti-inflammatory drugs (NSAIDs), pain relievers that help relieve menstrual pain by affecting prostaglandin levels, and oral contraceptives (OCPs). The side effects of these drugs are well known (nausea, breast tenderness and sudden bleeding, dizziness, drowsiness, hearing and vision disturbances)^[8] Alternative or non-pharmacological treatments, including TENS,^[9] exercise, acupuncture, acupressure, massage therapy, heating pads, and relaxation techniques, have shown improvement that are administered during menstruation and only offer transient comfort.

However, there is a lacuna that exists that analyses the long-term effects of a particular protocol. It is known that altered biomechanics of the spine can also lead to lower abdominal pain and back pain. Hence, core strengthening and Swiss ball training are the interventions used in this study.

Core strengthening allows the small intrinsic muscles around the lumbar spine to be

conditioned for better performance. This type of training helps to isolate and strengthen core muscle groups. When these muscles are strong, they are much more ready to handle the daily effects of normal biomechanics, even when the body is under the pressure of the menstrual cycle.^[10]

Exercise with Swiss ball helps to strengthen muscles, increase the flexibility of ligaments, isotonic and isotonic muscle contraction leads to vasoconstriction of blood vessels, where circulation will be smooth and increases endorphin levels by fold.4 to 5 times in the body. Higher levels of endorphins help relieve pain during menstruation.^[25]

Previous research has demonstrated that core strengthening exercises and Swiss ball therapy are helpful in reducing pain in primary dysmenorrhea. However, there are few studies showing the importance of comparing the effects of core strengthening exercise and Swiss ball exercise in primary dysmenorrhea. The aim of this study was to compare the effectiveness of core strength exercises and Swiss ball exercises in the management of symptoms associated with primary dysmenorrhea.^[11]

METHODOLOGY

Trial designs and participants

The quasi- experimental study was conducted at College of Physiotherapy, NIEPMD(D), Muttukadu, Tamil Nadu, India. A total of 34 unmarried, nulliparous woman with an age group of 18-25 years with primary dysmenorrhea, pain intensity of 5 or above in VAS were included in this study. Individuals using pharmacological or non-pharmacological methods for pain relief during the study, individuals suffering from systemic diseases or diseases in the genital organs, abnormal vaginal bleeding, and Irregular menstrual cycles were excluded. All the participants were screened by the other therapist, blinded to this study, based on the above inclusion and exclusion criteria. After providing written informed consent, 20 individuals were recruited and divided into two groups through a simple random assignment via an even-odd technique. Each individual selected a slot from a bowl in which a digit of the Natural numbers was written. In case the digit was even the participants were assigned to group A (Swiss ball Exercise), and in case it was odd, the participants were assigned to group B (Core strengthening Exercise).

INTERVENTION

Group A (Swiss ball exercise), participants were requested to perform all the following exercises for 10 sec holds \times 12 times/set \times 3 sets/day \times 3 days/week \times 12 weeks. Group B (Core strengthening exercise), participants were requested to perform all the following exercises for 10 sec hold \times 20 min/set \times 3 sets/day \times 3 days/week \times 12 weeks.

Before the commencement of both exercises, a brief period (5-7 minutes) of warm-up including jumping jacks, high leg kicks, lunges and stretching. After following the exercise regimen, a cool down period of 5 minutes, including light jogging, low leg licks, upper body and back stretch, and relaxing positions. The participants were asked to perform the exercises 1 hour before a meal and 1.5 hours after a meal. They were advised to follow the exercises every other day and to discontinue them if they experienced severe pain, discomfort, or uneasiness. They were asked to avoid performing exercises during the period cycle.

Outcome Measure: Visual Analog Scale (VAS) (10-point scale) and MOOS distress questionnaire were used to measure Pain intensity and Menstrual Distress.

