A Comparison of Western and Ayurvedic Perspectives of Premenstrual Syndrome

A Review of Literature
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INTRODUCTION
Premenstrual syndrome (PMS), also sometimes referred to as Premenstrual Disorder (PMD) is a widespread and prevalent condition associated with the second half of the female reproductive cycle. Many women at some point in their menstruating years experience some of the countless symptoms that go along with PMS. This review of literature is focused on the understanding of the disorder comparatively from a western and Ayurvedic perspective. It will not go into the in-depth Ayurvedic treatment protocol, only a general insight to treatment as it compares to western medicine. The reader should have a basic knowledge of Ayurvedic anatomy and physiology.

DEFINITION
PMS is not a disease but a syndrome, something that doesn’t have a definitive cause but produces many symptoms. It can be defined as “a recurrent luteal-phase condition characterized by physical, psychological, and behavioral changes of sufficient severity to result in deterioration of interpersonal relationships and normal activity.” The key point that distinguishes PMS from other menstrual disorders is that the symptoms are relieved upon the start of menses, or shortly thereafter. Some sources say that a woman has to present with both physical and mental symptoms in order to gain a diagnosis of PMS.

EPIDEMIOLOGY
PMS is a household name as far as women’s health goes. If a woman hasn’t experienced PMS herself, it is likely she knows of at least one other woman who has. The percentage of effected woman ranges from source to source, anywhere from 20% to 80%. This number is probably due to estimations, as it is not likely that all women will seek out a doctor and get a diagnosis of PMS. UpToDate reports that clinically significant PMS only occurs in 20% to 30% of women, and here’s why:

The prevalence of PMS in the population has been overestimated because of the failure to apply strict inclusion criteria. Estimates as high as 80 percent have been reported, based upon the inclusion of women who have some form of premenstrual mood or physical symptoms. The problem with these estimates is that they do not consider whether symptoms are moderate to severe or if they interfere with functioning.

This challenges the severity of symptoms and what actually constitutes as Premenstrual Syndrome. It more or less implies that more mild symptoms, though unpleasant, in reality don’t fall into the category of PMS. Again, this may be why women don’t seek help for it and just accept it as part of their cycle.
Regardless of exact numbers or intensity of symptoms, the bottom line is that this menstrual syndrome is very common in our high-stress, fasted-paced society.

THE HEALTHY MENSTRUAL CYCLE

A solid grasp on the basic workings of the female reproductive cycle will help us to have a greater understanding of the symptoms and the pathogenesis from both a western and Ayurvedic perspective. There are five main hormones involved in the menstrual cycle: gonadotropin-releasing hormone (GnRH), follicle-stimulating hormone (FSH), luteinizing hormone (LH), estrogen, and progesterone. The hypothalamus delivers Gonadotropin-releasing hormone (GnRH), which may also be referred to as luteinizing hormone-releasing hormone (LHRH) to the pituitary gland to trigger it to release two other hormones: follicle-stimulating hormone (FSH) and luteinizing hormone (LH). FSH influences the ovaries to bring follicles to maturation in preparation for ovulation. LH guides follicles to release their egg and also to make the hormones that get the uterus ready for implantation of a fertilized egg. The other two hormones that play a significant role are estrogen and progesterone. Estrogen stimulates the development and maintenance of secondary sex characteristics and affects the cyclic changes in the uterine lining. It also works outside the female reproductive tract and is interestingly enough found in every tissue of the body as lubrication and nourishment. Not enough estrogen results in dryness throughout the body, not just the vagina. Too much can look like weight gain, lethargy, depression, tender breasts, or water retention. We need both good quality estrogen as well as appropriate quantities it. The corpus luteum (the structure that develops from the mature follicle after ovulation) releases progesterone. This hormone prepares the uterus for implantation, it maintains pregnancy though inhibiting uterine contractions, it primes the mammary glands for lactation, and it also balances the effects of estrogen. Progesterone helps the body to defend itself against estrogen-induced overgrowth (like breast fibroids) and it keeps the uterine lining built by estrogen in place. It also neutralizes signs of excess estrogen by using fat for energy to prevent weight gain and inhibits water retention through its diuretic properties and also manages normal blood clotting. The two hormones work quite well together, and as long as the natural checks-and-balances system in the body is functioning properly, a woman can experience a symptom-free cycle.
With an awareness of the major roles of each hormone, we can look at the ovarian cycle. It begins with the follicular cycle when the hypothalamus releases GnRH to stimulate the pituitary gland to release FSH as well as smaller amounts of LH. Low levels of estrogen from the developing follicles apply a negative feedback effect on the hypothalamus and pituitary while increasing the effect of FSH on the follicle. A negative feedback effect simply means that Estrogen levels increase as the follicles, under the influence of FSH, continue to grow until the middle of the cycle. During the ovulatory phase, high estrogen levels from the mature follicle exert a positive feedback effect on the pituitary gland, which results in a surge of LH as well as a smaller spike in FSH. The high amount of LH causes the follicle to rupture (ovulate), after which estrogen declines considerably. The luteal phase begins when the surge of LH stimulates the development of the corpus luteum to secrete progesterone along with lesser amounts of estrogen. These have a negative feedback effect on the hypothalamus and anterior pituitary so that FSH and LH levels decline. As LH levels drop, the corpus luteum activity wanes and removes the inhibitory effect. The cycle starts over.  

