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AN INTEGRATIVE REVIEW OF PREMENSTRUAL SYNDROME AND THE THERAPEUTIC ROLE OF YOGIC PRACTICES WITH SPECIAL REFERENCE TO MSRT

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ABSTRACT

Premenstrual Syndrome (PMS) is a common yet complex condition affecting up to 75% of menstruating women, presenting a spectrum of physical, emotional, and behavioural symptoms that cyclically emerge during the luteal phase and resolve with menstruation. A more severe variant, Premenstrual Dysphoric Disorder (PMDD), significantly impairs daily functioning in 3-8% of women. The underlying etiology of PMS remains multifactorial, involving hormonal fluctuations, neurotransmitter imbalances, genetic predisposition, and psychosocial stressors. Diagnosis is clinical, based on symptom patterns and exclusion of differential conditions. Conventional management includes lifestyle modifications, pharmacological agents such as SSRIs and hormonal contraceptives, and non-steroidal anti-inflammatory drugs. Emerging evidence supports the effectiveness of integrative therapies like yoga and Mind Sound Resonance Technique (MSRT), a meditative practice that modulates autonomic nervous function, reduces cortisol levels, and enhances emotional regulation. This review aims to provide a comprehensive overview of PMS, with a particular focus on its etiology, symptom profile, and evidence-based treatment options. Emphasis is placed on emerging integrative approaches, including MSRT and yogic practices, that offer promising, non-pharmacological avenues for symptom relief and holistic management.

Keywords: Premenstrual Syndrome, PMS, PMDD, Mind Sound Resonance Technique, MSRT, Yoga, Meditation, Women's Health, Hormonal Therapy, SSRIs, GABA Modulation, Integrative Medicine, Lifestyle Interventions, Stress Reduction

INTRODUCTION

Premenstrual Syndrome (PMS) is a recurrent and distressing condition affecting a substantial proportion of women of reproductive age. Characterized by a constellation of emotional, behavioural, and physical symptoms, PMS typically manifests during the luteal phase of the menstrual cycle and resolves shortly after the onset of menstruation. Epidemiological data suggest that up to 75% of menstruating women report experiencing at least one symptom of PMS, with approximately 5-8% meeting the criteria for its more severe form, Premenstrual Dysphoric Disorder (PMDD) **[1-3, 15]**.

The symptomatology of PMS is broad and heterogeneous, encompassing mood swings, irritability, anxiety, depression, fatigue, breast tenderness, bloating, and sleep disturbances. While the precise pathophysiological mechanisms underlying PMS remain incompletely understood, it is widely accepted that hormonal fluctuations-particularly in estrogen and progesterone-interact with central neurotransmitter systems, notably serotonin and gamma-aminobutyric acid (GABA), to precipitate symptom onset **[1]**.

The neurosteroid allopregnanolone, a metabolite of progesterone, has been shown to modulate GABA-A receptor activity, influencing emotional and behavioural responses during the luteal phase **[3]**.

Diagnosis of PMS is primarily clinical, based on the prospective recording of symptom patterns over at least two menstrual cycles. Differential diagnoses such as mood and anxiety disorders, thyroid dysfunction, and chronic fatigue syndrome must be considered and ruled out **[2]**.

Conventional management strategies for PMS include lifestyle modifications, dietary interventions, and pharmacological treatments such as selective serotonin reuptake inhibitors (SSRIs), non-steroidal anti-inflammatory drugs (NSAIDs), and hormonal contraceptives. However, an increasing body of research supports the inclusion of complementary and integrative therapies-such as yoga, mindfulness-based stress reduction, and the Mind Sound Resonance Technique (MSRT)-as effective adjuncts in reducing PMS symptom severity. MSRT, a yogic practice involving guided sound vibrations, is shown to activate the parasympathetic nervous system and lower cortisol levels, thereby alleviating both physiological and psychological symptoms of PMS.

