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# Deep Breathing Exercises In Reducing Pain And Psychological Symptoms Of Premenstrual Syndrome: A Narrative Review

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**Abstract**
Among women of reproductive age, premenstrual syndrome (PMS) is a prevalent ailment that is characterized by range of physical and emotional symptoms that interfere with daily life and overall well-being. In recent years, non-pharmacological strategies such as deep breathing exercises have gained attention as potential approaches for symptom management. This narrative review aims to explore and summarize the available evidence on the effectiveness of deep breathing practices in alleviating both pain and psychological symptoms associated with PMS.A comprehensive literature search was conducted using databases including PubMed, Scopus, and Google Scholar, focusing on studies published between 2005 and 2025. Randomized controlled trials, observational studies, and systematic reviews evaluating the role of deep breathing techniques in PMS management were selected and critically analyzed. Evidence suggests that deep breathing exercises, through their influence on the autonomic nervous system, can significantly reduce physical complaints such as cramps and fatigue, while also improving psychological outcomes like irritability, anxiety, mood instability, and depression. The relaxation response triggered by deep breathing reduces sympathetic activity and enhances emotional regulation. Deep breathing techniques represent a promising, cost-effective, and accessible option for managing both physical and psychological aspects of PMS. However, further large-scale, high-quality randomized controlled trials are necessary to establish standardized protocols, confirm long-term benefits, and validate findings across diverse populations.

**Keywords:** Premenstrual Syndrome, Deep Breathing, Pain Relief, Psychological Symptoms, Non-Pharmacological Intervention, Women's Health.

## Introduction

Premenstrual syndrome (PMS) lacks a universally agreed definition, but it is commonly described as a recurring cluster of physical and psychological symptoms that cause distress and impair daily functioning. During the luteal phase of the menstrual cycle these symptoms appear and typically ease for at least a week during the follicular phase .PMS affects women during their reproductive years and is associated with emotional, behavioral, and physical changes. Symptoms often emerge 7–14 days before menstruation and resolve once menstrual bleeding begins (Zaka, M., & Mahmood, K. T. 2012).

Despite its widespread occurrence, PMS is often downplayed or dismissed as a routine part of womanhood (Sanchez, B. N., Kraemer, W. J., & Maresh, C. M. 2023). In reality, it is a significant health concern that negatively impacts social interactions, lifestyle, work performance, emotional health, and overall quality of life, while also creating an economic burden. Since PMS is particularly prevalent among young women and adolescents, it represents an important public health issue (Rizk, D. E., Mosallam, M., Alyan, S., & Nagelkerke, N. 2006) .Menstrual issues and stress are common concerns

among college students, according to research and PMS has major negative impact on both academic performance and emotional health (Kannan, L. S. (2024).
Nutritional supplements , selective serotonin reuptake inhibitors (SSRIs), hormonal supplements and Non steroidal anti inflammatory Medications (NSAIDs) are all considered traditional treatments for PMS. These may alleviate symptoms but they can also have negative consequences such as breast soreness , nausea , weight gain and emotional apathy (Rapkin, A. J., & Winer, S. A. 2009).
Furthermore the postural problems that lead to PMS , Musculoskeletal discomfort, stress related respiratory dysfunctions are typically not addressed by pharmaceutical treatments. Interventions based on Physiotherapy are better suited to treating these functional deficits (Çitil, E. T., & Kaya, N. 2021).
Because of this conservative, non-pharmacological approaches are receiving more and more attention. In particular deep breathing exercises are an important aspect of holistic physiotherapy methods. This narrative review aims to evaluate critically how well deep breathing techniques work to lessen PMS symptoms both psychologically and physically.

**Literature search**
A comprehensive literature search was conducted using databases including PubMed, Scopus, and Google Scholar, focusing on studies published between 2005 and 2025. Randomized controlled trials, observational studies, and systematic reviews evaluating the role of deep breathing techniques in PMS management were selected and critically analyzed.

