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EFFECT OF '61-POINTS RELAXATION TECHNIQUE' ON STRESS PARAMETERS IN PREMENSTRUAL SYNDROME

JYOTI DVIVEDI*▫, SANJAY DVIVEDI**, K. K. MAHAJAN*, SUNITA MITTAL# AND ANIL SINGHAL***

*Departments of *Physiology, **Plastic Surgery, and ***Neurosciences, Himalayan Institute of Medical Sciences, Jolly Grant, Dehradun – 248 140*

and

#Department of Physiology, Shri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun – 248 001

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Abstract : Premenstrual Syndrome is a psychoneuroendocrine stress related disorder and more than 300 treatment modalities for PMS show that the existing remedies have not provided satisfactory help to relieve PMS. 61-points relaxation exercise (61-PR), a relatively less known *hatha yoga* technique, is a successful means of stress relaxation and is expected to relieve PMS as well. The present study was conducted on 50 clinically healthy women volunteers who were in their reproductive age group and in their premenstrual period, from which a control group (n=20) and a PMS group (n=30) based on the symptoms were identified. In both groups basal heart rate (HR/min), systolic (SBP; mmHg) and diastolic blood pressure (DBP; mmHg), electromyogram (EMG; mV), electrodermal galvanic activity (EDG; μv), respiratory rate (RR/min) and peripheral temperature (T; °F) were recorded and the subjects were taken through a guided 61-PR. The symptoms and parameters were re-recorded after the 61-PR.

In control group, the basal HR was 82.06±8.07, SBP 111.95±8.23, DBP 76.8±6.42, EMG 4.08±2.99, EDG 9.77±3.29, RR 15.60±3.77 and T was 97.86±0.63. After 10 minutes of 61-PR, HR (77.27±10.85, $P<0.05$), SBP (107.35±7.41, $P<0.05$), DBP (75.25±7.57, $P<0.05$), EMG (2.07±1.90, $P<0.05$), EDG (8.06±2.87, $P<0.05$), RR (16.00±4.12, $P<0.05$) fell significantly and T (97.97±0.64, $P>0.05$) rose significantly.

In the PMS group, the basal HR was 90.61±8.46, SBP 122.5±11.52, DBP 83.53±8.26, EMG 5.79±2.75, EDG 13.14±6.54, RR 19.13±3.76 and T was 93.43±5.29. After 10 minutes of 61-PR, HR (75.58±10.11, $P<0.0001$), SBP (114.53±9.70, $P<0.0001$), DBP (77.46±8.68, $P<0.0001$), EMG (2.56±1.77, $P<0.0001$), EDG (10.64±5.72, $P<0.0001$), and RR (16.13±3.76, $P<0.0001$) declined to a much greater extent and T (93.49±5.28, $P<0.0001$) rose more significantly.

▫Corresponding Author

These results suggest a reduction in sympathetic activity by 61-PR, also the high basal sympathetic tone present in subjects of PMS group due to stress is considerably reduced by relaxation. 61-PR is effective in providing relief from PMS and may be a useful adjuvant to medical therapy of PMS and other stress disorders.

Key words : Yoga 61-points relaxation premenstrual syndrome heart rate blood pressure peripheral temperature EMG EDG respiratory rate

INTRODUCTION

The ancient yogic scriptures write about many variants of ‘shavasana’ or relaxation technique as is called by the western world. Among these, the ‘shavayatra’ (travel through one’s own corpse) is a well-established technique of Hatha Yoga, to relax the mind and body. Swami Rama of the Himalayan International Institute of Yoga Sciences and Philosophy developed a modification of the ‘shavayatra’ and named it ‘61-points relaxation exercise’ (1). It is a guided relaxation technique in which a person is directed to pay attention to specific key points in the body, and calm them down, so that the whole body is completely relaxed. The 61-points mentioned in the 61-PR, are nodal points at specific parts of the body. 61-PR, like other relaxation techniques, affects the sympathetic and parasympathetic components of autonomic nervous system, thereby affecting the vital physiological functions that govern heart rate, blood pressure, respiration, temperature, muscle tension and sweating. This exercise eliminates muscular tension, reduces stress, improves sleep and calms down anxiety (2, 3).

Premenstrual syndrome (PMS) is a condition of recurrent physical and psychological symptoms occurring in a cyclic fashion during the 1- to 2-week period preceding a woman’s menstrual period, significant enough to cause disruption in either family, personal, or occupational function (4). Research has proved that PMS is a psycho physiological and a stress induced disorder and that stress is a cause of symptoms of PMS (5, 6, 7).

