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Dietary Modifications Can Help Alleviate Symptoms of PMS

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Mention the word PMS and there are bound to be many negative reactions, but few people really understand what PMS is. Premenstrual syndrome (PMS) is a recurring cyclical disorder that encompasses a variety of emotional and physical symptoms that appear in the luteal phase of the menstrual cycle. Overall, approximately 75% of the women with regular cycles complain of some premenstrual symptoms (Barnhart). Fortunately, the majority of these women have relatively mild and transient symptoms that do not require medical or psychiatric interventions. PMS in its most severe form is known as premenstrual dysphoric disorder (PMDD). PMDD affects 3-8% of women (Steiner).

The symptoms associated with PMS fall into two general categories, emotional and physical. Emotional symptoms include emotional hypersensitivity, depression, irritability, mood swings, anxiety, tension, fear of loss of control, and confusion. Somatic complaints include feelings of bloating, body aches, breast tenderness, headaches, food cravings, and poor coordination (Barnhart). Women with PMS may experience any number of these symptoms and to varying degrees.

The etiology of PMS and PMDD is still largely unknown. Attempts have been made to explain the phenomena in terms of biology, psychology, or psychosocial factors, but most of these explanations have failed to be confirmed by laboratory and treatment-based studies. Theories about what causes PMS include progesterone deficiency, metabolic abnormalities, estrogen excess, hyperprolactinemia, increased activity of aldosterone or renin-angiotensin, vitamin B6-deficiency, and serotonin deficiency. Current research, however, suggests that PMS is probably multifactorial with involvement of neurohormones and neurotransmitters. Increasing evidence suggests that the neurotransmitter serotonin may be important in the pathogenesis of PMDD and PMS (DeMonico et al). According to Steiner, in the week preceding menstruation, there is a reduced platelet uptake of serotonin and a lowered level of platelet serotonin content. Low serotonin has previously been linked to negative affect and depression. Although the underlying cause remains unclear, significant progress has been made in treatment of symptoms.

Both pharmacologic and nonpharmacologic therapies are used to treat premenstrual symptoms. The treatment approach is determined by results of a thorough interview and use of prospective daily diaries. No laboratory measures are useful in the diagnosis of PMS. If presenting symptoms are mild, infrequent, or of short duration, use of nonpharmacologic approaches such as dietary modification, exercise, support, and stress reduction are suggested. If symptoms are more severe, frequent, or longer-lasting, drug therapy such as nonsteroidal anti-inflammatory drugs, hormonal agents, diuretics, and psychotropics are available (DeMonico et al). Results from several randomized, placebo-controlled trials have clearly demonstrated that selective serotonin reuptake inhibitors, as well as medical or surgical oophorectomy, are effective in severe cases (Steiner). Currently, selective serotonin reuptake inhibitors are the first-line therapy for treating women with severe PMS because of its effectiveness and minimal side effects.

In women who have mild PMS or for those wanting to avoid drug treatment, self-care measures such as nutrition and exercise can be helpful in preventing and/or alleviating the number and severity of symptoms. Although there is still some disagreement in the literature concerning the efficacy of various nonpharmacologic treatments for PMS, this paper examines the dietary modifications that have recently been studied, some of which may offer women relief from certain premenstrual symptoms.

## Carbohydrates

Changes in carbohydrate and protein intake observed during the perimenstruum are consistent with the growing body of literature linking dietary intake with moods and behavior mediated by brain neurotransmitters. Lower carbohydrate intake is associated with decreased levels of tryptophan and serotonin (Johnson et al). Carbohydrate consumption without protein has been shown to increase serotonin synthesis and release by increasing the brain's uptake of serotonin's precursor, tryptophan. Low serotonin levels in the brain have been associated with some types of depression. An avoidance of protein-rich foods is also advised since protein consumption would inhibit brain uptake of tryptophan and prevent serotonin synthesis and release (Wurtman et al).

In 1989, a now well-known study examining the relationship between carbohydrate intake and PMS observed that subjects who were given a high carbohydrate meal during the late luteal (premenstrual) phase of their cycle reported less depression, anger, tension, fatigue, confusion, and sleepiness (Wurtman et al).

A more recent study conducted by Sayegh and colleagues in 1995 found that experimental carbohydrate intervention during the late luteal phase significantly decreased self-reported depression, anger, confusion, and carbohydrate craving 90-180 minutes after intake. The results show that consumption of a carbohydrate beverage designed to increase the serum tryptophan to large neutral amino acid ratio relieves premenstrual mood and appetite disturbances and improves certain aspects of memory. These studies suggest that increase in carbohydrate intake during the premenstrual phase will help improve mood.

## Sodium

Women often have cyclical physical symptoms of bloating, swelling, and breast tenderness. During the luteal phase of the menstrual cycle and pregnancy, osmoregulation changes significantly and sodium-retaining hormone secretion and salt preference increase. It is popularly believed that water and sodium retention may cause these physical symptoms during the premenstrual phase.

