

# WOMEN'S HEALTH

## EXERCISE AS A THERAPEUTIC MODALITY FOR THE TREATMENT OF WOMEN WITH PREMENSTRUAL SYNDROME

– Written by Khalid W. Al-Bibi, Qatar

Millions of women are affected by premenstrual syndrome (PMS) during part or all of their reproductive years. PMS is the name given to the group of cyclic affective, somatic and behavioural symptoms that reoccur during the 10 days prior to menstruation (luteal phase), with symptoms disappearing with the onset of menstruation or soon thereafter<sup>1</sup>. PMS symptoms can significantly interfere with the physiological, psychological and social function of afflicted women. The severe and predominantly psychological form of PMS is termed 'premenstrual dysphoric disorder' (PMDD). The key diagnostic feature for PMS is that the symptoms must be absent between the end of menstruation and ovulation<sup>2</sup>.

Although there are approximately 200 symptoms that have been associated with PMS, there are no symptoms that are unique to and diagnostic of PMS. Diagnosis of PMS depends on the temporal relationship between the symptoms and the days of menstruation. Diagnosing PMS is further complicated by the fact that some affective, behavioural and physical symptoms are not specific to PMS. For example, 40 to 60% of women who present for treatment for what they think is PMS were found to have generalised psychiatric or affective disorders<sup>3,4</sup>. Therefore, it is important to distinguish PMS from concomitant medical or psychiatric disorders. A means for detecting chronic psychiatric disorders is the absence of at least one asymptomatic

week in the mid-follicular phase of every menstrual cycle<sup>5</sup>. Given that retrospective recall is poor, the symptoms must be ascertained by prospective monitoring. Smith and Schiff<sup>5</sup> and Mortola<sup>6</sup> recommend that a preliminary diagnosis of PMS may be made from the prospective daily ratings of one menstrual cycle, but that a monitoring period of two menstrual cycles be used to confirm the diagnosis.

Globally, PMS has been reported to affect as many as 24 to 87% of all females for varying durations at some point in their reproductive years<sup>7-12</sup>. The large range in the reported prevalence is due to a number of methodological issues in the research. As such, interpretation of the published literature must be made in consideration

**TABLE 1**

<i>A change in libido</i>	<i>Forgetfulness</i>	<i>Conjunctivitis</i>
<i>Abdominal bloating</i>	<i>Heart palpitations</i>	<i>Faintness</i>
<i>Aggression</i>	<i>Abdominal cramps</i>	<i>Irritability</i>
<i>Asthma</i>	<i>Increased appetite</i>	<i>Hypoglycemia</i>
<i>Confusion</i>	<i>Insomnia</i>	<i>Nausea</i>
<i>Crying</i>	<i>Acne</i>	<i>Loneliness</i>
<i>Distractibility</i>	<i>Breast tenderness</i>	<i>Low self-image</i>
<i>Dizziness</i>	<i>Nervous tension</i>	<i>Fatigue</i>
<i>Food cravings</i>	<i>Epilepsy</i>	<i>Numbness</i>
<i>GI Symptoms</i>	<i>Glaucoma</i>	<i>Oily skin</i>
<i>Hot flashes</i>	<i>Skin disorders</i>	<i>Weight gain</i>
<i>Mood swings</i>	<i>Restlessness</i>	<i>Headaches</i>
<i>Peripheral Oedema</i>	<i>Social avoidance</i>	<i>Tension</i>
<i>Reduced concentration</i>		

**Table 1:** Forty most common PMS symptoms. Modified from Bibi (1995)<sup>7</sup>. GI=gastrointestinal.

of the following potential but serious limitations:

- Before 1989, there were no uniformly accepted diagnostic criteria or a standard working definition of the disorder, often leading to poor communication between researchers and clinicians<sup>13</sup>.
- Samples in the published literature often included non-PMS research participants such as peri-menopausal women, pre-adolescent girls and other participants suffering from non-PMS psychiatric disorders.
- In the literature, there has been a working assumption that the disorder constituted one syndrome rather than multiple groupings of different ones<sup>14</sup>.
- The literature has often lacked research controls for socialising agents such as cultural and religious bias.
- Invalid and unreliable tools used to assess PMS symptoms have been present in the research.

- The literature has used weak research designs and/or improper statistical analyses.
- The literature has used retrospective evaluation methods.
- The literature suffers from missing physical and/or anthropometric data.

The American College of Obstetrics and Gynecology states that 20 to 40% of all women experience PMS symptoms that are sufficiently severe to affect their lifestyle or work and that 3 to 8% meet the strict criteria for PMDD<sup>8,15</sup>. Even at their most conservative, PMS estimates highlight a health issue that warrants serious attention.