More than 160 symptoms have been associated with the premenstrual phase of ovarian cycle, indicating the heterogeneous diagnostic criteria and ethnic variations (8). Presence of more than 300 modalities of treatment shows that existing remedies have not provided satisfactory help to relieve PMS (9). The 61-PR being a successful means of stress relaxation is expected to relieve PMS as well.

To the best of our knowledge, the evaluation of the efficacy of 61-points relaxation therapy in treatment of PMS has not been investigated in the past. The present study was, therefore, planned to investigate the effects of 61-PR on this stress induced disorder, with the help of specific physiological parameters that indicate stress and its release.

Presented here is the evaluation of effect of 61-PR upon the heart rate, systolic and diastolic blood pressure,

peripheral temperature, skin conductance, electromyogram, and respiratory rate of the volunteers in health and in patients of PMS.

MATERIAL AND METHODS

Subject population: The present study was conducted on 50 clinically healthy female volunteers in their reproductive age who were selected out from 87 female volunteers on the basis of a 'premenstrual syndrome questionnaire' developed by the investigator, to evaluate the symptoms of subjects, under guidelines from previous research publications (10, 11) (Table III). The symptoms of the cases were charted down and analyzed. Based on the presence or absence of symptoms, the subjects were divided into two groups:

Group I : 20 subjects having no symptoms of PMS (Control Group)

Group II : 30 Subjects having symptoms of PMS (PMS Group)

The experimental protocol was explained to them and a detailed informed written consent was obtained from each subject. All the procedures were non-invasive and the study plan was approved by the Ethics Committee of the Himalayan Institute of Medical Sciences. All the subjects had regular menstrual cycles and were not on any medication. The subjects belonged to middle socio-economic class and were living in the same geographical surroundings.

Experimental protocol: The subjects were asked to report in their premenstrual phase of the menstrual cycle. Three to 5 days prior to the expected date of menstruation, in supine posture, a baseline record of the non-invasive systolic blood pressure (SBP; mm Hg) and diastolic blood pressure (DBP; mm Hg) from the right arm were recorded using an automated sphygmomanometer (Panasonic Omron), the heart rate (HR/min), electromyogram (EMG; mV), electrodermal galvanic activity (EDG; µV), respiratory rate (RR/min), peripheral temperature (T; °F), were recorded simultaneously, on an automated biofeedback apparatus (J and J Engineering, USA). The electrode for HR recording was placed on the left thumb, for EMG on the forehead (Frontalis muscle), for EDG on the left index and ring finger and for T, on the tip of left middle finger. The electrodes for RR were attached to a belt which was worn around the chest.

The subject was then requested to maintain the supine position, and was guided by the investigator, through 61-PR for the next 8–10 minutes. All the variables were then again recorded. There subjective perception was also recorded after the relaxation. This assessment was done for 5 subsequent cycles.

The 61 points relaxation technique (12)

It was done in supine posture. The subjects were asked to follow the instructions given below.

- *Lie down on the bed in a comfortable posture. Feet should be about a foot apart and palms should be facing up. Use a small pillow under the head if desired. Close your eyes.*
- *Observe the commands to relax over 8–10 minutes. Concentrate for about 10 sec-*

onds upon the narrated 61 points and imagine a cool, intense, sharp blue light over these points. As your awareness reaches the narrated point, the part will start relaxing. Relax each of these points over the narrated sequence.

- *Now slowly become aware of the surroundings and gradually open the eyes. Keep on lying supine while the variables are being recorded.*

Analysis of data: Mean and standard deviation (± SD) of all observations were calculated and comparisons were done between the basal and post-relaxation values of control (mean±SD) and those of PMS group subjects by applying Student's 't'-test (paired). Analysis was tabulated with the help of 'Microsoft Excel' (Microsoft Office 2003). The recorded data was subjected to 'descriptive statistical analysis' and 'paired *t* test' through the 'data analysis tool' of the same software. Statistical significance was assigned at $P<0.05$. P values were obtained by comparison of parameters of control and PMS group subjects.

RESULTS

It was found in our series that heaviness of breast- 83%, irritability- 80%, lower abdominal pain- 76%, low backache- 67%, and vaginal discharge- 53%; were the commonly present symptoms of PMS. The results are summarized in tables I and II. The mean age of subjects of PMS group was 28.48±5.19 years, while age of the subjects of control group was 27.52±5.19 years.

In the control group, after 10 minutes of 61-PR, HR ($P<0.05$), SBP ($P<0.05$), DBP ($P<0.05$), EMG ($P<0.05$), EDG ($P<0.05$), RR ($P<0.05$) fell significantly and T ($P>0.05$) rose significantly (Table I).

