

Original article:

The effect of regular 4 months aerobic exercises on premenstrual syndrome on healthy females

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Abstract:

Premenstrual syndrome (PMS) is a combination of physical, psychological, or behavioral changes in the late secretory phase of menstrual cycle and interferes with interpersonal relationships or activities. The purpose was to assess the effects of 16 weeks of regular aerobic exercise on PMS in healthy working females. The study included personal information, a medical questionnaire and a form of premenstrual symptoms. Before the training, the daily symptoms were recorded for 3 months , so that confirmed cases of are selected as per the PMS scale. The participants were evaluated before and after 4 months aerobic exercises , statistical analysis was done by *t*-test. The study showed that the mean scores of PMS declined after 16 weeks significantly ($P < 0.0001$). We conclude that regular aerobic exercises are effective in reducing the severity of PMS symptoms.

Introduction:

A woman has to play different roles in her life, deal with diverse circumstances, likewise the monthly menstrual cycle also has cyclic changes which is also matter to be dealt. One of the most conspicuous is the premenstrual syndrome, which in severe cases is known to adversely affect the woman's personal, professional, familial and social life. By definition premenstrual syndrome is a common cyclic disorder of young and middle aged women characterized by emotional and physical symptoms that consistently occur during the leutal phase of the menstrual cycle(1). The symptoms must be present for one to weeks premenstrually with relief by 4 days of menses and should be documented prospectively for at least two cycles(2).The major somatic symptoms include; low back pain, breast tenderness, weight gain, headache, bloating and water retention leading to

edema in extremities. Depression, loneliness, anger, confusion irritability and restlessness are the common psycho-emotional and behavioral symptoms (1,3).

There is a strong impact on quality of life ,distracting woman's function at home as well at work, therefore timely and appropriate treatment is mandatory. In order to ameliorate the signs and symptoms, variety of treatment has been recommended including medical (hormonal, antidepressant, vitamin B , pain killers etc), surgical and alternatives like (acupuncture, massage). No treatment is beneficial up to the mark, since the etiology of PMS is still not very clear and multifactorial aspects are hypothesized. The positive relation between the physical, psychological health and exercise is recently more under spotlight(4). Considering the side effects of medical and surgical modalities of treatment, which are used in severe cases of PMS,

more ever all of the cases may not even respond to therapeutic management, center of attention can be made on safe exercises in women with mild to moderate symptoms. Bearing in mind the prevalence of PMS , its adverse outcomes ,the present study was conducted to see if any positive outcome could be obtained by just lending one hour from 24 hours to simple and enjoyable aerobic exercises on PMS symptoms.

Material and Methods:

The study was performed on 50 healthy height and weight matched, married females in the age group of 26-40.The participants were selected by giving PMS test scale(5), calendar was used to record the daily symptoms ,score more than or equal to 30 is taken moderate to severe, and between 25-29 is mild. Maximum score is 36. Females with regular menstrual cycle of length 28-32 days and for 3-7 days were taken. Informed consent was taken from all the participants, after explaining the study protocol. Study started with detailed medical history, menstrual history. The PMS SCORE was taken prior exercises; the aerobic training was started for next 4 months. Exercises were done 5 sessions in a week with 60 min each session, under guidance of experienced trainer. To begin with a warm up of 5 min, stretching was performed, then rapid movement of trunk and limbs in a combined manner for 50 minutes after which light stretching was done to back to original state. Once a week, hand weight were also used to increase the intensity.

After 4 months of training the PMS questionnaire was gain circulated and data collected. The pre and post test PMS score was analyzed, mean, SD and t test were used for statistical analysis, < 0.05 was considered as the significance level.

Observation and results:

The mean age of the subjects taken for study was 29.52±3.0177.

Table: 1 showing the PMS scores before and after the aerobic training

Pre –exercise PMS (Mean ±SD)	Post –exercise PMS (Mean± SD)	P VALUE
27.9±2.846	22.96±3.017	< 0.000***

Table: 2 showing the BMI before and after aerobic training

Pre –exercise BMI (Mean ±SD)	Post –exercise BMI (Mean± SD)	P value
30.12 ±1.72	33.12 ±1.72 27.22 ±2.12	0.001

Discussion:

In the present study the effect of regular 4 months aerobic exercises on PMS symptoms were analyzed, and showed a positive effect which are hand to hand with previous work done. The exact etiology not being very clear multiple facts are related with this syndrome, like changes in Mg⁺⁺ & Ca⁺⁺, Ovarian hormones, influencing neurotransmitters (serotonin). There is also suggested role of angiotensin – aldosterone, prolactin , leptin like hormones apart from genetic and life style. Dehghan *et al.* (2008) also observed that 3 months of aerobic exercise reduces the physical and psychological symptoms effectively (6).Physical symptoms such as swelling,

weight gain, headaches, and breast pain are possibly related to increased aldosterone in serum, prostaglandin E₂, and deficiency of vitamin B and Mg. Increased level of prolactin in the late luteal phase is also one of the predicted causes of breast pain and swelling, and possibly aerobic exercise reduces the level of these hormones and helps in improving the symptoms.

