

Efficacy of Yoga versus Relaxation Techniques on Climacteric Symptoms of Perimenopausal women

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Abstract : Between the age of 45 to 60 years, 85% of the women display the typical symptoms of climacterium. Out of these 35% of the women experience little weakness, 35% display moderate symptoms, 25% complain of severe pain and 5 % of these are so much affected that they are incapable of working. There have been number of alternative treatments available for treating climacteric symptoms apart from hormonal therapy. The present comparative study is aimed to find out the advantages of one therapy over other so that it could be easily followed by women suffering from climacteric syndrome.

Materials & Methods: It was two group simple randomized design 250 women were screened, out of which 132 perimenopausal were used for selecting 60 samples by purposive sampling with random allocation by using lottery method and equally divided into two groups.

Results: There was significant improvement in all the parameters of climacterium (Psychological, vasomotor and somatic) except the sexual component within both the groups because of their mechanism of working on sympathetic nervous system by decreasing the cortisol levels and modulating central adrenergic activity.

Keywords: Climacterium, Green Climacteric Scale, Kupperman's Index, Perceived Stress Scale, Perimenopause

I. Introduction

Between the age group of 45 to 60 years of age, 85% of the women display the typical symptoms of climacterium. Out of these 35% of the affected women experience some weakness or not at all burdened by it, 35% displays moderate symptoms, 25% complaint of severe pain and 5% of these are so affected that they are incapable of working.

If compared to the other bodily organs, menopause (climacterium) characterized by a premature ageing of the ovaries. It is the rapid decline of the estrogen level and the progesterone contents in the blood which are responsible for many vegetative and psychical symptoms affecting the large number of women. Because of the interrelationship between the endocrine and nervous system any decrease in the estrogen production affects the central equilibrium. For the major part this hormone deficit is responsible for the menopausal disorders. However, the significance of the manifestation of the symptoms originating from each independent psychogenic process should not be under estimated. The processes occurring during menopause affect the complete individual. Each women reacts differently to the physical changes taking place and very often these changes also coincide with a change in the living condition. A women's own disposition and above all her attitude allowing her to adapt to new life activities in advanced age are decisive factors for the intensity at which many climacteric afflictions are manifested. Considerable strain ensues from these afflictions which tremendously affect the quality of life of the women.

Peri and Postmenopausal women often seek medical help and climacteric symptoms are their most common reason for doing so. These symptoms are due to changes in the ovarian function during the menopause. Moreover, psychosocial and other age related changes also cause certain physical symptoms. There are number of treatments available for treating climacteric symptoms and the commonly used one is the Hormonal Therapy with sex steroids, but the use of HT has fallen dramatically due to increasing risk for breast and endometrial cancer, coronary heart disease, stroke and thromboembolism and less commonly uterine bleeding, hemorrhage, arthralgia, emotional changes rash, Pruritis and weight gain. Thus an increasing number of women are turning to complementary and alternative therapies like Yoga , (which incorporates physical poses, breathing exercises and meditation) and Relaxation Techniques (including Paced breathing, Progressive Muscle relaxation and Guided imagery) which help attenuate Climacteric Symptoms by improving the indices of Psychological and physical health without any side effects. The present comparative study is aimed to find out the equivalent effects of relaxation techniques with yoga therapy, so that it could be easily followed by all women suffering from Climacteric Syndrome who cannot perform difficult yoga asana. This will help in developing a protocol that will be symptom specific as menopause is a part of natural ageing process.

II. Materials And Methodology

The study design adopted was two group simple randomized design. 250 women were screened, out of which 132 were perimenopausal women. Purposive sampling technique was used for selection of 60 samples and random allocation of the samples using lottery method was done to assign 30 samples equally to yoga and relaxation therapy groups. Subjects underwent sun salutation, yogic breathing exercises and cyclic meditation in yoga therapy and paced respiration, visual imagery and progressive muscle relaxation in relaxation therapy for 43 minutes per day. post test was completed 4 weeks after the treatment.

2.1 Inclusion and Exclusion Criteria:

Females of age between 40 and 55 years irrespective of whether they were menstruating regularly women who had undergone hysterectomy with retained ovaries are also included. the exclusion criteria were a) females having practiced yoga for 1 month or more b) taking hormonal therapy c) any surgery in past 3 months d) gynaecological problems such as endometriosis, fibroids, ovarian cysts, tumours of uterus, prolapsed uterus e) females having hypertension (β -blockers or centrally acting antihypertensives drugs may affect vasomotor symptoms) f) females with diabetes mellitus (vasculopathy or autonomic neuropathy may affect vasomotor symptoms) g) females taking psychiatric medication.

