

Evaluation of Psychological Symptoms in Premenstrual Syndrome using PMR Technique

VEENA JASUJA¹, GEETANJALI PUROHIT², SAMEER MENDPARA³, B.M. PALAN⁴

ABSTRACT

Background: The mood changes surrounding menstrual cycle mainly during luteal phase, known as premenstrual syndrome, have been described as early as the time of the ancient Greeks. Beck Depression Inventory (BDI-II) and State Trait Anxiety Inventory (STAI) are used to study psychological symptoms of anxiety and depression.

Aims: To study the psychological parameters and effects of PMR on females with premenstrual syndrome.

Settings and Design: It was an experimental study.

Materials and Methods: Sixty participants aged between 18 and 40 years, volunteered for this study. Relaxation technique, PMR

was given to the study group (Group A, Mean age 24.13±5.69) for one month and control group (Group B, Mean age 28.96±9.42) was evaluated without any intervention.

Statistical Analysis Used: Paired students t test. Alpha error was set at 1% level.

Results and Conclusion: PMR Group A showed significant decrease in both BDI II and STAI scores ($p < 0.001$), showing benefits of relaxation in reducing anxiety and depression. We conclude that PMR helps to alleviate symptoms of premenstrual syndrome and decreases anxiety and depression as shown by changes in scores of both questionnaires.

Keywords: PMR, PMS, Relaxation

INTRODUCTION

The term "premenstrual syndrome" was first coined in 1953. Premenstrual syndrome (PMS) is a condition of recurrent physical and psychological symptoms occurring in cyclic fashion during luteal phase of menstrual cycle of women. The mood changes surrounding menstrual cycle have been described as early as the time of the ancient Greeks; however it was not until 1931 that this disorder was officially recognized by the medical community. There are wide-ranging symptoms, so there is difficulty in making a firm diagnosis [1]. Several theories have been advanced to explain the cause of PMS but none of these theories have been proven, and specific treatment for PMS still largely lacks a solid scientific basis. In 1987, the American Psychiatric Association, in the DSM III, introduced the "Late Luteal Phase Dysphoric Disorder Diagnosis" that became "Premenstrual Dysphoric Disorder" in the DSM IV in 1994, with the same diagnosis criteria [2,3].

Numerous, but heterogeneous studies have been performed about premenstrual syndrome, with finally a lack of credibility and interest among practitioners. More recently with the diagnosis criteria generalization, psychiatrists were more concerned about this syndrome, because of anxiety and mood symptoms involved in social impairment and need of medical care. The most frequent mood-related symptoms of PMS include: anger, irritability, anxiety, tension, depression, crying, oversensitivity and exaggerated mood swings [1]. Most evidence suggests that PMS results from the alterations in or interactions between the levels of sex hormones and brain chemicals known as neurotransmitters. Since mood and behavioral symptoms are key features of PMS, underlying mechanisms must involve the brain. Indeed, sex steroids easily pass the blood-brain barrier, and sex steroid receptors are abundant in many brain regions that regulate emotions and behavior, including the amygdala and the hypothalamus [4]. The brain neurotransmitter serotonin is implicated in the regulation of mood and behavior, partly

because of observations made in preclinical studies, and partly because of the antidepressant and anxiety-reducing effects exerted by serotonin-facilitating drugs in human beings. This notion has also gained support from genetic studies [5-6] and from brain imaging experiments [7].

There is evidence that stress exacerbates the symptoms of PMS. For instance, Siegel et al., found that negative life changes accounted for a significant amount of variance in premenstrual behavioral change, pain and water retention [8]. Similarly, Woods et al., states that both major life events and daily stressors were positively correlated with negative effect, water retention, and performance impairment [9]. Furthermore, during the luteal phase there is evidence of increased physiologic response to stress as measured by heart rate, blood pressure, adrenocortical activity, and urinary excretion of epinephrine and norepinephrine. Other studies however, have shown no changes in heart rate and respiratory rate or adrenocortical responsivity throughout the menstrual cycle [8,10,11].

Most of the studies reported, have focused on prevalence of PMS, severity of symptoms and any alleviation of premenstrual symptoms. Relaxation therapy has been found to be useful in the treatment of wide variety of conditions including hypertension, gastro-esophageal reflux, insomnia, anxiety and many other psychosomatic illnesses. The purpose of present study was to determine whether regular practice of PMR reduces the severity of emotional premenstrual symptoms.