Causes and Pathophysiology

The exact cause of PMS remains unclear, but several interrelated factors contribute:

- **Hormonal Fluctuations:** Cyclic changes in estrogen and progesterone during the menstrual cycle influence neurotransmitter systems and mood

regulation. Particularly, the progesterone metabolite allopregnanolone acts as a modulator of GABA-A receptors in the brain, affecting mood and anxiety.

- **Neurotransmitter Changes:** Serotonin deficiency or altered serotonergic function is linked to mood symptoms, explaining the efficacy of selective serotonin reuptake inhibitors (SSRIs) in treatment.
- **Genetic and Psychosocial Factors:** Family history, stress, diet, smoking, alcohol use, and socioeconomic status can influence symptom severity.
- **Immune and Inflammatory Components:** Elevated markers like hs-CRP suggest immune dysregulation may play a role.

Adaptations in GABA receptor sensitivity to fluctuating neuro-steroids and the resulting imbalance in inhibitory neurotransmission may underlie mood symptoms. Changes in progesterone levels rather than absolute levels appear critical in triggering symptoms.

Symptomatology of PMS

PMS symptoms vary widely but generally fall into two categories:

(A)Emotional and Behavioural Symptoms:

- Mood swings, irritability, and anger
- Anxiety and tension
- Depressed mood and crying spells
- Appetite changes and food cravings
- Trouble sleeping (insomnia)
- Social withdrawal and poor concentration
- Changes in libido

(B) Physical Symptoms:

- Breast tenderness
- Abdominal bloating and weight gain due to fluid retention
- Headache and joint or muscle pain
- Fatigue
- Acne flare-ups
- Gastrointestinal disturbances such as constipation or diarrhea
- Alcohol intolerance

For most women, symptoms are mild and do not interfere significantly with daily life. However, a smaller subset experiences severe symptoms classified as Premenstrual Dysphoric Disorder (PMDD), which includes intense mood disturbances such as severe depression, anxiety, and irritability **[1]**.

Diagnosis

There are no definitive laboratory tests for PMS. Diagnosis is clinical and based on the predictable recurrence of symptoms in the luteal phase, resolving with menstruation. Women are often asked to keep symptom diaries for at least two menstrual cycles to establish patterns. Differential diagnosis is important to exclude thyroid disorders, depression, anxiety, and chronic fatigue syndrome.

Table 1: Premenstrual Syndrome (PMS) - ICD-10 Classification [11-13]

Aspect	Details
ICD-10 Code	N94.3
ICD-10 Chapter	Chapter XIV: Diseases of the Genitourinary System
Block	N94 -Pain and other conditions associated with female genital organs
Diagnosis Title	Premenstrual tension syndrome
Description	A condition characterized by emotional, behavioral, and physical symptoms occurring in the luteal phase of the menstrual cycle.
Common Symptoms	Irritability, depression, anxiety, breast tenderness, bloating, headache, fatigue
Onset & Duration	Occurs typically 1-2 weeks before menstruation and resolves with onset or shortly after menstruation begins
Exclusion Criteria	Should not be confused with mood disorders, generalized anxiety disorder, or other psychiatric conditions
Related Disorders	- N94.4: Primary dysmenorrhea - N94.5: Secondary dysmenorrhea
Recommended Management	Lifestyle changes, cognitive behavioral therapy, hormonal therapy, SSRIs, yoga, and meditation

Table 2: Diagnostic Criteria for Premenstrual Dysphoric Disorder (PMDD) [14]