RESULTS

The collected data were tabulated and analyzed using statistical package for social science (SPSS), IBM SPSS version 26.0. Shapiro-wilk Normality test is determined that data is normally distributed. It indicates that the individuals are equally divided between the two groups. Repeated-measures ANOVA was used to assess the effects of all parameters within the Swiss ball and Core strengthening groups (pre-test, 1st cycle, 2nd cycle, & post-test). An independent t-test was used to compare the changes in mean values across all parameters between the Swiss ball and Core strengthening groups. Pain intensity and level of distress were significantly reduced in both Groups (Group A: Pain level $F = 92.759$; $P = 0.00$, Distress level $F = 32.517$; $P = 0.000$ & Group B: Pain level $F = 31.029$; $P = 0.000$, Distress level $F = 22.992$; $P = 0.000$) but there is no significant differences in pre-1st cycle, pre – 2nd cycle & pre – post values of MOOS (-0.651, -0.740 & -0.959; $P > 0.05$) and VAS ($t = 1.264$, 0.856 & 1.18; $P > 0.05$) between group A and group B treated with Swiss Ball exercise and Core Strengthening exercise.

Table 1: Comparison of pre, 1st cycle, 2nd cycle & post treatment values of MOOS & VAS within group A treated with the Swiss ball exercise.

Scale	Mean \pm SD				Mean Difference			F-value	P-value
	Pre	1 st cycle	2 nd cycle	Post	Pre-1 st cycle	Pre-2 nd cycle	Pre-post		
MOOS	76.6 \pm 21.0	69.6 \pm 17.5	64.2 \pm 15.1	58.1 \pm 13.4	7.00	12.44	18.55	32.51	0.00
VAS	7.22 \pm 1.80	6.16 \pm 1.60	5.50 \pm 1.56	4.83 \pm 1.60	1.056	1.722	2.389	92.75	0.00

Table 2: Comparison of pre, 1st cycle, 2nd cycle & post treatment values of MOOS & VAS within group B treated with Core Strengthening exercise.

Scale	Mean \pm SD				Mean Difference			F-value	P-value
	Pre	1 st cycle	2 nd cycle	Post	Pre-1 st cycle	Pre-2 nd cycle	Pre-post		
MOOS	83.6 \pm 24.8	74.5 \pm 18.9	65.8 \pm 14.9	60.1 \pm 14.2	0.911	17.77	23.55	22.99	0.00
VAS	5.77 \pm 0.93	5.05 \pm 0.63	4.33 \pm 0.79	3.66 \pm 0.93	0.722	1.444	2.111	31.02	0.00

Table 3: Comparison of pre-post difference values of the MOOS Questionnaire and VAS between Group A treated with the Swiss ball group and Group B treated with the core strengthening exercise.

Scale	Cycle	Mean		t value	P value
		G-1	G-2		
MOOS	Pre-1 st cycle	7.00	9.11	-0.651	0.52
	Pre-2 nd cycle	13.0	16.7	-0.740	0.47
	Pre-Post	18.5	23.5	-0.959	0.35
VAS	Pre-1 st cycle	1.06	0.75	1.264	0.224
	Pre-2 nd cycle	1.75	1.45	0.856	0.404
	Pre-Post	2.50	2.05	1.18	0.253

DISCUSSION

The present study was conducted to compare the effects of core strengthening exercises and Swiss ball exercises on primary dysmenorrhea. The findings revealed a significant reduction in menstrual pain and associated distress over an average period of 12 weeks in both intervention groups.

Previous studies have reported similar outcomes, indicating that Swiss ball exercises can reduce the intensity of menstrual pain^[25], while strengthening of abdominal musculature

contributes to a decrease in both the severity and symptoms of dysmenorrhea.^[24]

In this study, the Visual Analog Scale (VAS) and Menstrual Outcome of Severity Scale (MOOS) questionnaire scores were analyzed for participants in both groups. The results demonstrated significant improvements in pain and distress levels in both the Swiss ball and core strengthening groups, indicating that both interventions are effective in reducing the intensity of primary dysmenorrhea. However, no statistically significant difference was observed between the two groups, suggesting that both approaches are equally effective. These findings are consistent with existing literature on exercise-based interventions for primary dysmenorrhea.