The uterine cycle is happening simultaneously with the ovarian cycle. It begins with the menstruation phase, which should generally last from 3 to 5 days. During menstruation, the stratum functionale (the endometrium excluding the basal layer) detaches from the uterine wall and accompanied by bleeding, exits through the vagina as menstrual flow. During this time, the follicles are growing in the ovary under the influence of FSH. The proliferative phase begins with the end of menstruation and typically lasts eight days. The increasing levels of estrogen from the growing follicles in the ovary stimulate the repair of the endometrium in the uterus. At the time of this phase, the endometrium thickens, glands develop, and blood vessels grow in the new tissue. Ovulation in the ovarian cycle happens at the end of the proliferative phase. The secretory phase follows next and corresponds to the luteal phase of the ovarian cycle. Progesterone from the corpus luteum stimulates the continued growth and thickening of the endometrium. Arteries and glands proliferate and enlarge. If fertilization does not take place, the corpus luteum in the ovary begins to degenerate, halting the supply of progesterone and leading to menstruation; the cycle starts over.  


Figure 1: The above left image portrays the role of the hormones in the ovarian cycle.\(^8\)

Figure 2: The above right image illustrates the interrelationship of events between the ovarian and uterine cycles.\(^9\)

In Dr. Claudia Welch’s book *Balance Your Hormones, Balance Your Life*, she mentions a scientist by the name of Margie Profet who explored the idea of what the point of a women’s menstrual cycle is. Besides the obvious role of fertility, she surmised that the menstrual cycle was a way for the body to protect its reproductive organs. Dr. Welch says “menstrual blood is rich in immune cells ... when the menstrual blood flows, it freely bathes and cleanses the uterus, cervix, and vagina with its antibacterial, antiviral properties.” This idea becomes important when looking at the western treatment of PMS using oral contraceptives (birth control pills) that stop the body from ovulating and going through its natural
rhythms. Although women may still bleed when they use oral contraceptives, it is not the same as an uninhibited menstruation. The intuitive urges of the body to ovulate and build a uterine lining have been suppressed, so the bleeding that occurs is not the nourishing menses mentioned above.\textsuperscript{10}

**AN AYURVEDIC UNDERSTANDING OF THE MENSTRUAL CYCLE**

Ancient Ayurveda also had an awareness of the menstrual cycle that closely relates to the uterine cycle, the more easily observable cycle. The ancient Indian authorities divided the menstrual cycle into 3 phases based on physiological changes that take place in the body - rutukala, rutavateta kala, and rajahkala. Before we take a closer look at each of the phases, we must go back and remind ourselves of the three natural stages of dosha development.

The doshas are continuously ebbing and flowing throughout the body and are influenced by external factors. These factors include a person’s constitution, the climate that they live in, the time of day, as well as the time of the year (season), and time of their life (age). The doshas all rise, peak, and retreat as part of the natural stage of doshic development. The first stage is sanchaya or accumulation. This is where the dosha rises and typically causes unnoticed, mild symptoms in the digestive tract. The second stage is prakopa or aggravation. This stage is when someone may become more aware of their symptoms; if taken care of, the dosha will retreat into the final phase. The last stage is prashama or alleviation. This is when the dosha withdraws, and the series of events can begin again.\textsuperscript{11}

The first phase, rutukala, begins after menstruation and is relatable to the proliferative phase of the uterine cycle as well as the follicular phase of the ovarian cycle. We can say that Kapha governs this phase for two reasons: the uterus is building tissue and Kapha is rasa, a main component of the endometrium. In this phase, Kapha accumulates (kaphachaya) and peaks (Kapha-prakopa). All the while Kapha is aggravating, Pitta is accumulating (Pittachaya) and Vata is alleviated (vatashama). Kapha is essential for growth of the uterine lining, and because Vata impedes growth, it must be alleviated for proper formation of the uterine lining.\textsuperscript{12}

The next phase is rutavateta kala, which is related to the secretory phase of the uterine cycle and it is governed by Pitta. Pitta works through Rakta to build make the glandular and vascular changes in the endometrium to best prepare it for implantation of the egg. In this phase, Pitta keeps Kapha in check and prevents it from overgrowing. Pitta’s aggravation here causes Kapha’s alleviation (Kaphashama).
The Pitta that was accumulating during the later phase of rutukala now moves into aggravation, or Pitta-prakopa.  