Category	Details
A. Timing of Symptoms	**At least 5 symptoms must occur in the last week before periods, improve within a few days after the period starts, and disappear in the week after.**
B. Core Symptoms ***(at least 1 required)***	**- Mood swings or tearfulness - Irritability or anger - Sadness or hopelessness - Anxiety or tension**
C. Additional Symptoms ***(to total 5 with B)***	**- Low interest in usual activities - Poor concentration - Fatigue or low energy - Change in appetite - Sleep problems (too much or too little) - Feeling overwhelmed or out of control - Physical symptoms (bloating, breast tenderness, joint/muscle pain)**
D. Severity	**Symptoms cause clinically significant distress or interfere with work, school, daily activities, or relationships.**
E. Rule Out Other Disorders	**Symptoms are not merely an exacerbation of other mental health conditions (e.g., major depression, anxiety, personality disorders).**
F. Symptom Confirmation	**Symptoms should be confirmed by daily tracking for at least two symptomatic cycles.**
G. Exclude Other Causes	**Symptoms are not due to substance use (e.g., drugs or medications) or other medical conditions like hyperthyroidism.**

Treatment

Treatment focuses on symptom relief and may include:

- **Lifestyle Modifications:** Regular exercise, stress management, balanced diet, and sleep hygiene.
- **Pharmacological Treatments:**
  - **SSRIs:** First-line for moderate to severe PMS/PMDD, effective in reducing mood symptoms with rapid onset of action. They

can be taken continuously or only during the luteal phase.

- **Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):** For pain and cramping relief.
- **Diuretics:** Such as spironolactone to reduce bloating and fluid retention.
- **Hormonal Contraceptives:** Combined oral contraceptives, especially those containing drospirenone, suppress ovulation and stabilize hormonal fluctuations, alleviating symptoms.

- **Other Interventions:** Cognitive-behavioral therapy, mindfulness meditation, and complementary therapies may support symptom management.

Prognosis and Impact

While PMS can significantly affect quality of life, symptoms usually resolve with menstruation. PMDD requires more intensive treatment due to its disabling nature. Understanding the bio-psychosocial nature of PMS allows for individualized and holistic care approaches.

This comprehensive overview integrates current understanding of PMS's multifactorial etiology, symptomatology, diagnosis, and treatment to guide effective management strategies.

Management of PMS

The management of PMS focuses on symptom relief and may include:

- **Lifestyle modifications**: Regular exercise, balanced diet, stress management, and adequate sleep.
- **Medications**: Nonsteroidal anti-inflammatory drugs (NSAIDs), hormonal contraceptives, and in some cases, antidepressants (especially for PMDD).
- **Nutritional supplements**: Calcium and vitamin D may help some women.
- **Psychological support**: Cognitive-behavioural therapy can be beneficial, especially for emotional symptoms.

PMS is a widespread and sometimes debilitating condition with a broad spectrum of symptoms. While the exact causes are not fully understood, hormonal and neurotransmitter changes, along with lifestyle and genetic factors, are implicated. Most women can manage symptoms with lifestyle changes and, if necessary, medical treatment. For those with severe symptoms, particularly PMDD, professional intervention is often required to restore quality of life.

Hormonal Interventions for Premenstrual Syndrome (PMS)

Combined Oral Contraceptives (COCs)

Drospirenone + Ethinylestradiol

Monophasic COCs containing **3 mg drospirenone and 20 mcg ethinylestradiol** are FDA-approved for PMDD and effective for PMS by suppressing ovulation and stabilizing hormone fluctuations. They reduce physical symptoms (e.g., bloating) and mood disturbances through anti-androgenic effects. **Levonorgestrel-based COCs** are alternatives for uncontrolled bleeding or pain.

Mechanism: Stabilizes hormonal fluctuations, preventing maladaptation of GABA-A receptors to progesterone metabolites like allopregnanolone.

Progesterone and Progestin's

Progesterone supplementation (unapproved for PMS) is sometimes used to address perceived low progesterone, but evidence of efficacy is lacking. **Progestin-only contraceptives** are not recommended, as they may worsen mood symptoms.

Ulipristal acetate (progesterone receptor blocker) improves psychiatric symptoms in PMDD by blocking progesterone's genomic interactions in the brain.

Gonadotropin-Releasing Hormone (GnRH) Agonists

Leuprolide acetate suppresses ovulation, eliminating hormonal fluctuations, but induces menopausal symptoms (e.g., bone loss). **Add-back estrogen** (e.g., transdermal estradiol) mitigates side effects but may worsen mood if combined with progestins.