#### PREVALENCE OF PMS IN THE MENA REGION

Data on the prevalence of PMS in the Middle East and North Africa (MENA) was late in appearing in the literature. In 1990, Al-Gasseer<sup>16</sup> measured the prevalence of PMS in 172 Bahraini women (aged 17 to 45 years) at 30%. A 1992 study on 342 Egyptian women revealed PMS frequency ranged

from 36% for breast pain/tenderness to 66% for stomach and back cramps<sup>17</sup>. A study conducted on 488 college students at King Faisal University in Dammam, Saudi Arabia, rated the prevalence of 'high-severity' PMS at 37.5%<sup>18</sup>. A study published 3 years later in 2006 by Rizk et al<sup>19</sup>, rated the prevalence of PMS in 12 to 18-year-old Emirati girls at 16.4%. A 2012 study conducted in Iran on 602 females aged 14 to 19 years estimated the prevalence of PMS at 37.2%<sup>20</sup>.

#### SYMPTOMS AND TEMPORAL PATTERNS

Since 1931, over 200 symptoms have been attributed to PMS<sup>2</sup>. Table 1 lists 40 of the most commonly reported symptoms. Reid and Yen<sup>21</sup> state that the appearance of PMS symptoms in women with a pure PMS symptomatology seem to differ with respect to the manifestation of the symptom(s) to menses. Four patterns of PMS-symptom timing have been observed:

1. In the first pattern, symptoms gradually increase in severity throughout the luteal phase and end with the onset of menses.
2. In the second pattern, symptoms gradually increase throughout the luteal phase but persist into the first few days of the next cycle.
3. Women who demonstrate the third pattern experience severe symptoms that are limited only to a few days in the late-luteal phase.
4. Women who demonstrate the fourth pattern experience two periods of severe symptoms, the first around the time of ovulation and the second immediately prior to menses.

#### PMS-SYMPTOM SUBGROUPS

Early research by Moos et al<sup>22</sup> conducted on 579 women in 1969 enabled the categorisation of 47 common PMS symptoms into more clinically manageable subgroups. Eight PMS subgroups were derived in this early study:

1. pain
2. concentration
3. behavioural change

- 4. autonomic reactions
- 5. water retention
- 6. negative affect
- 7. arousal
- 8. motor-control.

Most PMS questionnaires in use today include stems from each of the above subgroups<sup>12,23</sup>. Later research by Bibi (conducted in 1995) derived four primary subgroups<sup>14</sup>. Upon factor analysis of 21 PMS symptoms, measured prospectively over four menstrual cycles, results revealed the clustering of the symptoms into four main PMS subgroups: H, D, A and F (Table 2). Other similar subgroupings have been offered in the literature.

PMS THERAPIES: FROM PLACEBO TO BIZARRE

Dr RT Frank<sup>24</sup> first described PMS in 1931 as a unique disorder requiring therapeutic attention. He described the disorder as “a feeling of indescribable tension from 10 to 7 days preceding menstruation which, in most instances, continues until the time that the menstrual flow occurs. Their personal suffering is intense and manifests itself in many reckless and sometimes reprehensible actions.” Dr Frank’s early description highlights both the severity of the symptoms as well as the desperation of the afflicted women in their attempt to seek a cure or at least relief from the symptoms. To date, the tried methods

include hormone therapy, yoga, vitamin and mineral supplementation, psychological counselling, hypnosis, meditation, self-hypnosis, biofeedback, guided-imagery treatment, phototherapy (exposure to sunlight) and surgery. Unfortunately, these treatments have shown limited success in reducing PMS symptomatology. Evidence on the efficacy of hormonal treatment aimed at the suppression of ovulation or at reducing progesterone sensitivity has been mixed or fraught with undesirable consequences such as masculinising or menopausal side-effects<sup>25,26</sup>. Pharmaceutical therapy such as anti-depressants should not be avoided when indicated. However, when drug side-effects tip the risk-to-benefit ratio against the patient, alternative methods (in lieu of or in conjunction with medication) must be sought.

EXERCISE AND MENTAL HEALTH

The increasing interest in exercise research over the past 4 decades has enforced the belief that physical fitness has psychological as well as physiological benefits. Due to the multitude of people who have reported that they ‘feel better’ when they exercise, psychologists and psychiatrists in the late 1970s began using aerobic exercise as a means of alleviating a host of anxiety- and depression-related disorders that were not responding well to medications. As anecdotal reports of the

benefits of exercise peaked in the 1980s, many mental-health practitioners became interested in prescribing exercise for their patients as standard practice.

Several hypotheses that attempt to explain the positive relationship between exercise and improved mental health have been offered. One hypothesis, which discounts any physiological connection, is termed the ‘distraction theory’. This theory states that the distraction from stressful stimuli associated with exercise is responsible for the improved affect rather than the physical conditioning. A second hypothesis is termed the ‘monoamine hypothesis’. This hypothesis states that neurotransmitters such as noradrenaline, serotonin and γ-Aminobutyric acid are associated with depression<sup>27</sup>. A third hypothesis is termed the ‘endorphin hypothesis’. This popular hypothesis states that exercise can increase the brain’s production of endorphins leading to a narcotic feeling and/or a state of euphoria.