In the PMS group, the basal level of T was lower and all other parameters were higher than controls. After 10 minutes of 61-PR, HR ($P<0.0001$), SBP ($P<0.0001$), DBP ($P<0.0001$), EMG ($P<0.0001$), EDG ($P<0.0001$), and RR ($P<0.0001$) declined to a much greater extent with a very high statistical significance and T ($P<0.0001$) rose more significantly (Table II).

TABLE I: Parameters in Control Subjects (n=20).

Basal parameters in Control Subjects					
HR (Beats/min)	*SBP (mm Hg)*	*DBP (mm Hg)*	*EMG (mV)*	*EDG (µV)*	*RR (Breaths/min)*	*T (°F)*
82.06±8.07	111.95±8.23	76.8±6.42	4.08±2.99	9.77±3.29	15.60±3.77	97.86±0.63
Effect 0f 61-PR on Control Subjects					
HR (Beats/min)	*SBP (mm Hg)*	*DBP (mm Hg)*	*EMG (mV)*	*EDG (µV)*	*RR (Breaths/min)*	*T (°F)*
77.27±10.85*	107.35±7.41*	75.25±7.57*	2.07±1.90*	8.06±2.87*	16.00±4.12*	97.97±0.64*

The values are expressed as means±SD.
*P<0.05; **P<0.01; ***P<0.001; ****P<0.0001.
P values are comparisons between basal parameters and the effect of 61-PR on the parameters.

TABLE II: Parameters in PMS Subjects (n=30).

Basal parameters in PMS						
HR (Beats/min)	*SBP (mm Hg)*	*DBP (mm Hg)*	*EMG (mV)*	*EDG (μV)*	*RR (Breaths/min)*	*T (°F)*
90.61±8.46	122.5±11.52	83.53±8.26	5.79±2.75	13.14±6.54	19.13±3.76	93.43±5.29
Effect 0f 61-PR on PMS Subjects						
HR (Beats/min)	*SBP (mm Hg)*	*DBP (mm Hg)*	*EMG (mV)*	*EDG (μV)*	*RR (Breaths/min)*	*T (°F)*
75.58±10.11****	114.53±9.70****	77.46±8.68****	2.56±1.77****	10.64±5.72****	16.13±3.76****	93.49±5.28****

The values are expressed as means±SD.
*P<0.05; **P<0.01; ***P<0.001; ****P<0.0001.
P values are comparisons between basal parameters and the effect of 61-PR on the parameters.

TABLE III: Premenstrual Syndrome Questionnaire.

Date:
Name/Age/Address:
Marital Status: Married/Unmarried
Education: Doctor/Nurse/House wife
Age at Onset of PMS (Years)

Date of Last Menstruation

Duration of menses (days) 26 28 30 32 More

Prementrual problems

Lower abdominal pain: Yes/No/Sometimes
Headache: Yes/No/Sometimes
Low back ache: Yes/No/Sometimes
Swelling in abdomen: Yes/No/Sometimes
Heaviness in breast: Yes/No/Sometimes/Painful/Tender/Sore

How frequently you observe these premenstrual problems? Every cycle/Alternate cycle/Sometimes
Any other feature you want to highlight:

Psychological symptoms

Irritability: Yes/No/Sometimes
Anxiety: Yes/No/Sometimes
Lack of sleep/More sleep: Yes/No/Sometimes
Depression/loneliness/crying: Yes/No/Sometimes
Mood swings: Yes/No/Sometimes
Appetite: Increased/Decreased/Normal
Constipation/Diarrhea: Yes/No/Sometimes
Nausea/Vomiting: Yes/No/Sometimes
Preference for food: Bitter/Salty/Sweet/Sour/High fat
Frequency of micturition: Yes/No/Sometimes
Acne Face: Yes/No/Sometimes
Greasiness of scalp and hair: Yes/No/Sometimes

On comparing the basal parameters of both the groups, it was found that HR (P<0.05), SBP (P<0.05), DBP (P<0.05), EMG (P<0.05), EDG (P<0.05), RR (P<0.05) was significantly higher and T (P>0.05) was lower in the PMS group (Tables I and II).

Subjects reported a 'feeling better' response everytime after the relaxation.

DISCUSSION

The results of 61-PR can be compared to reports available on various other relaxation techniques as they are fairly similar. The present study shows that the basal parameters of women who suffered from PMS, were significantly higher than control subjects, hence indicating the presence of stress in them.

In the present series while on one hand, on undergoing 61-PR the alteration of said parameters in the control subjects was statistically significant, on the other hand the relaxation induced alteration of the said parameters in subjects of PMS group was

statistically highly significant. The study results suggest a normal relaxation response in control subjects, while the relaxation response in the patients suffering from PMS showed a reduction in an abnormally high basal sympathetic activity and a heightened relaxation response. These findings corroborate with the observations of Goodale et al, who have studied different forms of relaxation response in their studies, and the same was supported by reports of others (6, 7, 13).