Meanwhile, Vata is accumulating (Vatachaya) and when Vata hits its peak (Vata-prakopa), the last phase, called rajahkala, begins. Vata acts through the arteries by spasm, which helps the uterus to shed the stratum functionale. Apana Vayu is the downward force that helps the menstrual fluid find its proper exit through the cervix and out the vagina. Once menstruation starts, Pitta diminishes into Pittashama. The Sushruta Samhita describes healthy menstrual flow as, “blood which is red like the blood of a hare, or the washing of shellac and leaves no stains on clothes (which may be washed off by simply soaking them in water).” Kaphachaya begins once menstruation ends, and starts rebuilding the tissue that was just sloughed off.

Below is a table that summarizes the western ovarian and uterine cycles and matches them up with the Ayurvedic menstrual cycle.

<table>
<thead>
<tr>
<th>Ayurvedic Phase</th>
<th>Rutukala</th>
<th>Rutuvateta kala</th>
<th>Rajahkala</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggravated Dosha</td>
<td>Kapha</td>
<td>Pitta</td>
<td>Vata</td>
</tr>
<tr>
<td>Accumulating Dosha</td>
<td>Pitta</td>
<td>Vata</td>
<td>Kapha</td>
</tr>
<tr>
<td>Alleviated Dosha</td>
<td>Vata</td>
<td>Kapha</td>
<td>Pitta</td>
</tr>
<tr>
<td>Ovarian Phase</td>
<td>Follicular Phase</td>
<td>Ovulation/Luteal Phase</td>
<td>Luteal/Follicular Phase</td>
</tr>
<tr>
<td>Uterine Phase</td>
<td>Proliferative Phase</td>
<td>Secretory Phase</td>
<td>Menstruation Phase</td>
</tr>
</tbody>
</table>

So long as the doshas are balanced and ojas is substantial, the menstrual cycle remains healthy and without symptoms. When a dosha doesn’t stay balanced and isn’t alleviated, the beginnings of disease start to manifest. The dosha goes into prasara, the overflow phase. It moves into the rasavaha and raktavaha srotamsi, where it can circulate through the body, though it usually causes only mild and transient symptoms at this time. Usually, people will ignore their body’s signals that tell them something is out of balance. If not managed at this point, the dosha will advance into sthana samshraya, the relocation stage. This is when a dosha settles into typically the weakest dhatu of the body. If the person still does not seek management at this point, it will progress to the fifth disease stage called vyaki or manifestation. It is finally at this point that Western medicine usually recognizes a disease and gives it a name and treatment. The last stage is diversification, or bheda, and by then, the symptoms are severe and the damage to the dhatu may be beyond repair. This concept of disease progression is important.
because it shows us that Ayurveda recognizes that we can step in long before we get to the fifth or sixth stage of a disease.  

Figure 3: The beautiful image above depicts the Ayurvedic understanding of the menstrual cycle, broken into three phases.  

CLINICAL MANIFESTATIONS  
Symptoms of PMS can be either physical or behavioral, and women can experience any number of them from either category. Physical symptoms include bloating or fluid retention, constipation or diarrhea, backaches, headaches, tender breasts, acne, and food cravings. Behavioral symptoms include irritability, mood swings, anxiety, depression, forgetfulness, lack of focus, and trouble sleeping or oversleeping. Some of these symptoms, like depression or anxiety, can look like other conditions, so a proper
A diagnosis from a health care provider is important. If it is PMS, the symptoms cease around the onset of menses; if there is no period of relief, the person may have a different issue going on. A diagnosis of PMS will most likely include a complete medical history, a physical and pelvic exam, and the healthcare provider may ask the patient to track their symptoms along with their cycle for several months to get a better idea of the timing, onset, and duration of the symptoms.\textsuperscript{18}

**AYURVEDIC RUPA**

As we saw in the Clinical Manifestations section, symptoms are various and numerous. Ayurveda also recognizes this but is able to classify the rupa by dosha, which allows for specific treatment. The most common rupa are listed below, divided by doshas. Notice how conditions are all Vata, Vata/Pitta, or Vata/Kapha. This is due to Vata's strong influence on the female reproductive tract because its home is in the lower abdomen.\textsuperscript{19}

<table>
<thead>
<tr>
<th>Vata</th>
<th>Vata/Pitta</th>
<th>Vata/Kapha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood swings</td>
<td>Alternating Constipation &amp; Diarrhea</td>
<td>Anger / outbursts</td>
</tr>
<tr>
<td>Constipation</td>
<td></td>
<td>Red Rashes</td>
</tr>
<tr>
<td>Irritability</td>
<td></td>
<td>Acne</td>
</tr>
<tr>
<td>Lack of clarity</td>
<td></td>
<td>Diarrhea / Loose stools</td>
</tr>
<tr>
<td>Pain in body</td>
<td>Insomnia</td>
<td>Breast tenderness</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Bloating</td>
<td>Additionally, any Vata rupa</td>
</tr>
</tbody>
</table>