Anxiety and depression reduction following acute<sup>28,29</sup> and chronic<sup>30-35</sup> exercise has been well documented and acute physical activity has been found to cause a reduction in anxiety for a period that may last up to 5 hours following a bout of exercise<sup>34,36</sup>. In 1984, the National Institute of Mental Health conducted a workshop on exercise and mental health<sup>32</sup>. The workshop yielded the following consensus statements:

TABLE 2: PREMENSTRUAL SYNDROME SYMPTOMS SUBGROUPS

(H)YDRATION	(D)YSPHORIC MOOD	(A)NXIETY	(F)UNCTIONAL IMPAIREMENT
Feel bloated, have oedema	Depressed, sad, blue	Headaches	Less or impaired work
Increased appetite, eat more, crave foods	Hostile, aggressive, quarrelsome, loss of control	Anxious	Low energy, tired, weak
Breast Pain	Mood swings	Jittery	Stay at home
Abdominal pain or cramps	Difficulty in concentration, unclear thinking, forgetfulness	Nervous	Avoid social activity
Back, joint or muscle pain	Irritable, impatient	Restless	More sleep, naps, stay in bed

Table 2: PMS Symptoms Subgroups. Modified from Bibi<sup>18</sup>.

**FIGURE 1**

<i>Instrument</i>	<i>Number of symptoms</i>	<i>PMS diagnosis</i>	<i>PMDD diagnosis</i>
<i>Premenstrual symptom diary (PMSD)</i>	17	Yes	No
<i>Calendar of premenstrual experiences (COPE)</i>	22	Yes	No
<i>Visual analogue scales (VAS)</i>	open	Yes	No
<i>Daily ratings form (DRF)</i>	20	Yes	No
<i>Daily record of severity of problems (DRSP)</i>	24	Yes	Yes
<i>Penn daily symptom rating (DSR)</i>	17	Yes	Yes
<i>Menstrual distress questionnaire (MDQ)</i>	48	Yes	Yes

**Figure 1:** Modified from: Freeman E. Premenstrual syndrome and premenstrual dysphoric disorder: definitions and diagnosis. *Psychoendocrinology* 2003; 28:25-37.

- Physical fitness is positively associated with mental health and well-being.
- Exercise is associated with the reduction of stress emotions such as state anxiety.
- Anxiety and depression are common symptoms of failure to cope with mental stress and exercise has been associated with a decreased level of mild-to-moderate depression and anxiety.
- Long-term exercise is usually associated with reductions in traits such as neuroticism and anxiety.
- Severe depression usually requires professional treatment, which may include medication, electroconvulsive therapy and/or psychotherapy, with exercise as an adjunct.
- Appropriate exercise results in reductions in various stress indices such as neuromuscular tension, resting heart rate and some stress hormones.
- Current clinical opinion holds that exercise has beneficial emotional effects across all ages and in both genders.
- Physically healthy people who require psychotropic medication may safely exercise when exercise and medications are titrated under close medical supervision.

#### EXERCISE AS MEDICINE FOR PMS AND PMDD

The concept that the menstrual cycle is altered by exercise was initially suggested by in 1939 by Selye<sup>37</sup> and later supported by many researchers<sup>14,38-47</sup>. Exercise has been proposed as a significant potential therapeutic modality for PMS and PMDD because evidence suggests that exercise can reduce stress, improve depressive symptoms in chronically depressed individuals, as well as elevate mood states in normal subjects via central effects on endogenous opiates<sup>28,32-35,48-52</sup>. A recent study conducted on 16 to 20-year-old Egyptian girls arrived at the same conclusion, demonstrating positive diminution of PMS symptoms on all subscale symptoms as well as many blood markers, including a decrease in prolactin, estradiol and progesterone levels<sup>53</sup>. A similar study conducted in Iran on 40 female college students yielded the same results<sup>40</sup>.

#### CONCLUSION

PMS is a complex, multifactorial, cyclical outcome that is affected by physiological factors, as well as many others including social, cultural, surgical and genetic. This disorder afflicts many women during part or all of their reproductive years and can

be severely debilitating. Unfortunately, reliable treatment has been as elusive as the syndrome is complex. The prevalence of PMS in the MENA region has been shown to be similar to its prevalence in the Western world and therefore, this issue is worthy of serious consideration by primary-care and obstetric and gynaecologic physicians, as well as other healthcare practitioners in this region. All evidence suggests that exercise is effective in the reduction or elimination of some PMS symptoms, particularly the physical and psychological symptoms. Patients with unresolved conditions should consider seeking advice from reproductive endocrinologists and PMS experts.

#### References

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Khalid W. Al-Bibi M.D., Ph.D.

Associate Dean for Academic Programmes  
Georgetown University – Qatar  
Doha, Qatar

Contact: [kwb29@georgetown.edu](mailto:kwb29@georgetown.edu)