Evaluation outcome prediction was based on pre and post test scores of Perceived Stress Scale (PSS), Green Climacteric Scale (GCS) and Kupperman's Index (KI) for psychological, vasomotor, somatic and sexual symptoms.

2.2 SUBJECTS

The assessment forms were filled up for 132 women at Physiotherapy OPD, Lovely Professional University, Punjab. Ultimately, 60 perimenopausal women were chosen for the study who fulfilled inclusion and exclusion criteria and were randomly divided into two training groups. Yoga group (N=30) and Relaxation Group (N=30) using chit method.

2.3 Procedure

The training was provided for 50-60 minutes for 6 days per week for consecutive 4 weeks in a neat and quiet room, without any external noise or glaring lights. Each subject was asked to fill the consent form and questionnaires – Green Climacteric Scale (GCS), Perceived Stress Scale (PSS) and Modified Kupperman's Index (KI). An introductory session was provided to all the subjects before beginning with the study where they were acquainted with the procedure, application and aim of the study.

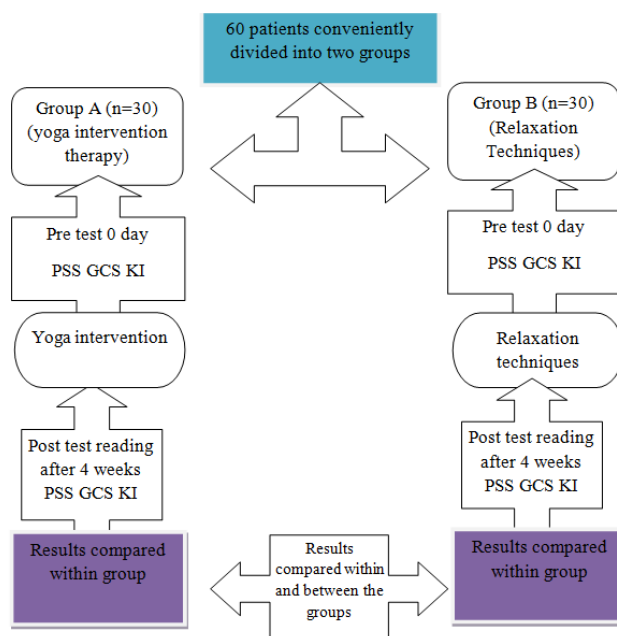


Figure1 Summary of the Procedure

Group A – Yoga Therapy		Group B – Relaxation Therapy
Sun salutation (Surya Namaskar)	10 minutes	Slow Paced Respiration and Word repetition
Breathing Exercises -Hands in and out breathing (Hasta Ayama Savasanam) -Hands stretch breathing (Hasta Vistara Svasanam) -Ankle stretch breathing (Gulpha Vistara Svasanam) -Tiger Breathing (Vyaghra Svasanam) -Bridge Posture Breathing (Setu Bandha svasanam)	10 minutes	Guided Imagery
Cyclic meditation (Avtan Dhyanam)	20 minutes	Progressive Muscle Relaxation
Lecture and difficulties	10 minutes	Lecture and difficulties

Figure 2

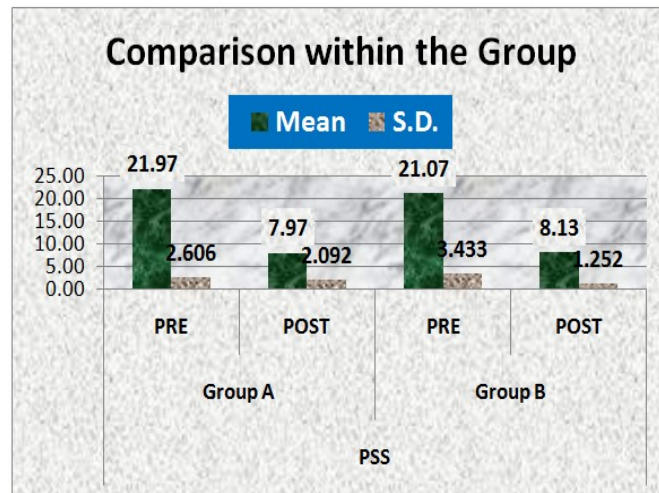
III. Data Analysis And Result

Data analysis was carried out after collecting the data for six outcome measures of the subjects in both the groups. The comparison done for Perceived Stress Scale and Modified Kupperman’s Index and Green Climacteric Scale consisting of four variables – Psychological, Vasomotor, Sexual and Physical Symptoms. Yoga was given in Group A and Relaxation Techniques in Group B. As the comparison was done within and between the two groups, the sample size was small (n=30 Group A and n=30 Group B) so paired and unpaired t-test was used.