**ETIOLOGY OF PMS**

The exact cause of PMS is more or less unknown. Some studies have shown a strong genetic factor in the predisposition to PMS, but there may also be environmental factors or learned behaviors that go along with this as well (nature vs. nurture). One cause may be that the tissues in the body are very perceptive to hormone levels that change during the menstrual cycle. Some studies propose that the rising and falling levels of hormones, like estrogen and progesterone, may also impact the chemicals in the brain like serotonin - a neurotransmitter in charge of perception of pain, the sleep-wake cycle, and mood. Western medicine can't tell us why some women develop PMS and others do not because they have found that the levels of estrogen and progesterone are comparable in women with and without these symptoms. It is likely that some women are just more sensitive to normal changes in hormone levels.\textsuperscript{20} Symptoms appear to worsen when individuals are under stress as well. A study done in 2015 measured the brain activity of women with PMS (as well as women without it) by using resting state functional magnetic resonance imaging, or rs-fMRI. The participants also completed emotion scales on
anxiety (BAI) and depression (BDI) and the stress perception scale (VAS) before going through the rs-fMRI. The study found that “compared with the control group, the PMS group had higher anxiety and depression scores as well as lower stress perception scores. This confirmed again, from the perspective of subjective perception, that PMS is a stress-related mood disorder that results in general effects in patients similar to those in stress disorders such as PTSD.”

There was a study done comparing the metabolic and hormonal profiles of women with PMS concluding that there was a significant association between PMS scores and the prevalence of metabolic syndrome. According to WebMD, metabolic syndrome can be described as “a group of risk factors - high blood pressure, high blood sugar, unhealthy cholesterol levels, and abdominal fat.” These researchers found that prolactin levels (a hormone produced in the pituitary whose main function is to stimulate mammary glands to produce milk) were significantly higher in women with PMS. The study states that “prolactin plays an indirect role in PMS and may cause renal retention of water, sodium, and potassium, and it interacts with lithium. Prolactin can also interact with ovarian hormones to cause symptoms of depression, anxiety or irritable hostility.” This just goes to show how complex the human body is and how intertwined the hormones are with each other. It is so difficult to determine specifically what hormones are involved in the disorder when there could potentially be seemingly unrelated factors causing the symptoms.

SIDE NOTE: ESTROGEN DOMINANCE
Some naturopaths and other alternative health practitioners look to a condition called “estrogen dominance” as a suspect in some of the PMS symptoms though western medical doctors do not typically identify this as an actual condition. Estrogen dominance basically means that a woman’s estrogen to progesterone ratio is skewed in the direction of estrogen. This doesn’t necessarily mean that a woman has an obscene amount of estrogen in her body; she could have a low level of estrogen, but she would have an even lower amount of progesterone. If the liver is overworked or sluggish, it cannot do the job of removing excess hormones from the bloodstream efficiently, leaving residual estrogen circulating in the body. Keep in mind that the first half of the menstrual cycle is dominated by estrogen, and the second half of the cycle is dominated by progesterone. If the body doesn’t produce enough progesterone to counteract the estrogen from the follicular phase, then it might go into this “estrogen dominance” state. This imbalance has the potential for many side effects including ones associated to estrogen-related PMS symptoms.
Causes of estrogen dominance that are recognized by Naturopathic.org include:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive exposure to xenoestrogens</td>
<td>Synthetic estrogens (birth control, HRT)</td>
</tr>
<tr>
<td>Prolonged stress</td>
<td>Anovulation (a lack of ovulation)</td>
</tr>
<tr>
<td>Poor lifestyle choices</td>
<td>Digestion issues (stress on the liver)</td>
</tr>
<tr>
<td></td>
<td>Unresolved emotional issues</td>
</tr>
<tr>
<td></td>
<td>Unhealthful diet</td>
</tr>
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**AYURVEDIC NIDANA**

According to Ayurveda, the most important causative factor of PMS is low ojas. Additionally, Vata is predominantly imbalanced and may be accompanied by Pitta to a lesser degree, and Kapha even less so. Vata may be vitiated by taking cold, dry, light foods, excessive travel, extreme temperatures (hot or cold), and prolonged stress. All of these factors also have a negative impact on ojas. Ama comes into play in this condition as well, and we can connect it to possible estrogen dominance. If ama is blocking the estrogen receptor sites, then the body isn’t taking in enough estrogen, and it continues to circulate throughout the body. Normally, the liver would take care of the excess estrogen circulating by pulling it out and the body excretes it. If it is bogged down and overworked, then it cannot do its job properly and the estrogen is not removed, and the body then goes into “estrogen dominance.”

**PATHOGENESIS**

The exact manner of development of Premenstrual Syndrome isn’t clearly understood. There are a few factors that play a role and those include hormones, gamma amino butyric acid (GABA), and serotonin. Unfortunately it is beyond the scope of this paper to dive into the intricacies of each factor, however, we can grasp the general concept of each one.

1. **Hormones:** the symptoms of PMS are generally pinned on progesterone originating from the corpus luteum in the ovary

   Although we see that progesterone often gets blamed for PMS, it appears that classical progesterone receptor is not implicated in the pathophysiology of this condition. There have also been numerous studies that have been unable to show any progesterone excess or deficiency as the cause of this condition. Researchers have theorized that “a metabolite of progesterone may contribute to the generation of the affective and physical symptoms of PMDs through modulation of a different receptor mechanism.” As we’ve touch on before, the role of hormones in the body is incredibly complex and no one is yet sure what role they play exactly.

