COMPARATIVE EFFECTS OF PHYSIOTHERAPY-BASED BREATHING RETRAINING AND YOGIC PRANAYAMA ON PSYCHOLOGICAL SYMPTOMS OF PREMENSTRUAL SYNDROME: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background:

Premenstrual syndrome (PMS) is a common condition among reproductive-age women, characterized not only by physical but also psychological symptoms such as irritability, anxiety, mood swings, and depression, which significantly affect daily functioning and quality of life. Non-pharmacological approaches such as physiotherapy-based breathing retraining and yogic pranayama have gained attention for their role in regulating autonomic function, reducing stress, and improving emotional well-being.

Methods:

A randomized controlled trial will be conducted among women aged 12–25 years with clinically diagnosed PMS. Participants will be randomly assigned to either the Breathing Retraining group or the Pranayama group. Interventions will be performed 5 sessions per week for 8 weeks. Outcome measures will include the Premenstrual Syndrome Scale (PMSS), Depression Anxiety Stress Scale (DASS-21), assessed at baseline and after 8 weeks.

Results:

Both interventions are expected to reduce psychological symptoms of PMS, with pranayama to show greater improvements, while physiotherapy breathing retraining is equally effective in enhancing relaxation and emotional stability.

Conclusion:

The study may provide evidence for structured breathing-based physiotherapy and yogic pranayama into holistic, non-pharmacological management strategies for psychological symptoms of PMS.

Keywords:

Premenstrual syndrome, psychological symptoms, physiotherapy, breathing retraining, pranayama, women's health.

INTRODUCTION

Premenstrual Syndrome (PMS) is a common cyclical condition affecting women during their reproductive years. It occurs during the luteal phase of the menstrual cycle and resolves with the onset of menstruation.(1) PMS is characterized by a combination of physical, psychological, emotional, and behavioral symptoms that can significantly affect daily activities, academic performance, work productivity, and quality of life.(2) Although the exact cause remains unclear, hormonal fluctuations during the menstrual cycle are considered the primary underlying mechanism. More than 90% of women experience at least one premenstrual symptom, while approximately 20% report symptoms severe enough to interfere with their daily functioning.

The symptoms of PMS vary in severity and include physical manifestations such as abdominal bloating, breast tenderness, fatigue, menstrual cramps, headache, gastrointestinal disturbances, and sleep changes,(1) along with psychological symptoms including mood swings, irritability, anxiety, depression, poor concentration, fatigue, and food cravings. These symptoms often occur in a predictable pattern and may substantially impair emotional well-being and social functioning.(2)

Management of PMS includes both pharmacological and non-pharmacological approaches. Pharmacological treatment involves the use of non-steroidal anti-inflammatory drugs, hormonal therapy, antidepressants, and nutritional supplements.(1) Non-pharmacological interventions such as physiotherapy, yoga, lifestyle modification, dietary management, relaxation techniques, meditation, massage therapy, and acupuncture have also shown beneficial effects in reducing symptom severity and improving quality of life.(3)

Physiotherapy breathing retraining focuses on controlled diaphragmatic and pursed-lip breathing to promote relaxation, improve respiratory efficiency, and reduce stress and anxiety.(4) Similarly, yogic breathing (Pranayama), including techniques such as Nadi Shodhana, Anulom-Vilom, Bhramari, and Sheetali, helps regulate the autonomic nervous system, reduce psychological distress, and enhance emotional well-being.(5) As individual responses to these interventions vary, comparing the effectiveness of physiotherapy-based breathing retraining and yogic pranayama may help identify an effective non-pharmacological approach for reducing psychological symptoms in women with PMS.

MATERIALS AND METHODS

A randomized controlled trial was conducted over 8 weeks to compare the effects of physiotherapy-based breathing retraining and yogic pranayama on psychological symptoms of premenstrual syndrome (PMS). Thirty girls and young women aged 12–25 years with PMS, identified using the Premenstrual Symptoms Screening Tool (PSST), were recruited(6) through convenience sampling and randomly allocated into two groups (n = 15 each). Participants meeting the inclusion criteria and providing written informed consent (with parental consent for those under 18 years) were included, while those with pregnancy, chronic medical or psychiatric disorders, hormonal therapy, or regular yoga or breathing practice were excluded.

Both groups received supervised 60-minute sessions, three times per week for 8 weeks. Group A underwent physiotherapy-based breathing retraining, including diaphragmatic breathing, pursed-lip breathing, deep controlled breathing, and segmental thoracic expansion exercises. Group B practiced yogic pranayama, including Anulom Vilom, Bhramari, Chandra Bhedana, and deep yogic breathing. Participant attendance and adherence were monitored throughout the intervention.

The Premenstrual Symptoms Screening Tool (PSST) was used to assess psychological, behavioural, and physical symptoms of PMS at baseline and after the 8-week intervention.(6) Data were analysed using IBM SPSS Statistics version 25.0. Descriptive statistics were expressed as mean ± standard deviation. Paired t-tests were used for within-group comparisons, and independent t-tests were used for between-group comparisons. A p-value of <0.05 was considered statistically significant.

STATISTICAL ANALYSIS

Data was entered into Microsoft Excel and analysed using IBM SPSS Statistics version 25.0. Descriptive statistics were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Data normality was assessed using the Shapiro–Wilk test, and homogeneity of variance was evaluated using Levene's test.(7) Paired t-tests were used for within-group comparisons, and independent t-tests were used for between-group comparisons. A p-value < 0.05 was considered statistically significant, with a 95% confidence interval.