**Premenstrual Syndrome: A Clinical Perspective**

**Etiology and Pathophysiology**
The Fundamental causes of PMS are intricate and multifaceted. One widely accepted explanation relates to cyclical hormonal fluctuations, particularly variations in estrogen and progesterone levels throughout the menstrual cycle. These changes are most pronounced during late luteal phase as body prepares for menstruation (Sanchez, B. N., Kraemer, W. J., & Maresh, C. M. 2023).
Estrogen interacts with multiple neurotransmitters—such as serotonin, noradrenaline, dopamine, acetylcholine, and gamma-aminobutyric acid (GABA)—all of which regulate mood, cognition, and behavior. Estrogen also affects neuronal excitability and nervous system sensitivity. Consequently, the decline in estrogen levels during the luteal phase is strongly associated with onset of PMS symptoms. However, absence of these symptoms during the follicular phase suggests that additional mechanisms beyond hormonal variation also contribute (Zendehdel, M., & Elyasi, F. 2018).
Lifestyle and dietary habits are significant contributors. For Instance, frequent use of junk food , coffee and sugary meals was positively correlated with PMS symptoms found in the study conducted in Egypt. PMS was closely associated with unhealthy lifestyle choices such as consuming lot of fast food, carbonated beverages and deep fried snacks and having irregular schedules (Gudipally, P. R., & Sharma, G. K. 2023). All these studies point to a complex interaction between hormonal, neurochemical and lifestyle factors rather than a single cause of PMS.

**Diagnostic Criteria and Classification**
For diagnosing PMS a clinical criteria has been established by The American College of Obstetricians and Gynecologists (ACOG). These standards require a women to report at least one physical symptom and one emotional symptom over three consecutive menstrual cycles. At least five days before the menstrual cycle, these symptoms must manifest, go away four days after the menstrual cycle starts and continue to missing until atleast day 13 of the cycle (Czajkowska, M., & Hanzel, I. 2016).
Premenstrual tension syndrome is classified in ICD-10 under gynaecological diagnoses and requires at least one Psychological or physical symptom (Halbreich, U., Backstrom, T. et al. 2007).
Headaches, tenderness in breasts, abdominal bloating and fluid retention in extremities are some of the common physical symptoms. Emotional interpretation commonly include uneasiness, hopelessness, anger, fear, indecision or seclusion (Czajkowska, M., & Hanzel, I. 2016). These diagnostic structures are necessary for identifying PMS from other Gynaecological disorders with overlapping symptoms.

**Conventional Management of PMS**
Previously there were many management strategies. Primary treatments frequently include NSAIDs and prostaglandin inhibitors, which can reduce pain but frequently lead to gastrointestinal discomfort, nausea or loose stool (Desai, R. G. 2022). Hormonal therapies, herbal remedies, soft tissue manipulation and heat packs are additional options.
Physiotherapy based treatment such as aerobic exercise, stretching, and core stabilization—have demonstrated both preventive and therapeutic benefits.
Inspite of all the options available pharmacological therapies are limited by side effects and long-term results. Consequently, increasing attention has turned toward physiotherapy-based, non-pharmacological methods such as deep breathing exercises.

**Gaps in the Current Literature**

Although interest in non-pharmacological approaches has grown, several gaps remain in the literature. Much of the available research on deep breathing and PMS comes from small observational or pilot studies, making it difficult to draw strong conclusions. The lack of large, well-structured randomized controlled trials (RCTs) limits the generalizability of findings.

Moreover, uncertainty in breathing protocols including variations in duration, frequency, and techniques that makes it challenging to compare results across studies. Many outcome measures differ and often depend significantly on participants self-reported information about mood, anxiety, and pain which can lead to bias. These limitations highlight the need and more methodologically robust studies needed in this area.

**Deep Breathing Exercises: A Therapeutic Perspective**

Deep breathing exercises have been commonly known to reduce blood pressure, reduce muscular tension, relieve anxiety (Tavoian, D., & Craighead, D. H. 2023).

One proposed mechanism is the stimulation of endogenous opioids through deep breathing, which acts as a natural pain-relieving system to reduce dysmenorrhea. Additionally, the release of endorphins within the central nervous system contributes to relaxation and comfort.

By engaging the diaphragm, deep breathing facilitates muscle relaxation and activates the reticular formation, which plays a key role in pain modulation. This supports the concept that rhythmic and pleasant sensory input—such as controlled breathing—can trigger endorphin release and diminish pain sensations (Wahyuni, W., & Maghfiroh, F. K. 2022).

Supporting evidence comes from Smeltzer et al. (2008), who reported that deep breathing enhances blood oxygenation and ventilation, while Lin et al. (2014) observed reduced acute stress levels following guided breathing sessions. Together, these findings suggest that deep breathing not only reduces physiological arousal but also buffers against negative emotional states by lowering rumination and improving stress appraisal. In this way, individuals are encouraged to reconnect with both body and mind, fostering calmness and a more positive outlook toward discomfort.