2. **GABA:** an amino acid that acts as a neurotransmitter in the nervous system and blocks impulses between cells in the brain - low levels of GABA may be linked to anxiety or mood disorders
Because progesterone itself didn’t appear to be the solution, researchers moved on to examine the neuroactive metabolites of progesterone that were known to affect mood and behavior. GABA is a widely distributed neurotransmitter as well as the main inhibitory neurotransmitter in the brain and is significant in the management of stress and anxiety. In other words, GABA may play a role in why progesterone is associated with negative mood symptoms in PMS.  

3. Serotonin: as previously described, it is the main mood stabilizer in the brain. Low levels of serotonin can cause symptoms of “depression, mood swings, irritability, self-deprecation, poor impulse control, sleep disturbances, decreased pain threshold, carbohydrate cravings and difficulty concentrating.” Many of those sound familiar to the symptoms of PMS, which makes sense because it has been shown that serotonergic function is modified in the luteal phase of women with PMS.  

**AYURVEDIC SAMPRAPTI**

Ayurveda looks samprapti (pathogenesis) in a very different way than western medicine. It starts from the absolute beginning in the digestive system and works its way out from there. This gives a complete picture of how the disorder progressed to how it may be manifesting now.

Vata’s home is in the purishavaha srotas (colon). This is where it accumulates and aggravates, and if not alleviated, overflows into the rasavaha and raktavaha srotamsi. Vata then relocates into the artavavaha srotas and commonly disrupts the manovaha srotas as well. Vata agitates the harmony of the hormone system in the artvahavaha srotas. If Vata gets to the manovaha srotas, it causes the behavioral rupa mentioned above in the Ayurvedic Rupa section. Vata can also settle in any of the other dhatus or srotamsi were it could cause brief or more subtle rupa as well.

Pitta’s chief location is in the annavaha srotas, specifically in the lower stomach and small intestine. This is the location of its accumulation and aggravation. When it isn’t alleviated, Pitta overflows into the rasavaha and raktavaha srotamsi and then relocates into the artavaha srotas, manovaha srotas, and the mamsa dhatu. Pitta can also disrupt the hormonal system of the artavaha srotas, cause anger in the manovaha srotas, and cause hot skin conditions like acne, in the mamsa dhatu (of which the skin is an upadhatu).

Kapha’s main site is the stomach, which is also part of the annavaha srotas. Here it will accumulate and aggravate, and overflow into the rasavaha and raktavaha srotamsi if not alleviated. It can relocate in the
ambuvaha srotas causing fluid retention - and as a result, weight gain. Please note that this is not weight gain of the medovaha srotas.\(^3\)

**WESTERN TREATMENT OF PMS**

The Western treatment of PMS will vary depending on the severity of the symptoms. It is likely that doctors will try to manage more mild symptoms with diet and exercise suggestions along with stress-reduction techniques. Dietary recommendations may include reducing refine sugar intake, minimizing or eliminating caffeine consumption especially during the second half of the cycle, and decreasing salt in the diet if bloating or swelling is a predominant symptom. A 2017 study done in Australia did not find a lower prevalence of PMS in women who participated in high levels of physical activity compared with those who did a lower amount or no physical activity at all.\(^3\) Depending on how intense the exercise was, this makes sense. If the body is under stress already, and then intense exercise it added on top of that, the body is most likely going to get more stressed, not less stressed, therefore the symptoms of PMS would not go away.

For more moderate to severe symptoms, there are two main approaches to treatment, which include prescribing pharmaceuticals. The first method is to prescribe selective serotonin reuptake inhibitors (SSRIs) and Serotonin-norepinephrine reuptake inhibitors (SNRIs) to target the serotonin system. These can be taken continuously or just in the second half of the cycle, the luteal phase. For women who choose luteal phase therapy, it has been stated that the advantage to this is less side effects and a lower cost to the patient. Doctors may suggest continuous or luteal phase only, or even symptom-onset therapy treatment based on the type of symptoms and how long they typically express for, the regularity or irregularity of a woman’s menstrual cycle, and how predictable the symptoms are.\(^4\)

The second common approach is to use oral contraceptives (OCs) to stop recurring changes in sex steroids (steroid hormones that act on androgen and estrogen receptors) by suppressing the hypothalamic-pituitary-ovarian axis. Even though these pills are used to try to treat the discomforts of PMS, they can often produce side effects that are very similar to those symptoms that they are supposed to treat. Some common side effects include breast tenderness, headaches, mood changes, and weight gain.\(^3\) Researchers have done numerous studies to try to figure out the immeasurable complexity of how the hormones work in the body and why some treatments produce these undesirable
side effects. To that end, there are many different kinds of OCs, all with different intentions inside the body. One factor is the level of hormones in each of the pills throughout the month:

- Monophasic OC: every active pill has the same amount of hormones
- Multiphasic OC: the active pills hormone content fluctuates during the month

According to Dr. Andrea Rapkin and Dr. Alin Akopians, a randomized placebo-controlled trial demonstrated that multiphasic OCs decreased the physical symptoms but not the mood symptoms. They also state that there was another study comparing monophasic OCs to multiphasic OCs that inferred the monophasic one was less prone to cause unfavorable mood changes. Another factor that goes into an oral contraceptive’s effectiveness is the hormone-free period, the time where the woman bleeds. The traditional ratio is 21/7 (21 days of active pills and seven days of hormone-free pills). This longer interval without hormone intervention supports the continued hormone fluctuation in the body and this may be contributing to adverse symptoms that resemble the physical symptoms of PMS. It has been suggested that women try a 24/4 regimen with 24 active pills and four hormone-free ones. Then there are of course varying levels of synthetic progesterone and estrogen in different pills, some have stronger doses of one or the other. Again, it is beyond the scope of this paper to go into the fine details of how either works, but just be aware that doctors may tinker with hormone levels to try to alleviate PMS symptoms.

If oral contraceptives and SSRIs do not work, or cannot be tolerated by the woman, there is another therapy used called a GnRH analogue. As stated by Dr. Rapkin and Dr. Akopians:

A GnRH analogue is a synthetic peptide that interacts with a GnRH receptor and consequently elicits release of follicle-stimulating hormone and luteinizing hormone from the anterior pituitary. After the initial surge of production of ovarian steroid production, it then suppresses ovarian steroid production and therefore results in a ‘medical menopause’ with its associated relief of symptoms of PMS.

This is obviously a more extreme treatment and comes with its own set of side effects. When administered without any progesterone or estrogen addback therapy, they tend to have a “hypoestrogenism” effect on the body. This includes all symptoms associated with low estrogen in the body: dryness and bone mineral density loss, for starters. Doctors will remedy this by adding synthetic estrogen as well as synthetic progesterone in low doses. It is typically used for no more than 6 months.
Now that we’ve looked at the western understanding of PMS, we can look at how Ayurveda would approach this disorder. Since Ayurveda doesn't use SSRIs, oral contraceptives, or GnRH analogues, we get to come at this condition from a totally different angle. Ayurveda uses diet, lifestyle, five sense therapies, and herbs to try to help women with this condition. All of these approaches are not described in this paper, however, ones relevant to Western medicine and studies are.

**AYURVEDIC CHIKITSA**

Ayurveda teaches us that our treatment must always consider the state of a person’s digestive fire (agni), toxins in the body (ama), and the overall strength of the tissues and systems of the body (ojas). Treatment begins in the digestive system with the regulation of agni through a dosha-pacifying diet. Ama is dealt with through purification, either by Pancha Karma, Ayurveda’s strongest means of eliminating ama from the body, or by palliation, a more gentle and approach for those with low ojas. Strong ojas is built through proper diet and lifestyle, all dependent on a person’s vikruti (current state of health). Because Ayurveda has an understanding of the doshas in the body, it can give more specific recommendations based on a person’s constitution and the nature of the condition they have. We have determined that Vata is the dosha with the greatest imbalance in PMS, so the general treatment must be focused on pacifying Vata.

Western medicine makes some dietary suggestions, but falls short. Ayurveda teaches that there are three tastes that can soothe vata: sweet, sour, and salty. Sweet is a heavy taste however, so monitoring the agni and making sure it is strong enough to digest the heavy qualities is essential.

Medical doctors may suggest exercise to help or prevent symptoms, but Ayurveda again can take this one step further. The ancient text Caraka Samhita states, “perspiration, enhanced respiration, lightness of the body, inhibition of the heart and such other organs of the body are indicative of the exercise being performed correctly.”\(^{39}\) The Ashtanga Hrdyam adds to that, “those who indulge daily in too much exercise...perish, just as a lion, after vanquishing an elephant.”\(^{40}\) These passages are trying to relay the message that while exercise is important to health, over exercise can be extremely detrimental. Ayurveda also says that those especially with a primary Vata imbalance should avoid excessive exercise, as this will further vitiate the dosha. Gentle yoga asanas can be very beneficial for pacifying Vata. A study done on medical undergraduates showed yoga can offer a natural and effective way to alleviate
PMS symptoms and can serve as an alternate to painkillers and hormonal supplements. Along with stress reduction, it provides a moderate degree of exercise and tonification of the body.\textsuperscript{41}

