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Review Article

MOOD CHANGES DURING PREMENSTRUAL SYNDROME

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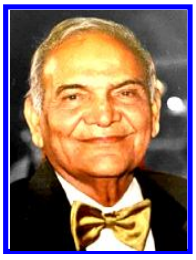
Abstract: ***Mood swing often bothers more women than men, since sex steroid hormone estrogen is one of the most important factors for mood change. Even in same woman on the same day of the period it may not show the same pattern. It is also found that even the Normal level of estrogen is not fixed it varies from 30 to 400 pg/mL. Both high and low levels of estrogens affect women's mood. Earlier it was found that specific portions of the brain has estrogen receptors and depending on saturation of estrogen receptors the brain synthesizes and /or secretes neuropeptides which are responsible for mood change.***

Keywords: Moods, Premenstrual, Syndrome

INTRODUCTION

Biologically, sex is usually categorized as female or male. Primary sex determination is strictly chromosomal and is not usually influenced by the environment. In most cases, the female is XX and the male is XY (1). But until ovary starts making estrogen, a sex steroid hormone, development of male and female child is the same. In fact estrogen makes a women a woman (2,3). Estrogen makes sea changes in female body during teen age. In addition to role played in development of primary and secondary reproductive organs, estrogens also regulate brain functions in females including moods and emotions under the physiological or pathological conditions when estrogen levels go high or low (3), however, normal estrogen levels vary widely. Large differences are typical in a woman on different days, or between two women on the same day of their cycles. The actual measured level of estrogen doesn't predict emotional disturbances (4).

Menstrual Cycle: In teen girl's life menarche is the most significant milestones; it set in between the ages of 9 and 15 years in most girls (3,5). Menstruation is the regular discharge of blood and mucosal



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tissue from the inner lining of the uterus through the vagina. The menstrual cycle (MC) is characterized by the rise and fall of hormones (3,6) The cycle tends to be an ovulatory and vary widely in length. They are usually painless and occur without warning. The menstrual cycle is a 28 days cycle (25 to 30 days) in woman commences from menarche and ceases with menopause with the intermittent pauses during pregnancies.

The menstrual cycle may be divided into two phases: (A) follicular or proliferative phase, and (B) the luteal or secretary phase. The follicular phase begins from the first day of menses until ovulation. After the ovulation the left over scar known as 'corpus leutium' produces progesterone. Before their periods as many as 90% of women experience unpleasant symptoms (3). Premenstrual syndrome (PMS) has a wide variety of signs and symptoms, including mood swings, tender breasts, food cravings, fatigue, irritability and depression (6). It's estimated that as many as 3 of every 4 menstruating women have experienced some form of premenstrual syndrome. Premenstrual dysphoric disorder (PMDD) signs and symptoms include depression, mood swings, anger, anxiety, feeling overwhelmed, difficulty concentrating (7). It is all due to chemical changes in the brain. Fluctuations of serotonin, a neurotransmitter that's thought to play a crucial role in mood states, could trigger PMS symptoms also.

PMS is a disorder characterized by physical, behavioral and emotional symptoms, which increases in severity during the luteal phase of the menstrual cycle (8) The physical and emotional changes one experience with premenstrual syndrome may vary from just slightly noticeable all the way to intense (9) In addition to physical symptoms such as breast tenderness, fluid retention leading to weight gain, fatigue, nausea, and constipation, the person also suffer psychological symptoms such as the tendency to become angry, irritable, tense, anxious, and restless as well as behavioral symptoms like depression, nervousness, and crying are seen. Over 40 million women worldwide experience these symptoms (10, 11). While approximately 90% of women have only mild premenstrual symptoms, approximately 20% have to cope with symptoms that severely disrupt their daily lives (12). Anger and irritability are one of the most severe and persistent symptoms of PMS that adversely affect women (13). It is reported that women frequently complain of anger and irritability in the premenstrual period (7). It is thought that hormonal changes in the menstrual cycle (fluctuations in estrogen and progesterone levels) affect the mood of women and trigger negative emotions such as anger and irritability. It is strange but true that women who are able to control anger in daily life lose their anger management ability in the premenstrual period.