Increased renin–angiotensin activity and decreased levels of estrogen and progesterone as factors in increased serum levels of aldosterone in the late luteal phase are listed, and increased level of aldosterone in the serum increases the reabsorption of sodium and water, and as a result causes edema and physical symptoms(7).

Studies have shown that the performance of physical activities reduces the levels of renin activity and increases the levels of estrogen and progesterone, and in this way, decreases the serum levels of aldosterone and reabsorption of sodium and water, thereby reducing edema and improving the physical symptoms. A survey conducted by Joyner and Charkoudian (2004) on 20 women showed that the 12-week aerobic exercise created the balance of estrogen and progesterone levels in women, reducing the symptoms (8). Another factor in the appearance of physical symptoms is the suggested role of prostaglandin E₂, which reduces muscle contractions. The repetitive contraction in the aerobic exercises results in the increase of prostaglandins and other substances which help prevent and reduce back pain and discomfort in the pelvis and the abdomen(9). Impaired levels of prostaglandins in the luteal phase are also known to be related with reduce libido in this phase (10).

Pablo (2011) considered 8 weeks of aerobic exercise as a treatment for reducing symptoms in with

patient's moderate depression (11). Studies have also shown that of regular physical activity can reduce anxiety and other neurovegetative symptoms. Noting that beta-endorphins levels in the late luteal phase decrease due to changes in sex hormones, it seems that physical activity with influences on brain endorphins improves the psychological symptoms. It is believed that aerobic activity through an increase in brain endorphin and reduction of adrenal cortisol results in the improvement of PMS symptoms and psychological symptoms that may occur due to reduced beta-endorphins.(12).

The positive effects of exercise on psychological symptoms are also justified by others. According to the cognitive–behavioral theory, intrusive thoughts and cognitive impairment lead to depression. Exercise results in the elimination of negative thoughts and brings about positive thoughts, and thus it can reduce depression for some time.(12) . Also, stress and anxiety are produced due to lack of confidence in people; on the other hand, exercise causes collective social contacts and people increase their self-image and confidence, and as a result, stress and anxiety are reduced(12). Another possible mechanism is the effect of exercise on blood leptin levels in women with PMS.(13). Leptin is a hormone secreted from fat cells and regulates the metabolism of the hypothalamus–pituitary–gonadal and has an important role in human reproduction. This hormone exerts its metabolic and neuroendocrinologic effects through its receptors in the hypothalamus area of emotional control. A study has shown that circulating leptin concentration in women with PMS is significantly higher than in women without PMS, and high hormone levels may be associated with psychological symptoms of PMS. Some researches

showed that physical activity reduces the amount of leptin in blood to 30-34%.

Perhaps physical activity by decreasing the blood leptin levels in women decreases the psychological symptoms of PMS. The positive effect of aerobics is also seen in decreasing weight, as seen in decrease in BMR, loss of weight on its own is a factor that decreases risk of many other diseases apart from improving self confidence. Regular aerobic exercise has many benefits, including increased power for women's heart vascular activity, increasing the bone density, and reducing the stress and PMS.

Within the psychophysiology literature, emerging research focus is on the notion of an exercise addiction, the contention being that the mood enhancing and analgesic properties.

Conclusion and further study:

Overall, the findings of this research show that aerobic exercise training to patients suffering from PMS can reduce symptoms, resulting in better job and social performance. It can be recommended as an effective treatment method. Human body is the best picture of human soul, so as to enjoy the glow of health, exercises should be incorporated in one's daily life as a convention, to see the miracle of fitness on physical, psychological and intellectual activity. As well said fitness is not being better than others but it is being better than you were before. As a further study, the role of exercises in infertility should also be considered, as the discussion reveals that prolactin and leptin levels are increased in severe PMS, and these hormones are also related with infertility, therefore more further should be done on these estimating these hormone levels and their correlation with PMS and exercises.

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