MATERIALS AND METHODS

After ethical clearance (SVIEC No: SVUEC/ON/MEDI/BH2009/D0937) this study was conducted in department of physiology at SBKS MI & RC, Vadodara, Gujarat, India between August 2009 and August 2010. This study was a case control study included 60 female participants aged between 18 and 40 years, having

one symptom either an affective or a somatic symptom and symptoms restricted to luteal phase of menstrual cycle only. After taking informed consent from each participant, a detailed history was taken and clinical examination was done. Beck Depression Inventory (BDI-II) and State Trait Anxiety Inventory (STAI), self evaluation questionnaire developed by Charls D. Spielberger were used to study psychological symptoms of anxiety and depression. All the participants were subjected to both questionnaire BDI-II and STAI. Now participants were randomly divided into two groups, Group A study group and Group B control group. Study group was given PMR session twice a week for one month. Instructions for PMR were given by recorded version in the voice of Dr B.M. Palan, a professional hypnotherapist. They were given Compact disc to practice PMR at home for next two months. Follow-up was done after three months to evaluate any alleviation in presenting symptoms. Again all participants were requested to fill up both questionnaires BDI-II and STAI. Participants were asked about any alleviation in symptoms and again they were requested to fill up self-evaluation questionnaires both BDI-II and STAI.

Scores on the STAI-Anxiety scale increase in response to physical anger and psychological stress, and decrease as a result of relaxation training. On the STAI-Anxiety scale, consistent with the trait anxiety construct, psychoneurotic and depressed patients generally have high scores [12]. BDI-II questionnaire is designed for individuals aged 13 and over, and is composed of items relating to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being fatigue, weight loss, and lack of interest in sex [13-14].

RESULTS

[Table/Fig-1] showed the scores of STAI and BDI II in both groups. Study Group A showed highly significant ($p < 0.001$) change. Scores of STAI, self evaluation questionnaire, showed highly significant change in Group A. Scores on BDI II questionnaire suggest that relaxation for one month and even meeting of group twice a week helped the participants to decrease depression. Group A shows significant decrease in BDI II after PMR ($p < 0.001$). The values are shown in [Table/Fig-1].

	Before	After	DIFF	p-value
Group A	11.03±5.67	6.96±3.22	4.07	<0.001
BDI II				
Group B	11.93±6.36	11.4±5.61	0.53	NS
STAI				
Group A	88.93±10.98	66.1±15.04	22.83	<0.001
Group B	90.73± 7.49	88.37±7.34	2.36	NS

[Table/Fig-1]: The scores of STAI and BDI II in both groups.

DISCUSSION

Premenstrual syndrome (PMS) is a common phenomenon characterized by mental and physical symptoms preceding menstruation. It is estimated that 50–80% of menstruating women experience some degree of physical and psychological premenstrual symptomatology and that 3–5% have sufficient severity to disrupt social or psychological functioning [15]. The diagnosis of clinically significant PMS is applicable when at least one moderate to severe physical and psychological symptom occurs for up to two weeks prior to menses with remission by the end of the menstrual flow. Symptoms should cause functional impairment and must be documented prospectively for at least two consecutive menstrual cycles.

The symptomatology of PMS, includes the depression symptom present in many severe cases, has a correlation between the severity of psychological and physical symptoms. However, there have been few studies on the association of menstrual cycle abnormalities with

female hormones and indices of biological responses in evaluating stress and depressive symptoms. Studies of PMS are remarkable for high (40-95%) placebo response, and good results with any treatment, especially in the 1st cycle in uncontrolled studies, but poor performance found in therapies in random, double-blind, placebo-controlled studies. Heterogeneous groups of subjects, small numbers and too few cycles may contribute to these findings [16].

Many studies of psychological interventions in treating premenstrual syndrome exist and broadly subdivided into lifestyle changes such as dietary modifications, exercise programme, relaxation and specific therapeutic approaches such as support groups and cognitive behavioral therapy. Relaxation training is a useful adjuvant therapy for PMS, but there is limited research evidence to support its use in isolation. Exercise has been more rigorously studied.

The relaxation response is a technique that consists of quiet sitting, PMR and repetition of a constant stimulus such as the word Aum at each breath in and out for 10 to 20 minutes twice daily. Relaxation is an important therapeutic tool in management of chronic pain and psychosomatic ailments. Psycho-neuro-immunology researches recommend relaxation for enhancement of immune power. The results of PMR therapy for PMS can be compared to various other relaxation therapies used to study PMS as they are reasonably similar. One of the several versions of original jackobson's PMR is known as Shavasana in system of YOGA.