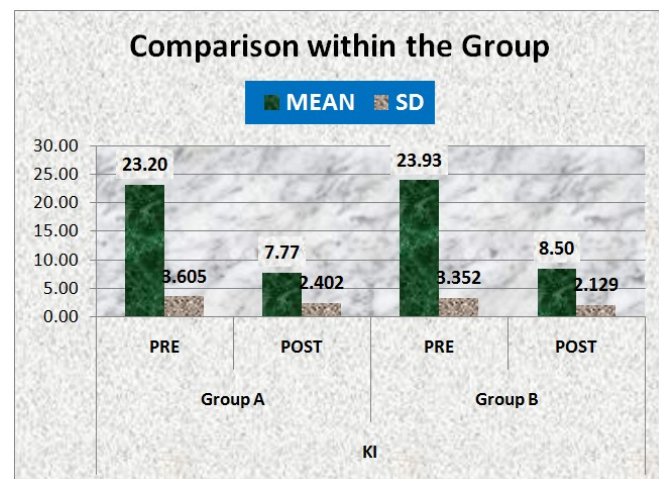
The relevant t-test statistics is calculated from the data and then compared with its probable value based on t- distribution at a specified level of significance for concerning degrees of freedom for accepting or rejecting the null hypothesis. (Kothari 2007)

Table 1 Paired t-test for the variables within the group

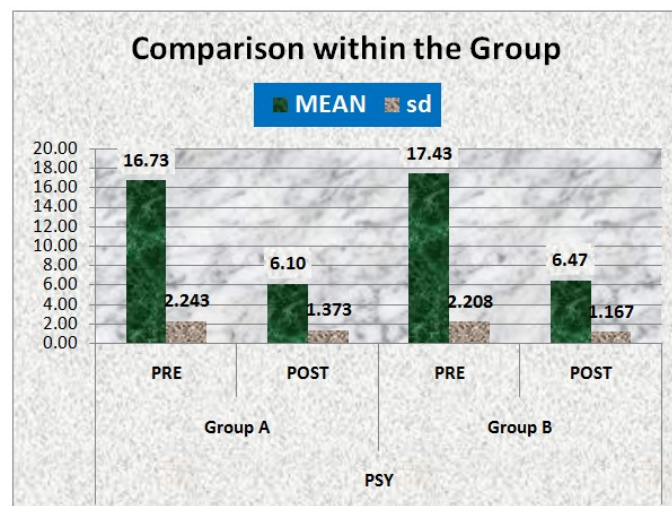
Age		Mean±SD	t-value	Level of significance
Group A		48.50±4.848	1.924	0.059
Group B		43.83±12.365		
PSS				
Group A	Pre value	21.97±2.606	23.684	0.0000
	Post value	7.97±2.092		
Group B	Pre value	21.07±3.433	18.662	0.0000
	Post value	8.13±1.252		
KI				
Group A	Pre value	23.20±3.605	26.398	0.0000
	Post value	7.77±2.402		
Group B	Pre value	23.93±3.352	28.486	0.0000
	Post value	8.50±2.129		
PSY				
Group A	Pre value	16.73±2.243	27.835	0.0000
	Post value	6.10±1.373		
Group B	Pre value	17.43±2.208	22.166	0.0000
	Post value	6.47±1.167		
VMS				
Group A	Pre value	4.80±0.89	19.000	0.0000
	Post value	1.63±0.56		
Group B	Pre value	4.40±0.77	14.203	0.0000
	Post value	1.73±0.87		
SXL				
Group A	Pre value	1.47±0.629	0.441	0.6624
	Post value	1.43±0.504		
Group B	Pre value	1.67±0.758	2.971	0.059
	Post value	1.43±0.679		
PHY				
Group A	Pre value	9.07±1.780	16.091	0.0000
	Post value	4.07±1.363		
Group B	Pre value	9.77±1.006	22.292	0.0000
	Post value	4.90±1.296		