Hormones and Emotions: Premenstrual syndrome (PMS) shifts the mood of a woman. Nearly, 48 % of women who are of childbearing age experience PMS, which can disrupt their daily life and cause significant physical discomfort and emotional issues (14). Puberty steps in when a baby girl in her teens and this is the first phase in a woman's life. A transit period from a child's life to adult life, where hormonal changes take place. At this time, a person undergoes emotional, physical, and psychological changes. Mood shifts and unexplained emotional reactions can be common during this phase of life (15). Many conditions and lifestyle choices can cause women to experience severe changes in mood during menopause. This shift in emotion may give a feeling that they come on for no reason. The hormonal changes due to menopause, in addition to its side effects, may be responsible for mood swings, sadness, and even rage during this time. In 70 percent of women estrogen-serotonin balance is out of proportion resulting in irritability. Insufficient amounts of serotonin may contribute to premenstrual depression, as well as fatigue, food cravings, and sleep problems. Estrogen may become the dominant hormone due to the falling levels of progesterone, which may be a contributory factor for the development of irritability and depression (16). Premenstrual syndrome (PMS-like symptoms) before their periods includes a group of symptoms that occur in women 1 to 2 weeks before a period is still an enigma. In addition to mood shifts, PMS can cause fatigue, changes in appetite, depression, bloating, and more. The severity of these symptoms may change from month to month and they may get worse or improve with age. In the days and weeks before a period, a woman's estrogen-progesterone levels rise and fall dramatically and researchers suspect estrogen is most likely to be blamed. They level out 1 to 2 days after menstruation begins. These shifts may affect mood and behaviour and calcium supplements may help to ease symptoms of depression, anxiety, and emotional fluctuation. Premenstrual dysphoric disorder (PMDD) is a more severe and rare type of

PMS for which no proper solutions are available till date. The pathophysiology is unclear affects only 5 percent of women of childbearing age. Symptoms of PMDD include extreme shifts in mood, severe depression, extreme irritability, and more [7]. Many women will combine alternative treatments like stress management and dietary changes with medication to ease out from symptoms and mood shift. A chain reaction originating from frustrations, constant state of stress and worries can lead to severe shifts in mood accompanied with psychological disorders and behavioural conditions translating to disorders including attention deficit hyperactivity disorder (ADHD), depression, bipolar disorder, and more [17]. Hormones influence many of the emotions people feel on a daily basis. When hormone levels shift, fluctuate, or just go wacky, they can seriously mess with emotions.

Estrogens regulate mood: So far endocrinologist identified over 50 hormones in the human body. Hormones that are synthesized and released in the blood control many different bodily processes, Estrogens are actually a group of steroid sex hormones derived from cholesterol, makes a woman. In other words it performs different roles in women's health and development. Estrogen helps make women curvier than men by making their pelvis and hips wider, and their breast grow (18). Estrogen is part of the menstrual cycle, helps in getting pregnant, developing bones and growing hair. It also helps regulate moods and impacts the brain development and structure.

It is an established fact that estrogens are needed to regulate for reproductive, cardiovascular and bone health in addition to these recently it is found that Human mood swings are dependent on levels of estrogens circulating in the blood because estrogen acts everywhere in the body, including the parts of the brain that control emotion. Some of estrogen's effects include: Increasing serotonin, and the number of serotonin receptors in the brain. Modifying the production and the effects of endorphins, the "feel-good" chemicals in the brain (19). One may feel sad, anxious, or frustrated when estrogen levels are low. There are times when estrogen levels fluctuate, such as during periods or when the person is pregnant. It also decline due to aging and approach menopause. Low estrogen levels can have a serious impact on our life. Fortunately, there are ways to replenish the quantity of estrogen by supplements or diet so one need not to suffer from the many life-altering symptoms.