**Impact on Pain and Somatic Symptoms**

Physical symptoms of PMS might include lower back pain, breast soreness, bloating in abdomen, exhaustion and menstrual cramps (Dysmenorrhea). Deep breathing techniques especially diaphragmatic or abdominal breathing have been shown to help reduce these discomforts through both neurological and physiological reasons.

**Back Pain and Menstrual Cramps**

Deep breathing techniques have been demonstrated to lessen PMS related musculoskeletal pain as well as length and severity of menstrual cramps. In a randomized controlled trial, Ibrahim et al. (2020) examined effects of breathing exercises on women with PMS both by themselves and in conjuction with walking. According to Daily Record of Severity of Problems (DRSP) scale, they found that the intervention groups stress levels, lower back pain, and abdominal discomfort significantly improved (Ibrahim, H. A., & Hassan, M. M. 2020).

**Fatigue and Energy Regulation**

During the premenstrual phase fatigue is another common issue , frequently associated with hormonal fluctuations and sleep disturbances. By stimulating parasympathetic activity, deep breathing promotes restorative sleep, conserves energy, and enhances metabolic efficiency, thereby contributing to autonomic nervous system (ANS) balance. Sheerin Banu et al. (2023) found that college women who practiced Pilates combined with deep breathing reported improved sleep quality and reduced fatigue (Banu, S., & Gaffar, A. 2023).

**Mechanisms of Pain Relief Through Diaphragmatic Breathing**

The pain-relieving effects of diaphragmatic breathing are supported by several interconnected mechanisms:

- **Parasympathetic Activation:** Slow, deliberate breathing stimulates the vagus nerve, which enhances parasympathetic tone and decreases both muscle tension and pain perception (Brown, R. P., & Gerbarg, P. L. 2005).
- **Reduced Cortisol and Inflammatory Response:** Deep breathing lowers cortisol levels, thereby modulating inflammatory pathways that contribute to PMS-related pain (Perciavalle, V., et al. 2017).
- **Endorphin Release:** Relaxation techniques and controlled breathing trigger the release of endogenous opioids, which provide natural analgesia (Jerath, R., Edry, J. W., Barnes, V. A., & Jerath, V. 2006).
- **Improved Oxygenation and Circulation:** Diaphragmatic breathing increases oxygen supply and improves blood flow, helping to reduce uterine ischemic pain and physical fatigue (Russo, M. A., Santarelli, D. M., & O'Rourke, D. 2017).

**Impact on Psychological Symptoms**

Along with physical discomfort, PMS is strongly associated with psychological disturbances such as mood swings, irritability, anxiety, depression, and emotional instability. These symptoms can significantly impair overall quality of life. Recent evidence indicates that deep breathing practices, particularly when integrated into yoga or mindfulness-based approaches, have a positive influence on emotional regulation and cognitive control.

**Depression, Mood Swings, Anxiety, and Irritability**

Deep breathing shows favourable effects in improving emotional stability by activating parasympathetic responses and lowering sympathetic excessing activity commonly seen in luteal phase (Ibrahim, H. A., & Hassan, M. M. 2020).

Likewise, there are few studies, Sharma et al. (2013) observed that regular breathing practices enhanced autonomic regulation and emotional balance as illustrated by reductions in electromyographic (EMG) activity and stress-related physiological markers (Sharma, B., Sharma, S., & Hegde, S. 2013). Balban et al. (2023) found that short, daily breathwork sessions were effective in lowering uneasiness, depression, and negative mood including among women experiencing premenstrual symptoms (Balban, M. Y., Dean, D. J., Joshi, S., et al. 2023).

**Emotional Control and Mindfulness**

Regulated breathing practices also foster mindfulness, encouraging awareness of the present moment and diminishing stress reactivity. Programs centered on mindfulness that include breath control have been associated with lower levels of rumination, enhanced emotional regulation, and greater cognitive flexibility (Brown, R. P., & Gerbarg, P. L. 2005, Chiesa, A., & Serretti, A. 2009).

Few studies in Neurophysiological supports these findings deep breathing has been shown to influence limbic system structures such as prefrontal cortex and amygdala both of which regulate emotional processing. By regulating these brain regions, deep breathing can help restore emotional balance and clarity during PMS episodes (Zaccaro, A., Piarulli, A., Laurino, M., et al. 2018).