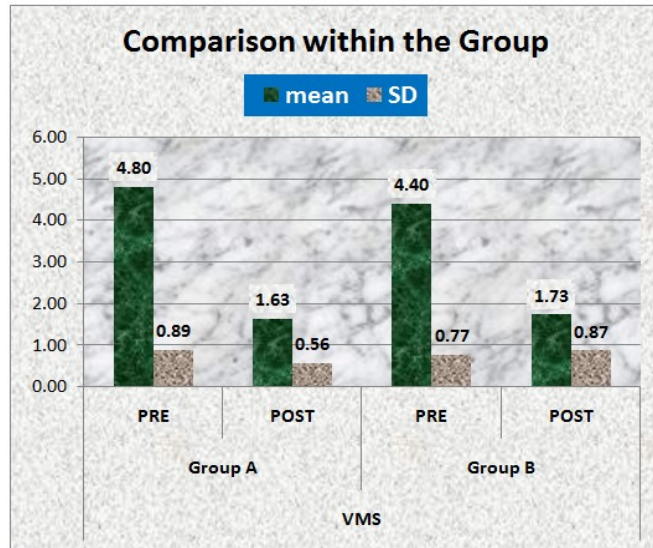
Graph 4.1



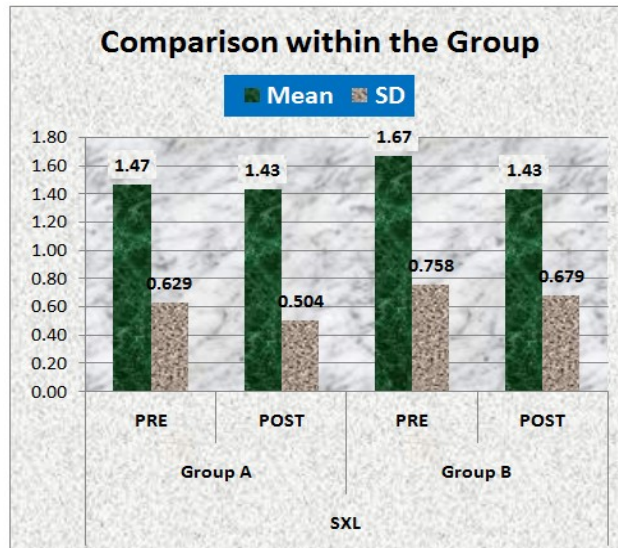
Graph 4.2



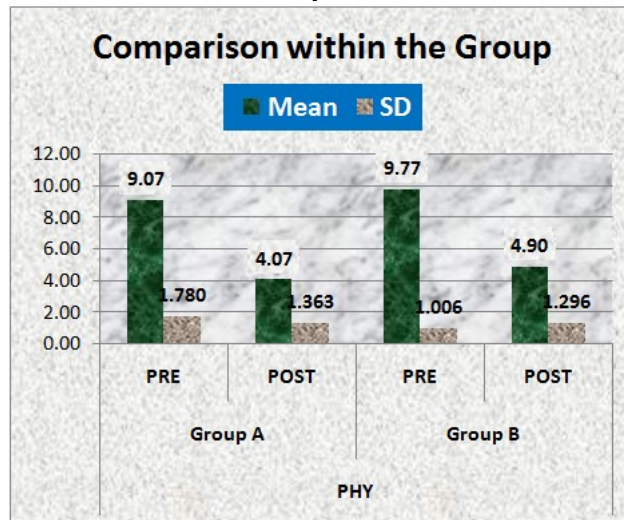
Graph 4.3



Graph 4.4



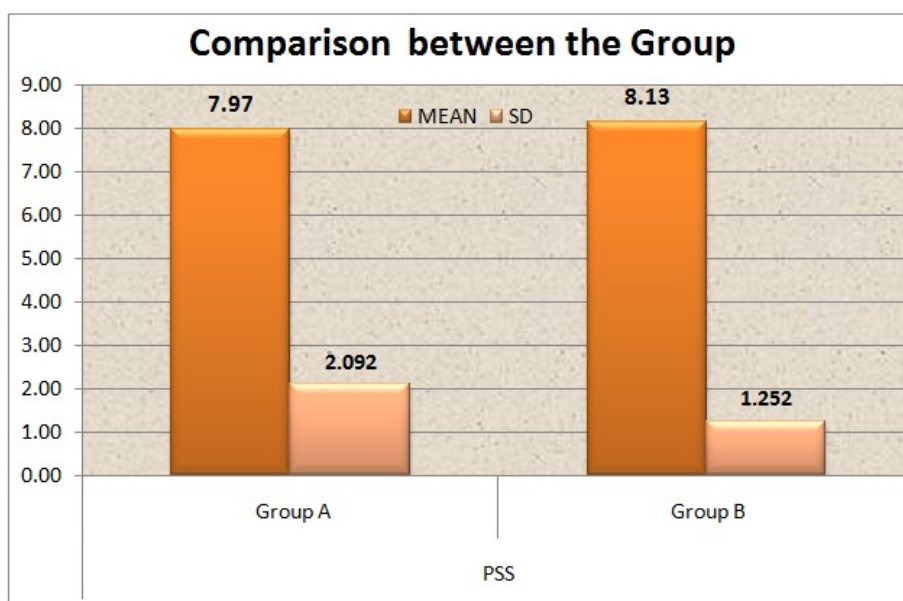
Graph 4.5



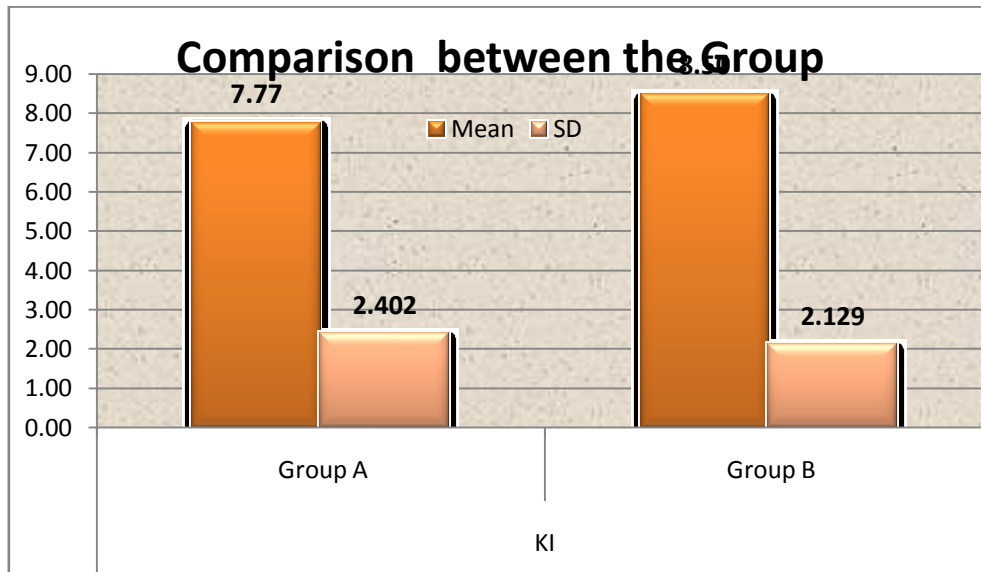
Graph 4.6

Table 2 Unpaired t- test for the variables between the group

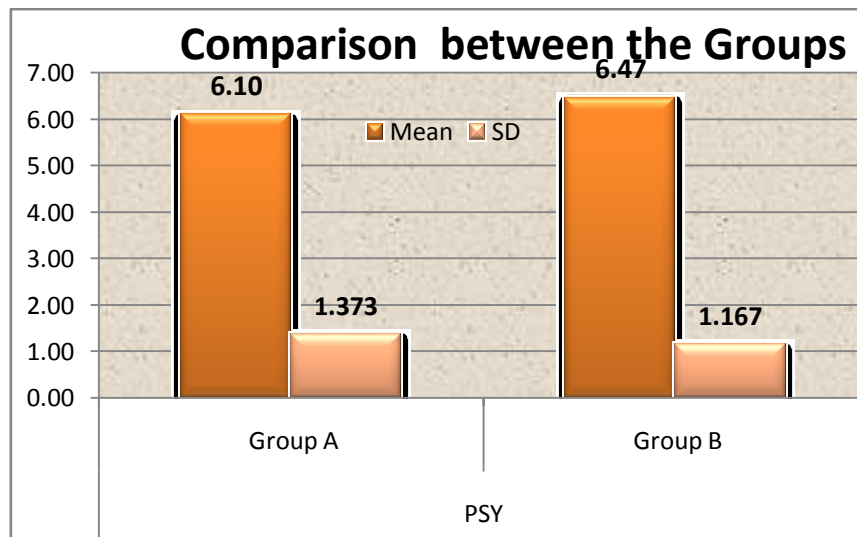
PSS		Mean±SD	t-value	Level of Significance
Group A & Group B	Pre value	21.97±2.606	1.144	0.2575
		21.07±3.433		
	Post value	7.97±2.092	0.374	0.7095
		8.13±1.252		
KI		Mean±SD	t-value	Level of Significance
Group A & Group B	Pre value	23.20±3.605	0.816	0.4178
		23.93±3.352		
	Post value	7.77±2.402	1.251	0.2159
		8.50±2.129		
PSY		Mean±SD	t-value	Level of Significance
Group A & Group B	Pre value	16.73±2.243	1.218	0.2281
		17.43±2.208		
	Post value	6.10±1.373	1.115	0.2697
		6.47±1.167		
VMS		Mean±SD	t-value	Level of Significance
Group A & Group B	Pre value	4.80±0.887	1.865	0.0672
		4.40±0.770		
	Post value	1.63±0.556	0.531	0.5973
		1.73±0.868		
SXL		Mean±SD	t-value	Level of Significance
Group A & Group B	Pre value	1.47±0.629	1.112	0.2706
		1.67±0.758		
	Post value	1.43±0.504	1.000	2.00
		1.43±0.679		
PHY		Mean±SD	t-value	Level of Significance
Group A & Group B	Pre value	9.07±1.780	1.875	0.0658
		9.77±1.006		
	Post value	4.07±1.363	2.427	0.0184
		4.90±1.296		