Core strengthening exercises have been shown to reduce pain intensity, menstrual distress, and improve quality of life.^[10] This improvement may be attributed to increased uterine blood flow and enhanced metabolic activity during exercise, which can help alleviate dysmenorrhea symptoms. Additionally, stress is known to increase sympathetic nervous system activity, leading to heightened uterine contractions and increased menstrual pain. Exercise may reduce sympathetic activity and promote the release of endorphins, which elevate the pain threshold and thereby reduce symptoms.^[32] Therapeutic exercise has also been associated with increased secretion of endorphins, contributing to pain relief.^[33] Swiss ball exercises, in particular, may enhance balance, stability, blood circulation, and nutrient supply, all of which can aid in relieving menstrual cramps.^[11,31] Furthermore, core strengthening exercises condition the intrinsic musculature surrounding the lumbar spine, improving stability and functional performance. Increased blood flow and metabolic activity in the uterus during exercise may play a significant role in reducing dysmenorrhea symptoms.^[34] Overall, both Swiss ball and core strengthening exercises were found to be equally effective in reducing pain intensity and distress levels in individuals with primary dysmenorrhea. These interventions can be incorporated into pain management and rehabilitation programs. The results also suggest that pain reduction can be achieved within a relatively short duration. These exercises are simple, time-efficient, do not require specialized equipment, and can be performed independently, making them suitable for individuals with busy schedules.

CONCLUSION

The present study concludes that both core strengthening exercises and Swiss ball exercises are effective in reducing pain intensity, alleviating menstrual distress, and improving the quality of life in females with primary dysmenorrhea. Although significant improvements

were observed within both intervention groups, no statistically significant difference was found between them, indicating that neither intervention is superior to the other.

These findings suggest that both exercise approaches can be safely and effectively incorporated as non-pharmacological management strategies for primary dysmenorrhea. Their simplicity, cost-effectiveness, and ease of implementation make them practical options for regular use, even among individuals with demanding schedules.

However, the generalizability of the results is limited by factors such as the small sample size, absence of a control group, and restriction to a specific age group. Therefore, further research with larger samples, controlled study designs, and longer intervention periods is recommended to validate these findings and to explore potential differences in effectiveness between the two exercise modalities.

CONFLICT OF INTEREST: No conflicts of interest are present.

REFERENCES

1. López-Liria, R., et al. (2021). Efficacy of physiotherapy treatment in primary dysmenorrhea: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 18(14): 7832. <https://doi.org/10.3390/ijerph18147832>.
2. Latthe, P., et al. (Year unknown). Dysmenorrhea. *Clinical Evidence Handbook*. BMJ Publishing Group.
3. Primary dysmenorrhea: Assessment and treatment. (2020). <https://doi.org/10.1055/s-0040-1712131>.
4. Koshy, M. M., et al. (2020). Effectiveness of chair aerobics and Swiss ball in primary dysmenorrhoea. *International Journal of Pharmaceutical and Biological Sciences*, <http://dx.doi.org/10.22376/ijpbs/lpr.2020.10.4.L16-20>.
5. Armour, M., et al. (2019). The prevalence and academic impact of dysmenorrhea in 21,573 young women: A systematic review and meta-analysis. *Journal of Women's Health*. <https://doi.org/10.1089/jwh.2018.7615>.
6. Latthe, P., et al. (2006). WHO systematic review of prevalence of chronic pelvic pain: A neglected reproductive health morbidity. *BMC Public Health*, 6: 177. <https://doi.org/10.1186/1471-2458-6-177>.
7. National Sleep Foundation. (1998). Women and sleep poll. Retrieved July 18, 2019, from