Selective Progesterone Receptor Modulators and Enzyme Inhibitors

Dutasteride (5-alpha-reductase inhibitor) reduces allopregnanolone production, alleviating symptoms in some studies. **Limited data** exist on long-term safety and efficacy.

Estrogen Therapy

Transdermal estradiol (gel/patches) improves physical and psychological symptoms but requires progesterone co-administration to prevent endometrial hyperplasia, which risks mood destabilization.

Key Considerations

- **SSRIs vs. Hormonal Therapy**: SSRIs remain first-line for severe mood symptoms due to rapid efficacy (days vs. weeks). Hormonal therapies prioritize physical symptom control.
- **Side Effects**: COCs may cause breast tenderness or headaches, while GnRH agonists require bone-density monitoring.

Emerging Insights

- **Neurosteroid Modulation**: PMS symptoms correlate with allopregnanolone's impact on GABA receptors, explaining why hormonal stabilization (via COCs) or allopregnanolone inhibition (via dutasteride) helps.

- **Progesterone Sensitivity**: Individual variation in progesterone receptor response influences treatment outcomes, necessitating personalized approaches.

Thus, COCs with drospirenone are most effective for hormonal management, while GnRH agonists and progesterone blockers are reserved for refractory cases. SSRIs remain superior for mood-related symptoms, highlighting the need for combined approaches in severe PMS/PMDD.

Lifestyle Changes to Help Reduce PMS Symptoms

Adopting certain lifestyle habits can significantly reduce the severity and frequency of premenstrual syndrome (PMS) symptoms. Here are evidence-based strategies:

1. Diet Modifications

- Eat smaller, more frequent meals to reduce bloating and fullness **[16]**.
- Focus on a balanced diet rich in complex carbohydrates (whole grains, fruits, vegetables), lean proteins, and healthy fats.
- Increase intake of calcium-rich foods (low-fat dairy, leafy greens) and consider vitamin D, B6, and magnesium if recommended by a healthcare provider.
- Limit salt, sugar, caffeine, and alcohol to help control bloating, mood swings, and fluid retention.
- Avoid highly processed foods and saturated fats.

2. Regular Physical Activity

- Engage in at least 30 minutes of aerobic exercise (walking, swimming, cycling, yoga) most days of the week.
- Exercise helps relieve fatigue, depression, anxiety, and other PMS symptoms by boosting mood and energy levels.

3. Stress Management

- Practice relaxation techniques such as yoga, meditation, deep-breathing exercises, or progressive muscle relaxation.
- Massage and enjoyable activities can also help manage stress and improve emotional well-being.

4. Sleep Hygiene

- Aim for at least 7-8 hours of sleep per night, especially in the days leading up to your period.
- Establish a consistent bedtime routine to improve sleep quality and cope better with PMS symptoms.

5. Symptom Tracking

- Keep a diary of your symptoms to identify patterns and triggers.

- Recording symptoms can help you and your healthcare provider tailor management strategies.

6. Hydration

- Drink plenty of water and avoid sugary or caffeinated beverages, which may worsen bloating and irritability.

7. Supplements (with Medical Guidance)

- Calcium, magnesium, vitamin B6, and vitamin E supplements may help some women, but always consult a healthcare provider before starting any new supplement.

8. Social Support

- Don't hesitate to seek support from friends, family, or professionals if PMS symptoms are affecting your daily life.

Table 3: Lifestyle Strategies for PMS Relief

Lifestyle Change	Key Actions
Diet	Frequent small meals, more whole grains, fruits, veggies, less salt/caffeine
Exercise	30+ min aerobic activity most days
Stress Management	Yoga, meditation, relaxation techniques
Sleep	7-8 hours nightly, regular routine
Symptom Tracking	Keep a diary/calendar
Hydration	Drink water, avoid sugary/caffeinated drinks
Supplements	Calcium, magnesium, B6, E (consult provider)
Social Support	Seek help from friends, family, professionals

Implementing these lifestyle changes can help many women manage PMS symptoms effectively and improve overall well-being.