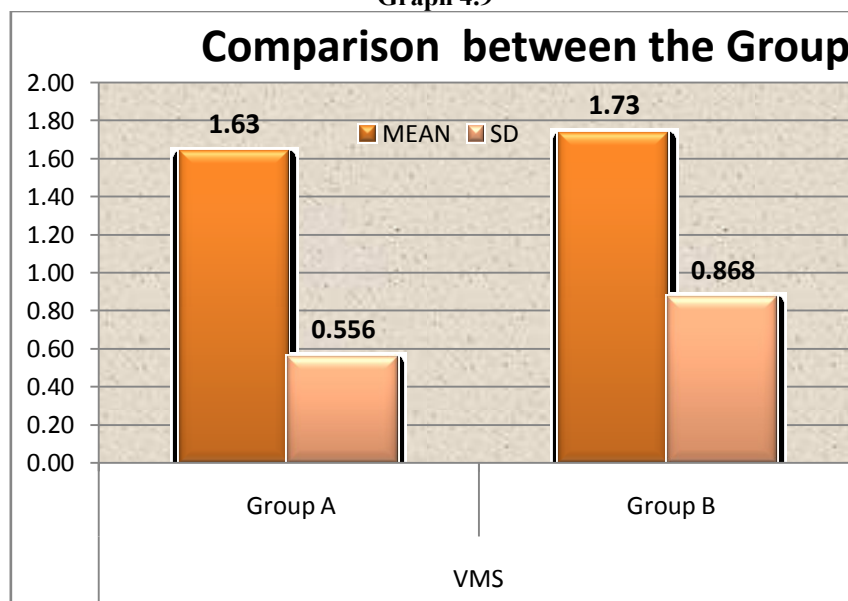
Graph 4.7



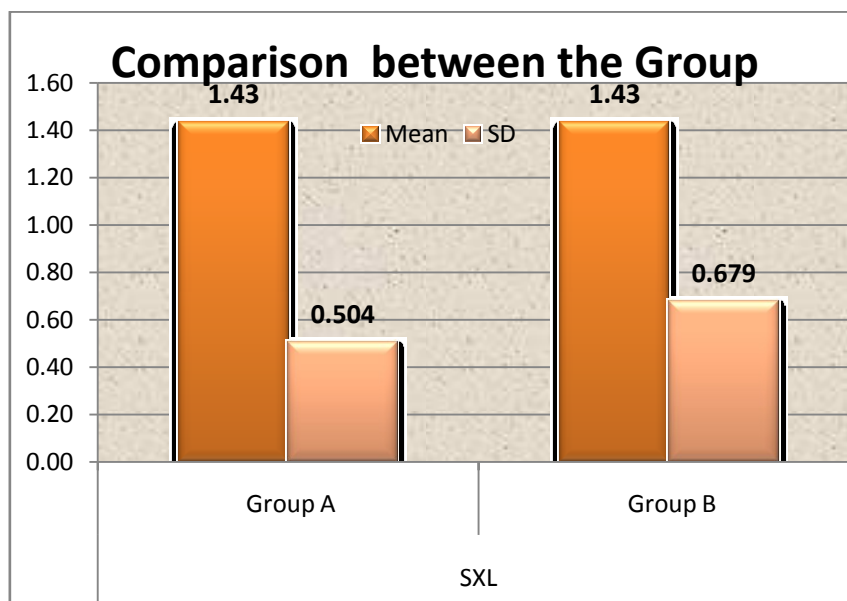
Graph 4.8



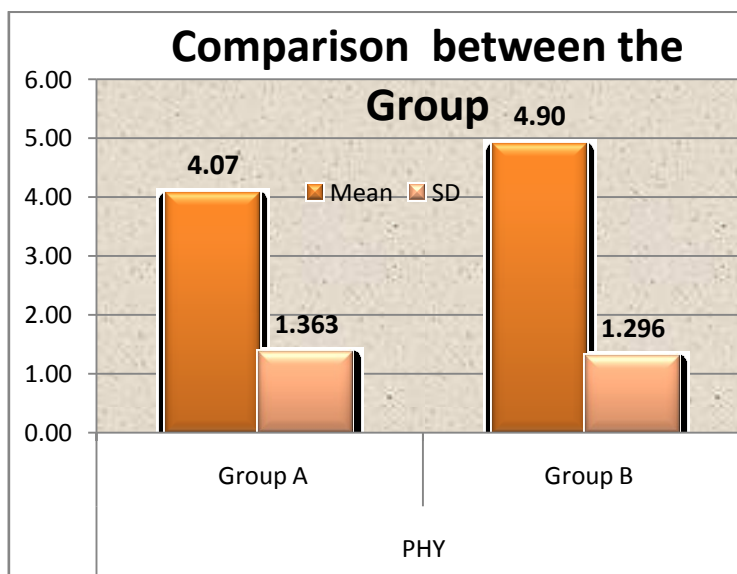
Graph 4.9



Graph 4.10



Graph 4.11



Graph 4.12

IV. Discussion

The baseline values in the study on all variables were on an average or severe values provided in the manual. After analysis we found that almost 95% of the females benefited from both the interventions. There was highly significant decrease in stress levels, vasomotor, psychological and somatic symptoms in both the groups. Sympathetic arousal resulting in increased catecholamines and cortisol levels mediated through the hypothalamic- pituitary adrenal axis is theorized to be the mechanism of increased stress and anxiety and the vasomotor and perimenopausal syndrome.

Similarly the pathophysiology of hot flushes is believed to be related to a thermoregulatory dysfunction at the level of hypothalamus that is mediated by estrogen withdrawal and increased adrenergic tone, thereby resulting in narrowing of the hypothalamic thermoneutral zone.

There was a significant improvement on all the variables in females with yoga therapy due to decrease in the neurotransmitters, hormone concentrations and electrophysiological changes of sympathetic arousal. Also stress reactivity is dependent upon the release of catecholamines during perimenopausal period as found by Blumenthal et al.

The findings of the study showed highly significant improvement on PSS scale within the Group A (P= 0.0001). Similarly, there were highly significant results on vasomotor (P=0.0001), psychological (P=0.0001) and somatic symptoms (P=0.0001) on GCS and for KI as well (P=0.0001). The reason behind all these

improvements accounts to the yoga training which had potential to reduce the somatization score and the scores related to mental health indicators such as anxiety, depression, anger and fatigue by increasing the urinary 8-OHdG levels. Cortisol is another objective stress related biomarker, because dysregulation of the level of cortisol is related to pathologies associated with stress related symptoms such as anxiety, depression and negative effect. Also the practice of yoga reduces the depressive symptoms of perimenopause by increasing GABA levels in the brain.