Increased sympathetic activity as seen in stress causes an increase in the heart rate, systolic and diastolic blood pressure, muscle tension, skin conductance and rate of respiration; while predominance of parasympathetic activity reduces these (3, 6). In presence of stress, reduction in peripheral temperature, recorded as fingertip temperature, is noted, while relaxation alleviates this peripheral cooling.

The relaxation response reduces the abnormally high sympathetic activity and causes a reduction in the blood pressure; and is a proven treatment for high blood pressure (6, 13, 14). The 61-PR lowered the systolic blood pressure in the subjects of control as well as PMS group where the reduction in PMS group was statistically highly significant, reinforcing the observations of previous studies (14). The basal diastolic blood pressure of women of PMS group in the present series was significantly higher than the control subjects, in corroboration with other studies (15). After 61-PR the reduction in diastolic blood pressure in the women of PMS group was statistically highly significant, showing that 61-PR can be used as an effective tool in treating the hypertension associated with stress disorders.

EMG is an indicator of sympathetic activity, denoting muscle tension. Since stress is stored in form of muscle tension, EMG is found to be raised in the event of stress. It was seen in the present study that basal EMG of women who suffered from PMS, was significantly higher than the control subjects. Other research workers have had similar findings of raised EMG in premenstrual syndrome (16). The relaxation response causes a reduction in the muscle tension as seen in EMG recording, by reducing the abnormal sympathetic activity. Findings in the present series on 61-PR therapy were in accordance with the results of Agarwal et al (15).

The estimation of EDG is useful in monitoring of the sweat gland activity and hyperhydrosis. Anxiety, a potent component of stress related disorders, triggers a sympathetic response leading to sweating; which is followed by a rise in electrodermal conductance of the skin. EDG is regarded as a gauge of arousal (17). The relaxation response causes a reduction in the sweating and results in reduction in the EDG, by tilting the autonomic balance in favor of parasympathetic and reducing the sympathetic tone (18). Van den Akker et al (19) found in their series that during relaxation, the raised EDG levels decrease to a greater extent in the premenstrual phase. Similar were the findings of other research workers (16).

Respiration slows down naturally during the course of relaxation (13, 20). Relaxation diminishes the activity of the sympathetic

nervous system to the bronchioles and increases parasympathetic input. Both systems together act on the smooth muscle encircling airways; causing them to constrict, and thereby increases the resistance to airflow. This coincides with the fact that we make use of less alveolar ventilation when we are relaxed (21). In the present series, on 61-points relaxation therapy, the reduction in rate of respiration in the women of PMS group was statistically highly significant. This finding supports the observations of Goodale (13).

Peripheral body temperature responds to sympathetic tone. When the sympathetic system is activated, skin (especially in the hands and feet) becomes cold because its blood supply is diminished by vasoconstriction and it becomes clammy because sweat glands flood the surface of body with moisture, which evaporates; further reducing the skin temperature. The sympathetic nervous system calms down in relaxation, thereby decreasing tone of the smooth muscle that encircles arteries and arterioles, allowing these vessels to dilate. The relaxation response, which reduces the abnormally high sympathetic tone, causes a rise in the skin temperature towards normal levels (16, 22). It has been observed by other research workers that there are finger temperature alterations in premenstrual stress (17). In the present study as well, the basal fingertip temperature of women who suffered from PMS, was significantly lower than the control subjects, indicating the presence of stress in the subjects of PMS group. Complementing the observations of previous workers, in the present series, on 61-PR, a rise in fingertip temperature was noted in the control subjects as well as those of the PMS group, which in the latter was statistically highly significant.

It will be illogical to explain the results purely from viewpoint of sympathetic and parasympathetic activation per-se. The future studies involving 61-PR must take into cognizance, the scarcity of scientific studies and it would necessitate monitoring of other blood parameters of stress like serum cortisol levels, circulating and urinary catecholamine levels during the period of stress. The general decrement in HR, SBP, DBP, EMG, EDG, RR and the rise in T in both the groups is in concert with earlier proposition that 61-PR tilts the autonomic balance to parasympathetic dominance, which is more prominent when the subject is in stress as seen in PMS group.

Conclusion

In the present study, outstanding effects of 61-PR were seen on the physiological parameters of subjects who were suffering from PMS. 61-PR is a deeply relaxing technique, objectively and subjectively, as seen in the results and the response shown respectively, especially by the PMS group, it has no side effects, and it is easy to be done by a woman who is under physical and psychological stress of PMS. In the absence of a single effective treatment regime for this disease in modern medicine, 61-PR can safely be recommended as an adjuvant to medical therapy to women suffering from PMS.

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