Meditative techniques in PMS management

Meditation demonstrates significant potential in alleviating premenstrual syndrome (PMS) symptoms across multiple studies. Key techniques include:

1. Shavasana meditation

A 4-week practice reduced physical and psychological symptoms in female medical students, with measurable physiological improvements:

- **Stress markers**: Significant decreases in systolic blood pressure ($p=0.0002$), diastolic blood pressure ($p=0.0001$), heart rate ($p<0.0001$), and serum cortisol levels.
- **Symptom severity**: Reduced irritability, mood swings, breast tenderness, and fatigue.

2. Mindfulness-Based Stress Reduction (MBSR)

An 8-week program with 2.5-hour weekly sessions and a retreat showed:

- **Large effect size**: PMSS total scores decreased significantly (96.35 vs 123.02 in controls, $p<0.001$) with partial $\eta^2=0.510$ **[4]**
- **Comprehensive benefits**: All symptom clusters improved, including physical discomfort and emotional disturbances **[4]**

3. Specialized meditation techniques

- **Cyclic meditation**: Immediate cognitive improvements in attention and information processing after sessions **[4]**
- **Music-based chakra meditation**: Significant reduction across all symptom clusters compared to controls **[7]**

Mechanisms

Meditation appears effective through stress reduction pathways, as evidenced by cortisol level decreases, and by enhancing emotional regulation capacities. Studies recommend 4-8 weeks of regular practice for optimal results **[4]**. While most research focuses on young adults, particularly students, the consistency of results across different meditation modalities suggests broad applicability for PMS management **[4, 7]**.

Current Evidences in PMS relief

Mindfulness-Based Interventions

Mindfulness meditation practices, including mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive-behavioural therapy (MBCT), demonstrate efficacy in reducing premenstrual symptom severity. Studies reveal that mindfulness moderates the relationship between negative menstrual attitudes (e.g., symptom anticipation) and symptom reports, with higher mindfulness scores correlating with lower premenstrual pain, water retention, and negative affect. A randomized trial showed MBSR significantly reduced symptom severity compared to controls, emphasizing non-judgmental awareness of physical and emotional states.

Cognitive-Behavioural Integration

MBCT specifically targets symptom-related distress through cognitive restructuring and mindfulness techniques. An 8-week MBCT program reduced PMS symptoms in students, with sustained improvements one month post-intervention. This approach addresses emotional regulation and stress reactivity, key factors exacerbating premenstrual symptoms.

Mechanisms of Action

Mindfulness may alleviate symptoms by:

- **Reducing anticipatory stress**: Mitigating negative attitudes toward menstruation through present-moment awareness.
- **Enhancing emotional regulation**: Decreasing reactivity to physical discomfort and mood fluctuations.
- **Improving self-awareness**: Helping individuals articulate sensations, thereby reducing perceived severity (e.g., water retention) **[5]**.

Comparative Effectiveness

While yoga and relaxation therapy show benefits mindfulness uniquely addresses cognitive and emotional components of PMS. Unlike pharmacological treatments (e.g., SSRIs), mindfulness-based practices

avoid side effects and are suitable for women seeking non-hormonal interventions.

Gaps and Future Directions

Mixed findings exist regarding mindfulness's impact on specific subscales (e.g., behavioral symptoms), highlighting the need for standardized protocols and larger trials. Research should explore neurobiological changes, such as stress-response modulation, to clarify therapeutic mechanisms **[5]**.

Mindfulness meditation, particularly MBSR and MBCT, offers a promising adjunct or alternative for managing PMS, emphasizing psychological resilience and symptom acceptance. Further studies are needed to optimize intervention designs and validate long-term outcomes.