The reduction in the vasomotor symptoms accounts for the fact that yoga therapy decreased the oxygen consumption and hence decreased heart rate and reduced skin resistance. Telles S et al supported this through his study when he found that there is reduction in sympathetic tone, heart rate, skin conductance levels, and finger plethysmogram, through yogic relaxation techniques. In addition, the spectral analysis of heart rate variability showed a decrease in low frequency (sympathetic tone indicator) and an increase in high frequency (parasympathetic tone indicator) bands, indicating decreased physiological arousal.

A specific type of meditation called cyclic meditation was incorporated as the main practice in the present study based on our earlier studies in which it is shown that CM brings about a deep state of physiological rest. Two days of a stress reduction program using CM in 26 executives with occupational stress showed a significant decrease in the power of the low frequency component of the heart rate variability, spectrum and low frequency to high frequency ratio and breathe rate. The oxygen consumption is considered as a general index of the metabolic rate during physiological activities. A significantly greater resting metabolic rate was found in a high trait anxious group than in a low trait anxious group, suggesting a higher rate of oxygen consumption is being associated with higher anxiety. A reduction in oxygen consumption has been reported after meditation practices and relaxation response. A rarely quoted traditional yoga scripture points to an interesting intrinsic mental phenomenon that, in a meditative technique that involves a series of alternating activity (physical movements or mental chanting) and non activity (relaxation or stoppage of internal dialogue) with awareness, the degree of rest that follows will be deeper than the physiological rest achieved during restful meditation in one posture and hence can facilitate stress release at deeper levels. During CM, the extremely slow, conscious movements of the body provide a high sense of sensitivity to grasp the subtle changes happening inside the body, which may go unnoticed in a simple meditative state. The practice of CM decreased oxygen consumption to 32% compared with the preceding period as well as with a reduction of 10.1% with a period of supine rest of equal duration.