A recent study by Olson, however, challenges this notion. Olson and his colleagues examined the relationship between menstrual cycle symptoms and sodium balance in normal women. The study involved changing sodium balance by decreasing intake of sodium by 30% for 2 months. This modest change in sodium balance did not decrease the severity or the cycle-dependent expression of somatic symptoms. Breast tenderness and bloating did not result from sodium retention in the luteal phases of the menstrual cycle. During normal and sodium-restricted diet cycles, women actually had urinary sodium loss, not retention, during the luteal phase. The severity of menstrual symptoms was unchanged (Olson et al). However, due to the limitations of the study—small sample size, lack of blood and urine data during symptom peak, and low level of sodium restriction—the authors could not unequivocally state that the menstrual symptoms studied are unrelated to sodium balance. In addition, this was not a double-blinded study. Overall, modest salt restriction has not been shown to be an effective treatment of PMS.

## Caffeine

Caffeine has been associated with both the prevalence and the severity of PMS symptoms. Caffeine can increase anxiety, tension, depression, and irritability. Although the role of caffeine

in PMS is still not clear, it appears that women with high PMS symptoms drink more caffeine-containing beverages than women who do not, but a cause-and-effect relationship has not been established. In addition, no clinical trials of caffeine reduction have been done. Nonetheless, many women report an improvement in symptoms after reducing caffeine (Johnson).

Although caffeine intake is not the cause of PMS and its associated symptoms, women with PMS may choose to avoid or decrease caffeine consumption. Care must be taken when stopping consumption of caffeine because an abrupt cessation of caffeine can be associated with withdrawal symptoms of irritability, nervousness, lethargy and headache (Barnhart).

### Vitamin B6

Vitamin B6 deficiency has been suggested as a cause in PMS by altering liver metabolism of estrogen, lowering dopamine or serotonin levels, and lowering production of essential fatty acids. Vitamin B6 supplementation in the treatment of PMS has been advocated since the 1940s. Although there have been several open label studies that suggest that vitamin B6 reduces depression, irritability, bloating, and overall symptom scores, numerous other studies have shown mixed or no effects of B6 on premenstrual symptoms (Penland and Johnson). These well-conducted and controlled double-blind trials failed to support consistently the use of vitamin B6 in the treatment of PMS. In addition, there is no good evidence supporting the causative factors involving vitamin B6 in PMS or supporting that women with PMS are vitamin B6 deficient (Barnhart).

Despite weak evidence of its benefit, vitamin B6 continues to be widely used by women in an attempt to alleviate PMS symptoms. Regardless, women who take B6 supplements should be aware that daily chronic use of as little as 200 mg carries a risk of peripheral neurotoxicity. Because of this danger, it is not recommended that women take more than 100 mg (Johnson).

### Calcium and manganese

A recent study demonstrated that increasing calcium intake improved mood and concentration, reduced pain during the menstrual phase of the cycle, and reduced water retention during the premenstrual phase. The researchers also noted that in spite of increasing calcium intake, low dietary manganese was associated with increased symptomology (mood and pain) similar to that reported with the low calcium intake (Penland and Johnson). This supports an earlier double-blind, crossover study by Thys-Jacobs and colleagues that found that daily supplements of 1000 mg of calcium resulted in reduced reports of negative affect and water retention during the premenstrual phase and of pain during both the premenstrual and menstrual phases of the cycle.

### Magnesium

Facchinetti et al reported that dietary magnesium supplementation relieved negative affective symptoms. Using an oral preparation of magnesium to provide slightly higher than the recommended daily amount of the cation without any risk of overload, the researchers evaluated its effects on premenstrual symptoms in a double-blind, randomized study. The relief of premenstrual mood fluctuations and depression during magnesium treatment occurred concomitantly with a definite increase in the cation contents in both lymphocytes and polymorphonuclear cells. The mechanism of action of magnesium in the modulation of premenstrual mood changes is unknown. Based on their data, the researchers concluded that

magnesium supplementation could be used to relieve certain mood changes associated with PMS. Moreover, magnesium treatment seems to be well tolerated and safe with minimal side effects (Facchinetti et al).

Premenstrual symptoms, in some form or another, is experienced by 75% of women. Prevalence rates for PMS in the literature range from 1% to 90%, reflecting a wide variety of criteria used in assessing premenstrual symptoms and the variety of populations sampled. Of women who have experienced PMS, 86% reported that they had tried treatments for premenstrual symptoms, and many reported having tried multiple treatments. When women were asked to nominate up to three treatments they had tried and found most effective, the most commonly mentioned were dietary changes, evening primrose oil, vitamins and exercise (Campbell). This suggests that diet and nutrition are important parts of the self-care therapy that women use in dealing with PMS.

Although there are no diet or nutritional changes that seem to provide relief from all the PMS symptoms, there are treatments that provide at least partial reduction in symptoms. For women who have mild symptoms or who want to avoid using drugs to control their PMS, dietary modifications may provide some relief from premenstrual distress. Although evidence for some nutritional treatments is inconsistent, many clinicians recommend a nutritional approach in the initial treatment of PMS. Dietary changes that enhance nutritional status and promote good health are often recommended. This approach is relatively safe and has the added advantage that it is patient controlled. Dietary approaches can modify or alleviate symptoms in some women, and maintaining a healthy, well-balanced diet is highly likely to maximize well-being. Reviewing the current literature on this topic, it appears that increased carbohydrate, calcium, manganese, and magnesium intake can decrease certain symptoms of PMS. However, the current studies do not indicate a clear role for sodium, caffeine, or vitamin B6 in alleviating premenstrual symptoms.

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