Shifting hormone levels and night sweats may disrupt sleep. This can cause fatigue, which may make mood swings worse. Low estrogen in females specially results in irregular periods or no periods (amenorrhea). Which in turn make people irritable and may react with anger to slight frustration? They become a short temper and may snap at people. Irritability can be a symptom of a mental health condition such as depression, anxiety or bipolar disorder, or it may be due to a physical condition, High estrogen levels may also cause mood swings (20-22). Mood symptoms are only present for a specific period of time.

On start of period: (day 1-2)Cramps and fatigue due to low estrogen, on day (3-5) Feeling good energy rises with estrogen the hormone that boost endorphins feeling more upbeat during this period.
On top of the world (6-9 day) Higher levels of estrogens bring feeling of unstoppable. Skin is glowing feel of energized and motivated
Bringing Sexy back (10-13 day) Most fertile period estrogen is highest the person feels her best, full of emotions, physically active live it up and enjoy
Ovulation takes place (14-18 day) Sudden change in hormones levels may leave you emotional and tired
Be mindful of the diet (19-22day) Estrogen levels drop skin may be more sensitive, appetite may increase, good time to eat healthy food
End of cycle (23-28 day) both the sex hormones decline, may feel blotted, sluggish, feeling down. Great time to boost serotonin levels

The neurotransmitter (serotonin) helps to regulate mood, sleep cycle, and appetite. Low levels of serotonin are linked to feelings of sadness and irritability, in addition to trouble sleeping and unusual food cravings — all common PMS symptoms. Mood swings are one of the most common and most severe PMS symptoms.

Mood swings during pregnancy: Mood swings also are common during pregnancy. Hormonal changes during early pregnancy can be similar to

how you might feel at the start of a menstrual period, breasts swell and become tender, hormones levels go up and down, and one may feel moody. If a woman suffered with PMS, she may likely to have more severe mood swings during pregnancy. They can make her go from being happy one minute to feeling like crying the next. Mood swings are very common during pregnancy (23).

Significant changes in the hormone levels can affect the level of neurotransmitters, which are brain chemicals that regulate mood. Mood swings are mostly experienced during the first trimester between 6 to 10 weeks and then again in the third trimester as your body prepares for birth (24-26). The increased levels of hormones during pregnancy can cause the woman feel low, tearful and easily irritated. Taking that into account one might be able to understand why they for, seemingly no reason the woman snapped at near and dear ones

Mood Swings during Pathological Conditions

A. Due to high estrogen levels:

a. Estrogen-dependent cancers: Breast cancer, ovarian cancer and endometrial (uterine) cancer, rely on estrogen to develop and grow (27).

b. Polycystic ovaries: High levels of estrogen are known as estrogen dominance and can occur in women with polycystic ovary syndrome (PCOS). This condition is a hormone imbalance that can cause irregular periods, unwanted hair growth, and acne. Women with PCOS also have a higher risk for depression, anxiety and extreme or rapid changes in mood (28).

c. Endometriosis: Research shows that women with endometriosis have higher levels of estrogen, which can affect the endometrial tissue outside of the uterus and lead to inflammation and pain. Estradiol is a type of estrogen that regulates how uterine tissue grows. Women with endometriosis often have higher-than-normal estrogen levels, which can cause mood swings, anger, irritability, and frustration (29,30).

B. Due to low estrogen levels:

a. Menstrual irregularities: Irritability, depressed mood, anxiety, or mood swings. Mood symptoms are only present for a specific period of time, during the luteal phase of the menstrual cycle (31-33).

b. **Low sex drive Depression:** Low self-esteem, feelings of hopelessness and physical fatigue can lower your libido. Depression also causes an imbalance of the neurotransmitters that help regulate libido. Anxiety disorders: Anxiety can cause increased levels of the hormone cortisol (18,34).

Reduced bone density/ osteoporosis depressive disorder was supposed to be associated with reduced bone mineral density (35,36).

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