Meditation and mindfulness can be very effective for stress reduction and calming the erratic movement of the element air in Vata. A study published in 2016 looked at the effect of mindfulness-based cognitive therapy (MBCT) on the symptoms of PMS. The participants of the study were taught a variety of stress management techniques like yoga, meditation, and self-care. The meditation practice was used to increase awareness and attention. The participants used MBCT to recognize how anxious or depressive thoughts may exacerbate PMS symptoms. The researchers state, “MBCT provides individuals with a heightened ability to simply observe thoughts, feelings, and experiences in order to disengage automatic and often dysfunctional reactivity and then to allow them to work with more balanced relationships with themselves.”\textsuperscript{42} The Caraka Samhita says, “The sense faculties, together with the mind, get vitiated by excessive utilization, non-utilization, and wrong utilization of the objects concerned.”\textsuperscript{43} This statement is telling us that we can put ourselves out of balance by misusing our senses, but by becoming aware of this, we can also get ourselves back into balance. MBCT is certainly one way to become aware of how we use or misuse our senses, and can help us make more conscious choices. It is always encouraging when modern science can back up what Ayurveda has been suggesting for thousands of years. This study mentioned teaching the participants self-care, and Ayurveda is an expert in this subject. The ancient texts all talk about sneha, which is the Sanskrit word for oil, but it also means love. Ayurveda is huge on abhyanga: a self-oil massage done daily to not only protect the skin, but also the mind. The Caraka Samhita expands upon this idea and says, “As a pitcher, a dry skin, and an axis (of a cart), become strong and resistant by the application of oil, so by the massage of oil the human body becomes strong and smooth-skinned; it is not susceptible to the disease due to vata; it is resistant to exhaustions and exertions.”\textsuperscript{44} Massage helps bring the nervous system back into the parasympathetic and relieves stress and tension, which helps to pacify Vata.

As we have seen, Western science has begun to describe the sophisticated and perplexing role of hormones and chemicals in the body and how they may have a role in the development of PMS. Though there is a lot of fascinating information out there, modern science seems to fall short in treatment and management of the condition. Ayurveda has a huge advantage here and recognizes imbalances long before they manifest in to more serious illnesses. By studying Ayurvedic anatomy and physiology, practitioners may be able to help on a deeper level, without chemical intervention.


Ibid., 124.
Abstracts

Title: Recreational Physical Activity and Premenstrual Syndrome in Young Adult Women: A Cross-Sectional Study
Authors: Kroll-Desrosiers AR, Ronnenberg AG, Zagarins SE, Houghton SC, Takashima-Uebelhoer BB, Bertone-Johnson ER.
Published: online Jan 12, 2017
PMID: 28081191

INTRODUCTION: It is estimated that up to 75% of premenopausal women experience at least one premenstrual symptom and 8-20% meet clinical criteria for premenstrual syndrome. Premenstrual syndrome substantially reduces quality of life for many women of reproductive age, with pharmaceutical treatments having limited efficacy and substantial side effects. Physical activity has been recommended as a method of reducing menstrual symptom severity. However, this recommendation is based on relatively little evidence, and the relationship between physical activity, premenstrual symptoms, and premenstrual syndrome remains unclear.

METHODS: We evaluated the relationship between physical activity and premenstrual syndrome and premenstrual symptoms among 414 women aged 18-31. Usual premenstrual symptom experience was assessed with a modified version of the Calendar of Premenstrual Experiences. Total, physical, and affective premenstrual symptom scores were calculated for all participants. Eighty women met criteria for moderate-to-severe premenstrual syndrome, while 89 met control criteria. Physical activity, along with dietary and lifestyle factors, was assessed by self-report.

RESULTS: Physical activity was not significantly associated with total, affective, or physical premenstrual symptom score. Compared to the women with the lowest activity, women in tertiles 2 and 3 of activity, classified as metabolic equivalent task hours, had prevalence odds ratios for premenstrual syndrome of 1.5 (95% CI: 0.6-3.7) and 0.9 (95% CI: 0.4-2.4), respectively (p-value for trend = 0.85).

CONCLUSIONS: We found no association between physical activity and either premenstrual symptom scores or the prevalence of premenstrual syndrome.

Title: The Effects of Mindfulness-Based Cognitive Therapy on Depression and Anxiety in Women with Premenstrual Syndrome.
Authors: Panahi F., Faramarzi M.
Published: online November 29, 2016
PMID: 28025621

OBJECTIVE: Little research has been done regarding the role of psychotherapy in the treatment of Premenstrual Syndrome (PMS). The aim of this study was to examine the effect of mindfulness-based cognitive therapy (MBCT) on the PMS symptoms and depression and anxiety symptoms in women with PMS.

DESIGN: In a randomized controlled trial, a total of 60 students at Mazandaran University with mild to moderate PMS who had depressive symptoms (Beck depression scores 16-47) were randomly allocated to either an experimental (n = 30) or a control (n = 30) group. The experimental group received MBCT in
eight group sessions (120 min each) over 8 weeks. The control group received no intervention. All participants completed the Premenstrual Assessment Scale (PAS), Beck Depression Inventory (BDI), and Beck Anxiety Inventory (BAI) at the beginning and the end of the study. Repeated-measure ANOVA was used to analyze the data.

RESULTS: At the end of study, the experimental and control groups showed the following scores, respectively (mean ± SD): depression, 15.73 ± 6.99 and 25.36 ± 7.14; anxiety, 16.96 ± 7.78 and 26.60 ± 9.38; and total PAS, 42.86 ± 8.02 and 58.93 ± 8.47. MBCT improved depression and anxiety symptoms and total PAS score.