- <https://www.sleepfoundation.org/articles/women-and-sleep>.
8. Berek, J. S. (2012). Berek and Novak's gynecology (15th ed.). Wolters Kluwer Health/Lippincott Williams & Wilkins.
 9. Kannan, P., et al. (2014). Some physiotherapy treatments may relieve menstrual pain in women with primary dysmenorrhea: A systematic review. *Journal of Physiotherapy*, 60(1): 13–21.
 10. Saleh, H. S., et al. (2016). Stretching or core strengthening exercises for managing primary dysmenorrhea. *Journal of Women's Health Care*, 5(1): <https://doi.org/10.4172/2167-0420.1000295>.
 11. Kirthika, V. K. S., et al. (Year unknown). Efficacy of yoga asana and gym ball exercises in the management of primary dysmenorrhea: A randomized controlled trial. https://doi.org/10.4103/cjhr.cjhr_93_17.
 12. Berde, S. D., et al. (Year unknown). Effect of core strengthening exercises and chair aerobic exercises in primary dysmenorrhea.
 13. Kim, S.-H., et al. (2017). Effect of gym ball exercise on primary dysmenorrhea and pulse wave velocity of lower limbs in young women. <https://doi.org/10.5958/0974-360X.2017.00408.5>.
 14. Bustan, M. N., et al. (2018). Abdominal stretching exercise in decreasing pain of dysmenorrhea among nursing students. *Journal of Physics: Conference Series*, 1028, 012103. <https://doi.org/10.1088/1742-6596/1028/1/012103>.
 15. The effect of abdominal stretching exercise on the intensity of dysmenorrhea. (2021). *Jurnal Kesehatan*. <https://doi.org/10.24252/kesehatan.v14i1.21665>.
 16. Patel, N. S., et al. (2015). Effect of active stretching exercises on primary dysmenorrhea in college-going female students. *Indian Journal of Physiotherapy and Occupational Therapy*, 9(3): 72–76.
 17. Dehnavi, Z. M., et al. (Year unknown). The effect of aerobic exercise on primary dysmenorrhea: A clinical trial study. https://doi.org/10.4103/jehp.jehp_79_17.
 18. Rouse, P. K. (1982). Studies using the MOOS menstrual distress questionnaire (Unpublished doctoral thesis). City University London.
 19. Onur, O. (2012). Impact of home-based exercise on quality of life of women with primary dysmenorrhea. *South African Journal of Obstetrics and Gynaecology*, 18: 15–18.
 20. Dawood, M. Y. (2006). Primary dysmenorrhea: Advances in pathogenesis and management. *Obstetrics & Gynecology*, 108: 428–441.
 21. Izzo, A., & Labriola, D. (1991). Dysmenorrhoea and sports activities in adolescents.

- Clinical and Experimental Obstetrics & Gynecology, 18: 109–116.
22. Bustan, M. N., et al. (2018). Abdominal stretching exercise in decreasing pain of dysmenorrhea among nursing students. *Journal of Physics: Conference Series*, 1028, 012103. <https://doi.org/10.1088/1742-6596/1028/1/012103>.
 23. Sharma, S., et al. (2022). Efficacy of core muscle strengthening in women with dysmenorrhea. <https://doi.org/10.16965/ijpr.2022.116>.
 24. Wahyuni, S., et al. (2019). Can Swiss ball exercise technique reduce menstrual pain intensity? ICoSHEET 2019 Conference Proceedings.
 25. Patel, C., et al. (Year unknown). Effect of chair aerobic exercises vs. core strengthening exercises with education on primary dysmenorrhea: A randomized controlled trial.
 26. Mahvash, N., et al. (2012). The effect of physical activity on primary dysmenorrhea of female university students. *World Applied Sciences Journal*, 17: 1246–1252.
 27. Aboushady, R. M., et al. (2016). Effect of home-based stretching exercises and menstrual care on primary dysmenorrhea and premenstrual symptoms among adolescent girls. *IOSR Journal of Nursing and Health Science*.
 28. Daley, A. (2009). The role of exercise in the treatment of menstrual disorders: The evidence. *British Journal of General Practice*, 59: 241–242.
 29. Shahr-jerdy, S., et al. (2012). Effect of stretching exercises on primary dysmenorrhea in adolescent girls. *Biomedical Human Kinetics*, 4: 127–132.
 30. Koshy, M. M., et al. (2020). Effectiveness of chair aerobics and Swiss ball in primary dysmenorrhoea. *International Journal of Pharmaceutical and Biological Sciences*. <http://dx.doi.org/10.22376/ijpbs/lpr.2020.10.4.L16-20>.
 31. Mastrangelo, M. A., et al. (2007). Effects of yoga on quality of life and flexibility in menopausal women: A case series. *Explore*, 3: 42–45.
 32. Dawood, M. Y. (2006). Primary dysmenorrhea: Advances in pathogenesis and management. *Obstetrics & Gynecology*, 108: 428–441.
 33. Izzo, A., & Labriola, D. (1991). Dysmenorrhoea and sports activities in adolescents. *Clinical and Experimental Obstetrics & Gynecology*, 18: 109–116.