In present study, Group A (PMR group), showed significantly high alteration of psycho-physiological parameters included in this study. Scores of self evaluation questionnaire of Spilberger improved and showed highly significant change in study group. In controls, we observed a change but that was less in comparison with study group. This was an unexpected result which can be explained that as it was a subjective study and participants were all medical students so their anxiety level increased while filling up the questionnaire. Scores for BDI II questionnaire also showed statistically significant change in Group A, PMR group.

A 10-month empirical study of 40 women with menstrual distress was undertaken to investigate the effectiveness of certain yogic practices in relieving negative symptoms. Eighty eight Women assigned to the study group underwent yoga training (regular practice of specific yoga postures and transcendental meditation); the control group had no training. The authors found significantly lower scores on the subscales of the menstrual distress questionnaire for subjects in the yoga-trained group compared with the control group in both the premenstrual and menstrual periods [17].

Several small studies have investigated the effectiveness of cognitive therapy in alleviating negative symptoms in women with PMS. Blake et al., compared a group of women randomized to receive immediate weekly cognitive therapy with a group of controls allocated to a waiting group list that kept a symptom diary over a 12-week period. Results of this study indicated that cognitive-behavioral therapy (CBT) was significantly more effective at remitting psychological and somatic symptoms as well as impairment of functioning compared with controls [18]. It is also reported that women utilizing CBT with relaxation instructions had significantly reduced PMS symptoms compared with women randomized to a non-active control group during two menstrual cycles [19].

In the present study women were carefully prospectively screened and those women in the PMDD group met full DSM-IV criteria for PMDD, experienced substantial mood changes, physical symptoms and changes in appetite during the luteal phase, which resolved during the follicular phase [20]. In contrast, Control women experienced minimal changes in these symptoms across the menstrual cycle. DSR (Daily Symptom Record) scores and measures related to anxiety and depression were significantly increased in the luteal phase of women with PMDD compared to the follicular phase.

Although the exact mechanism of action is unclear, it is thought that mind-body therapies such as PMR induce a "relaxation response". Alterations in sympathetic nervous system activity, including decrease in pulse rate, blood pressure, musculoskeletal tone and altered neuro-endocrine function, have been observed in relaxed subjects. It has been suggested that deep somatic restfulness reduces anxiety and physical arousal and PMR may directly inhibit anxiety and the muscular activity that generally precedes nausea and vomiting. It has been proposed that learning relaxation techniques can help people feel more in control of side effects and therefore less anxious [21]. Some researchers have suggested that PMR may serve as a distraction for cancer patients whereas others propose that distraction is only part of the effectiveness of such interventions [22-23].

CONCLUSION

A woman in her reproductive years of life, almost half of her lifespan undergoes these cyclic changes and quite a number of females experience some or other premenstrual symptom which affects her social, professional and family life too. PMR, a simple technique can teach her to handle this physiological stress and live her life more healthy and productive. Regular practice of progressive muscular relaxation is an effective way of achieving the balance between sympathetic and parasympathetic activities, Physical effects of stress are alleviated by relaxation of body which relaxes the mind automatically. Because many questions regarding the neuroendocrinologic mechanisms involved in PMS remain unanswered, one can only speculate about the physiological mechanisms by which regular practice of relaxation may decrease the severity of premenstrual symptoms.

Progressive muscular relaxation is a simple technique to learn and the best part of these practices is that, it is something that can be done comfortably even at home and there is no side effect reported so far.

Based on thorough review and lengthy discussion, the work group proposed that the information on the diagnosis, treatment, and validation of the disorder has matured sufficiently for it to qualify as a full category in DSM-5. A move to the position of category, rather than a criterion set in need of further study, will provide greater legitimacy for the disorder and encourage the growth of evidence-based research, ultimately leading to new treatments.

ACKNOWLEDGEMENT

I acknowledge all the participants involved in this study, without their cooperation and regularity, this study was impossible. I am thankful to Dr. BM Palan for his priceless guidance and Ms. Geetanjali Purohit for drafting and revision of this manuscript.