Mind Sound Resonance Technique (MSRT)

Mind Sound Resonance Technique (MSRT) is a yoga-based meditation practice that uses mantra chanting to generate sound vibrations or resonance within the body. This technique primarily influences the *Manomaya Kosha* (the mental sheath in yogic philosophy), promoting deep relaxation of both mind and body through mindful sound resonance **[6, 10]**.

Mechanism relevant to PMS

PMS involves mood disturbances, anxiety, stress, and physical discomfort linked to hormonal fluctuations. MSRT induces parasympathetic dominance by balancing the autonomic nervous system, reducing stress and anxiety levels, and improving mood and sleep quality **[9]**. These effects are crucial since stress and anxiety exacerbate PMS symptoms.

- MSRT enhances relaxation by activating brain areas involved in autonomic control (e.g., anterior cingulate cortex and insula), leading to increased heart rate variability (HRV), a marker of parasympathetic activity.
- The reduction in perceived stress and mood disturbances through MSRT can mitigate PMS-related emotional symptoms like irritability, anxiety, and depression.

Evidence of Effectiveness

While direct studies on MSRT specifically for PMS are limited, research on MSRT's impact on anxiety, mood, and stress provides a strong rationale for its potential benefit in PMS management:

- A study involving participants practicing MSRT thrice weekly for one month showed significant improvements in mood, anxiety, and sleep quality, factors closely linked to PMS severity **[6]**.
- MSRT demonstrated a significant reduction in state anxiety (up to 45.78% reduction) immediately after practice in patients with generalized

anxiety disorder, suggesting it can rapidly alleviate anxiety symptoms often seen in PMS **[8]**.

- MSRT improves cognitive functions and psychophysiological responses, which may help women better cope with PMS-related cognitive and emotional challenges **[9]**.

Practical Application for PMS

- Typical MSRT sessions last about 20 minutes, practiced in a supine position using guided audio mantras.
- Regular practice (e.g., three times per week for at least one month) is recommended to achieve sustained benefits.
- MSRT can be integrated with lifestyle advice (diet, exercise) and other yoga practices to enhance overall PMS symptom management.

MSRT is a promising meditation technique that can reduce anxiety, mood disturbances, and stress-key contributors to PMS symptoms-by inducing deep relaxation and parasympathetic activation. Although direct clinical trials on PMS are scarce, evidence from related studies supports its potential as a complementary non-pharmacological intervention for PMS.

CONCLUSION

Premenstrual Syndrome (PMS) is a multifactorial, cyclic disorder affecting a significant portion of menstruating women, often impairing physical, emotional, and social well-being. While its exact etiology remains complex, hormonal fluctuations, neurotransmitter dysregulation—particularly involving serotonin and GABA-genetic predisposition, and psychosocial stressors play central roles in symptom manifestation. Conventional treatment approaches including SSRIs, NSAIDs, diuretics, and hormonal contraceptives offer effective symptom relief for many women, particularly those with moderate to severe presentations.

However, the limitations and potential side effects of pharmacological therapies underscore the growing need for integrative, non-pharmacological approaches. Lifestyle interventions-such as diet regulation, regular physical activity, and stress management-are foundational in reducing symptom severity. Complementary therapies, particularly yoga and Mind Sound Resonance Technique (MSRT), offer promising benefits in promoting neuroendocrine balance, reducing anxiety and cortisol levels, and enhancing overall resilience to cyclic hormonal changes.

Emerging evidence supports the adoption of holistic models that combine conventional treatments with evidence-based mind-body interventions. MSRT, with its ability to induce parasympathetic dominance and improve emotional regulation, exemplifies the therapeutic potential of yogic practices in PMS management. Future research

should focus on large-scale clinical trials to further validate these complementary modalities and develop standardized protocols for their integration into clinical practice. A personalized, biopsychosocial approach-attuned to each woman's unique physiological and psychological profile-remains central to the effective management of PMS and the promotion of long-term well-being.

Conflict of Interest: None

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