CONCLUSION: MBCT intervention is acceptable and potentially beneficial in women with PMS symptoms. Psychotherapy should be considered as a treatment option for mild to moderate PMS in women with depressive symptoms.

Title: Comparing the Effects of Yoga & Oral Calcium Administration in Alleviating Symptoms of Premenstrual Syndrome in Medical Undergraduates.
Author: Bharati M.
Published: online September 1, 2016
INTRODUCTION: Medical undergraduates are heavily burdened by their curriculum. The females, in addition, suffer from vivid affective or somatic premenstrual syndrome (PMS) symptoms such as bloating, mastalgia, insomnia, fatigue, mood swings, irritability, and depression. The present study was proposed to attenuate the symptoms of PMS by simple lifestyle measures like yoga and/or oral calcium.

METHODS: 65 medical female students (18-22 years) with a regular menstrual cycle were asked to self-rate their symptoms, along with their severity, in a validated questionnaire for two consecutive menstrual cycles. Fifty-eight students were found to have PMS. Twenty girls were given yoga training (45 minutes daily, five days a week, for three months). Another group of 20 was given oral tablets of calcium carbonate daily (500 mg, for three months) and rest 18 girls served as control group. Data were analyzed by SPSS ver.13 software.

RESULTS: The yoga and calcium groups showed a significant decrease in number and severity of premenstrual symptoms whereas in the control group there was not the significant difference. Conclusion: Encouraging a regular practice of yoga or taking a tablet of calcium daily in the medical schools can decrease the symptoms of premenstrual syndrome.

Title: Comparison of Metabolic and Hormonal Profiles of Women With and Without Premenstrual Syndrome: A Community Based Cross-Sectional Study.
Authors: Hashemi S, Ramezani Tehrani F, Mohammadi N, Rostami Dovom M, Torkestani F, Simbar M, Azizi F.
Journal: Int J Endocrinol Metab. 2016 Apr; 14(2): e28422
Published: online February 14, 2016
BACKGROUND: Premenstrual syndrome (PMS) is reported by up to 85% of women of reproductive age. Although several studies have focused on the hormone and lipid profiles of females with PMS, the results are controversial.
OBJECTIVES: This study was designed to investigate the association of hormonal and metabolic factors with PMS among Iranian women of reproductive age.

MATERIALS AND METHODS: This study was a community based cross-sectional study. Anthropometric measurements, biochemical parameters, and metabolic disorders were compared between 354 women with PMS and 302 healthy controls selected from among 1126 women of reproductive age who participated in the Iranian PCOS prevalence study. P values < 0.05 were considered significant.

RESULTS: Prolactin (PRL) and triglycerides (TG) were significantly elevated in women with PMS, whereas their testosterone (TES), high density lipoprotein (HDL) and 17-hydroxyprogesterone (17-OHP) levels were significantly less than they were in women without the syndrome (P < 0.05). After adjusting for age and body mass index (BMI), linear regression analysis demonstrated that for every one unit increase in PMS score there was 12% rise in the probability of having metabolic syndrome (P = 0.033).

CONCLUSIONS: There was a significant association between PMS scores and the prevalence of metabolic syndrome. Further studies are needed to confirm and validate the relationships between lipid profile abnormalities and metabolic disorders with PMS.

Title: Abnormal Resting-State Connectivity at Functional MRI in Women with Premenstrual Syndrome
Author: Qing Liu, Rui Li, Renlai Zhou, Quan Gu
Published: online September 1, 2015

OBJECTIVES: Premenstrual syndrome (PMS) refers to a series of cycling and relapsing physical, emotion and behavior syndromes that occur in the luteal phase and resolve soon after the onset of menses. Although PMS is widely recognized, its neural mechanism is still unclear.

DESIGN: To address this question, we measured brain activity for women with PMS and women without PMS (control group) using resting-state functional magnetic resonance imaging (rs-fMRI). In addition, the participants should complete the emotion scales (Beck Anxiety Inventory, BAI; Beck Depression Inventory, BDI, before the scanning) as well as the stress perception scale (Visual analog scale for stress, VAS, before and after the scanning).

RESULTS: The results showed that compared with the control group, the PMS group had decreased connectivity in the middle frontal gyrus (MFG) and the parahippocampal gyrus (PHG), as well as increased connectivity in the left medial/superior temporal gyrus (MTG/STG) and precentral gyrus within the default mode network (DMN); in addition, the PMS group had higher anxiety and depression scale scores, together with lower stress perception scores. Finally, there were significantly positive correlations between the stress perception scores and functional connectivity in the MFG and cuneus. The BDI scores in the PMS group were correlated negatively with the functional connectivity in the MFG and precuneus and correlated positively with the functional connectivity in the MTG.

CONCLUSION: These findings suggest that compared with normal women, women with PMS displayed abnormal stress sensitivity, which was reflected in the decreased and increased functional connectivity within the DMN, blunted stress perception and higher depression.