REFERENCES

- [1] Psychiatric and psychological aspects of premenstrual syndrome. *Encephale*. 2001;27(6):501-8.
- [2] American Psychiatric Association. *Diagnostic and statistical manual of mental disorders-DSM-IV*. Washington DC: American Psychiatric Association 1994.
- [3] American Psychiatric Association. *Diagnostic and statistical manual of mental disorders-DSM-III-R*. Washington, D.C. American Psychiatric Press.1987.
- [4] Kimberly, Yonkers MD. Premenstrual Syndrome. *The Lancet*.2008;371(11): 1200-10.
- [5] Hariri AR, Mattay VS, Tessitore A, et al. Serotonin transporter genetic variation and the response of the human amygdala. *Science*.2002;297:400-3.
- [6] Caspi A, Sugden K, Moffitt TE, et al. Influence of life stress on depression: Moderation by a polymorphism in the 5-HTT gene. *Science*.2003;301:386-9.
- [7] Parsey RV, Hastings RS, Oquendo MA, et al. Lower serotonin transporter binding potential in the human brain during major depressive episodes. *Am J Psychiatry*. 2006;163:52-8.
- [8] Siegel J, Johnson J, Sarson I. Life changes and menstrual discomfort. *J Human stress*.1979;5:41-6.
- [9] Woods NF, Devy GK, Most A. Major life events and premenstrual symptoms. *J humans stress*.1982;8:23-31
- [10] Woods NF, Most A, Longenecker GD. Major life events, daily stressors and premenstrual symptoms. *Nurs Res*.1985;11:579-90.
- [11] Little BC, Zahn TP. Changes in mood and autonomic functioning during the menstrual cycle. *Psychophysiology*.1974;11:579-90.
- [12] Spielberger CD, Sydeman SJ. (1994). State-Trait Anxiety Inventory and State-Trait Anger Expression Inventory. In M.E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcome assessment*. (pp. 292-321). Hillsdale, NJ: Lawrence Erlbaum Associates.
- [13] Beck AT, Steer RA, Garbin MG. Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clin Psychol Rev*.1988;8:77-100.
- [14] Richter P, Werner J, Heerlein A, Kraus A, Sauer H. On the validity of the Beck Depression Inventory- A review. *Psychopathology* 1998;31(3):160-8
- [15] Mortola J: Premenstrual syndrome- pathophysiologic considerations. *N Engl J Med*. 1998;338:256-7.
- [16] Ito M, Matsubara R. Premenstrual syndrome in women with mood and anxiety disorder. *Clinical Psychiatry*.2006; 48:759-63
- [17] Kirkby RJ. Changes in premenstrual symptoms and irrational thinking following cognitive-behavioral skills training. *J Consult Clin Psychol*.1994; 62:1026-32
- [18] Blake F, Salkovskis P, Gath D. Cognitive therapy for premenstrual syndrome: a controlled trial. *J Psychosom Res*.1998;45:307-18.
- [19] Morse CA, Dennerstein L, Farrell E, et al. A comparison of hormone therapy, coping skills training, and relaxation for the relief of premenstrual syndrome. *J Behav Med*.1991;14:469-89
- [20] Stephanie Collins Reed, Frances R. Levin and Suzette M. Evans. Changes in Mood, cognitive performance and appetite in the late luteal and follicular phases of the menstrual cycle in women with and without PMDD (Premenstrual Dysphoric Disorder). *Horm Behav* 2008;54(1):185-93.
- [21] Lee EJ, Bhattacharya J, Sohn C, Verres R. Monochord sounds and progressive muscle relaxation reduce anxiety and improve relaxation during chemotherapy: a pilot EEG study. *Complementary therapies in medicine*. 2012;20(6):409-16.
- [22] Isa MR, Moy FM, Abdul Razack AH, Zainuddin ZM, Zainal NZ. Impact of applied progressive deep muscle relaxation training on the level of depression, anxiety and stress among prostate cancer patients: a quasi-experimental study. *Asian Pacific journal of cancer prevention*. *APJCP*. 2013;14(4):2237-42.
- [23] Pathak P, Mahal R, Kohli A, Nimbran V. Progressive Muscle Relaxation: An Adjuvant Therapy for Reducing Pain and Fatigue Among Hospitalized Cancer Patients Receiving Radiotherapy. *Int J Adv Nurs Stud*. 2013;2:58-65.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Physiology, GAIMS, Bhuj, Gujarat, India.
2. Assistant Professor, Department of Physiology, SBKS MI & RC, SVU, Vadodara, Gujarat, India.
3. Assistant Professor, Department of Physiology, C U Shah Medical College, Surendranagar, Gujarat, India.
4. Professor, Department of Physiology, SBKS MI & RC, SVU, Vadodara, Gujarat, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Ms. Geetanjali Purohit,
Assistant Professor, Department of Physiology, Dheeraj General Hospital, SBKS MI & RC, SVU, Vadodara-391760, Gujarat, India.
Phone: +919537086089, E-mail: Purohit85geet@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Oct 10, 2013**

Date of Peer Review: **Dec 30, 2013**

Date of Acceptance: **Feb 07, 2014**

Date of Publishing: **Apr 15, 2014**