**Discussion**

This narrative review highlights the potential of deep breathing techniques in managing both physical and psychological symptoms of premenstrual syndrome (PMS). Across the reviewed literature, diaphragmatic breathing consistently demonstrated beneficial effects on emotional disturbances such as irritability, anger, anxiety, and depression as well as somatic symptoms like menstrual cramps, fatigue, and back pain (Ibrahim, H. A., & Hassan, M. M. 2020, Sharma, B., Sharma, S., & Hegde, S. 2013 , Balban, M. Y., Dean, D. J., Joshi, S., et al. 2023). These enhancements are thought to be consequence of processes such as endorphin release, reduced cortisol, parasympathetic activation and improved oxygenation (Perciavalle, V., et al. 2017, Jerath, R., Edry, J. W., Barnes, V. A., & Jerath, V. 2006, Russo, M. A., Santarelli, D. M., & O'Rourke, D. 2017).

Yoga contributes to a holistic approach to PMS management. A meta-analysis by Chien et al. (2019) found that yoga significantly reduced menstrual pain and improved emotional regulation in women with PMS (Chien, L. W., Liu, C. F., & Chang, H. C. 2019). When practiced on its own deep breathing has shown distinct benefits especially in reducing autonomic arousal, improving heart rate variability and building emotional resilience (Russo, M. A., Santarelli, D. M., & O'Rourke, D. 2017, Balban, M. Y., Dean, D. J., Joshi, S., et al. 2023). Unlike meditation, which may require more time to induce effects, deep breathing can provide more immediate physiological relief during acute PMS distress (Brown, R. P., & Gerbarg, P. L. 2005).

A strength of current research is the use of validated outcome measures such as the Visual Analogue Scale (VAS), the Daily Record of Severity of Problems (DRSP), and standardized psychometric tools for mood and anxiety assessment (Ibrahim, H. A., & Hassan, M. M. 2020, Balban, M. Y., Dean, D. J., Joshi, S., et al. 2023). Nonetheless, limitations remain. Many studies suffer from small sample sizes, short intervention periods, and inconsistent protocols. Variations in breathing techniques, frequency, and duration make cross-study comparisons difficult. Additionally, in some studies, deep breathing was not examined as a stand-alone intervention but in combination with yoga or physical exercise, complicating interpretation of outcomes. The underlying neuroendocrine mechanisms also require further clarification.

Taken together, these limitations emphasize the need for standardized breathing protocols and larger, high-quality randomized controlled trials to firmly establish the role of deep breathing in PMS management.

From a therapeutic perspective, deep breathing is simple, inexpensive, and non-invasive, making it an appealing option for integration into holistic treatment approaches within primary care, gynecology, and mental health practice. It is particularly suitable for young women and adolescents who often seek safe, non-pharmacological methods of self-management. These findings support theoretical models that highlight the bidirectional relationship between stress and symptom intensity. By reducing autonomic reactivity and enhancing emotional regulation, deep breathing may act as a key modulator of body–mind interactions, consistent with psychophysiological models of somatic symptom control.

**Conclusion**

This review examined the role of deep breathing techniques in managing both the physical and psychological symptoms of premenstrual syndrome (PMS). The evidence consistently suggests that diaphragmatic breathing can significantly reduce menstrual discomfort, irritability, anxiety, and mood disturbances (Ibrahim, H. A., & Hassan, M. M. 2020, Sharma, B., Sharma, S., & Hegde, S. 2013 , Balban, M. Y., Dean, D. J., Joshi, S., et al. 2023). These benefits appear to be mediated through mechanisms such as improved autonomic regulation, parasympathetic activation, reduced cortisol levels, and enhanced emotional control (Perciavalle, V., et al. 2017, Jerath, R., Edry, J. W., Barnes, V. A., & Jerath, V. 2006, Russo, M. A., Santarelli, D. M., & O'Rourke, D. 2017).

While current findings are encouraging, further high-quality randomized controlled trials are necessary to develop standardized protocols, determine the ideal frequency and duration of practice, and evaluate long-term adherence and effectiveness.

At present, deep breathing can be recommended as a safe, accessible, and empowering adjunct to holistic PMS management

**Disclaimer Statements**

**Contributors**
The first author was primarily responsible for conducting the literature search and drafting the manuscript. The second author provided guidance, supervision, and overall support throughout the research and writing process.

**Funding**
The authors confirm that no financial support, grants, or external funding were received for this study.

**Conflict of Interest**
The authors declare that they have no conflicts of interest related to this article.

**Ethics Approval**
Since this work is a narrative review based solely on previously published literature, no ethical approval or informed consent was required. All referenced sources have been appropriately cited to ensure academic integrity and transparency.

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