RESULTS

A total of 30 participants completed the study, with 15 participants each in the Yoga and Physiotherapy-Based Breathing Retraining (PT) groups. The mean age was 16.67 ± 2.02 years in the Yoga group and 16.80 ± 1.66 years in the PT group, indicating comparable baseline characteristics. The mean pre-intervention PSST score was 56.80 ± 5.77 in the Yoga group and 54.00 ± 7.26 in the PT group. Following the 8-week intervention, the mean PSST score decreased to 42.87 ± 3.54 in the Yoga group and 44.80 ± 6.98 in the PT group. The mean improvement was 13.93 ± 3.52 in the Yoga group compared with 9.20 ± 4.40 in the PT group, indicating greater symptom reduction in participants who received yogic pranayama. (Table 1)

The assumptions for parametric analysis were verified before inferential testing. The Shapiro–Wilk test demonstrated that all variables were normally distributed ($p > 0.05$), while Levene's test confirmed homogeneity of variance between the two groups ($p > 0.05$). These findings supported the use of paired and independent t-tests for statistical analysis.

Within-group analysis using the paired t-test revealed a statistically significant reduction in PSST scores following the intervention in both groups. The Yoga group showed a mean reduction of 13.93 ± 3.52 ($t = 15.354$, $p < 0.001$), whereas the PT group demonstrated a mean reduction of 9.20 ± 4.40 ($t = 8.108$, $p < 0.001$) (Table 2). These results indicate that both physiotherapy-based breathing retraining and yogic pranayama were effective in reducing psychological symptoms associated with PMS.

Between-group analysis using the independent t-test demonstrated a statistically significant difference in improvement between the two interventions. Participants in the Yoga group achieved significantly greater reductions in PSST scores than those in the PT group ($t(28) = 3.258$, $p = 0.003$), with a mean difference of 4.73 points (95% CI: 1.76–7.71) (Table 3 & 4)

Overall, both interventions were effective in improving psychological symptoms of PMS; however, yogic pranayama produced significantly greater improvement than physiotherapy-based breathing retraining, suggesting its superior effectiveness in reducing psychological symptoms among girls and young women with PMS.

DISCUSSION

The present study compared the effects of yogic pranayama and physiotherapy-based breathing retraining on psychological symptoms of premenstrual syndrome (PMS) in adolescent girls and young women. Both interventions produced a significant reduction in PSST scores after the 8-week intervention ($p < 0.001$). However, the Yogic Pranayama group demonstrated significantly greater improvement than the Physiotherapy-Based Breathing Retraining group ($p = 0.003$), indicating that both interventions were effective, with yogic pranayama showing superior benefits.

The improvement observed in the Yogic Pranayama group may be attributed to its ability to enhance parasympathetic activity, reduce stress, and improve emotional regulation through controlled breathing and relaxation.(8) These findings are consistent with previous studies by Rai et al. (2013), Kamalifard et al. (2017), Kaur et al. (2022), Raghavendra et al. (2024), and Gonmei et al. (2025), (9)which reported significant reductions in PMS symptoms following yoga and pranayama interventions.

Participants in the Physiotherapy-Based Breathing Retraining group also showed significant improvement in psychological symptoms. Controlled breathing exercises may improve respiratory efficiency, decrease physiological arousal, and promote relaxation, thereby reducing stress and anxiety associated with PMS.(8) These findings are supported by previous studies highlighting the benefits of breathing exercises and other non-pharmacological interventions for PMS management.(8)

The greater effectiveness of yogic pranayama compared with physiotherapy-based breathing retraining may be due to the additional components of mindfulness, relaxation, and breath awareness incorporated into yoga practices. These mechanisms may provide enhanced emotional regulation and autonomic balance, resulting in greater reductions in psychological symptoms.(5)

Overall, the findings are consistent with existing literature supporting breathing-based and non-pharmacological interventions for PMS. Both interventions are safe, low-cost, and easy to implement; however, yogic pranayama appears to be a more effective option for reducing psychological symptoms of PMS and may be considered as a complementary intervention in women's health physiotherapy practice.(9)

CONCLUSION

The present study found that both yogic pranayama and physiotherapy-based breathing retraining significantly reduced psychological symptoms of premenstrual syndrome (PMS). However, yogic pranayama demonstrated greater improvement than physiotherapy-based breathing retraining. Both interventions were safe, simple, and effective non-pharmacological treatment approaches. Therefore, yogic pranayama may be recommended as a complementary intervention for improving psychological well-being in adolescent girls and young women with PMS.

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Tables

Table 1: Descriptive statistics of yoga group and physio based breathing retraining group

	TOTAL SAMPLE	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
YOGA GROUP					
AGE	15	13	20	16.67	2.024
PRE-TEST	15	46	66	56.8	5.772
POST-TEST	15	37	47	42.87	3.543
DIFF	15	9	20	13.93	3.515
PT GROUP					
AGE	15	15	20	16.8	1.656
PRE-TEST	15	42	63	54	7.26
POST-TEST	15	33	56	44.8	6.982
DIFF	15	2	17	9.2	4.395

Table 2: Paired t-test, within group analysis

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
YOGA GROUP	PRE-TEST POST-TEST	13.933	3.515	.907	11.987	15.880	15.354	14	.000
PT GROUP	PRE-TEST POST-TEST	9.200	4.395	1.135	6.766	11.634	8.108	14	.000

Table 3: Independent sample t-test comparison of mean improvement in PMSS score between the yoga group and physio-based breathing retraining group

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
	Equal variances assumed	.837	.368	3.258	28	.003	4.733	1.453	1.757	7.710
	Equal variances not assumed			3.258	26.709	.003	4.733	1.453	1.751	7.716

Table 4: Group statistics of improvement scores

Group Statistics					
s.no	GROUP	N	Mean	Std. Deviation	Std. Error Mean
1	YOGA	15	13.93	3.515	.907
2	PT	15	9.20	4.395	1.135