This study has shown one aspect, the efficacy of yoga in helping perimenopausal women improve their inner mastery, which could lead to better coping capacities, gracefully accept the change in their reproductive state, overcome stressors of aging, combat anxiety and depression and thereby improve their personality to enjoy the freedom from monthly menstruation and divert their energies toward spiritual growth.

Relaxation therapy which was administered in another group (n=30), also showed a highly significant decrease in PSS scores ($p=0.00001$), Psychological symptoms ($p=0.00001$), vasomotor symptoms ($p=0.00001$) and somatic symptoms ($p=0.00001$).

The reduction in vasomotor symptoms was due to Paced Respiration technique. The technique of slow, deep, diaphragmatic respirations is reported to decrease autonomic responsiveness and central sympathetic activity. It was similar to that of yoga as explained above. Due to same physiological response both therapies found equal efficacy and thus non significant results between the groups for vasomotor symptoms.

Mind and body are inextricably linked and the interaction between them can produce physical changes. Our brain notices a stressor, a physical reaction is triggered and the reaction can lead to further emotional reactions and mental and physical damage. Some problems such as headaches and muscle tension are often directly caused by the bodily responses that accompany stress.

Guided imagery technique given in the relaxation group is one of the techniques which work on stress by having dramatic influence on both the voluntary and involuntary nervous system. Scientists have proven that imagery enhances the immune system; increases and decreases salivation alters skin resistance and affects vascular tone.

Some imagery arises from unconscious processes, body processes and memories and perceptions from the cerebral cortex or “higher” center in the brain. Others having to do with smell for instance may arise from older more primitive areas. Whatever its origin may be, imagery is thought to have its effect by sending messages from the higher centres of the brain to lower centres that regulate person’s physiologic function, such as breathing, blood flow and pressure, heart rate, digestion, immunity, temperature, waking, sleep rhythms, thirst, hunger and sexual function. Thus it appears that the cortex can create these imaginary realities and clacking conflicting messages, to which the lower centres of the nervous system respond. Imagery tends to reveal the “big picture” and helps us recognize how things are unexpectedly related. Becoming aware of these relationships may support a positive constructive attitudinal shift or behavioral change that can aid in relieving, changing or coping with the illnesses or symptoms. Many physical ailments are direct manifestations of emotions that are locked within the unconscious. Through the imagery participants can access those emotions

and consciously change their effect on personal health. By directly accessing emotions, imagery aids participants in understanding the needs that may be represented by an illness and can help develop a way to meet those needs. Additionally imagery is one of the most direct ways of becoming aware of emotions and their effects on health, both positive and negative.

Regular relaxation results in less blood pressure increase to norepinephrine than is usually seen and it mimics the action of beta blocking drugs used to control blood pressure by improving blood flow to the heart.

Similarly Progressive Muscle Relaxation provided beneficiary effects to the subjects by reducing the somatic symptoms ($p=0.00001$). The effect of PMR can be theorized that the relaxation response is proposed to have the opposite effects of stress response including low levels of cortical arousal, decreased metabolism and decreased O_2 consumption and decreased cellular needs^[61]. It is the most effective method to deal with the stress or the parasympathetic response by reducing physiological activity through reduction in proprioceptive feedback from the muscles to reticular system. The decreased somatic symptoms may account for the fact, that muscle tension is significantly decreased with PMR as stated by Alasdair et al that during relaxation the heart rate slows down, skin resistance increases and levels of muscle tension decrease. This is due to diminution in the state of excitability of the sympathetic division of the hypothalamus and through a reduction in the hypothalamic cortical discharges by a similar reduction in the state of excitability of the cerebral cortex.

Relaxation Techniques thus provide general relaxation of the body by affecting different centres of the body either locally through dilatation, enhanced venous and lymphatic drainage or through the neural control. In a relaxation state sensors in the brainstem and hypothalamus provide feedback regulation to blood pressure by activating the higher limbic structures such as Amygdala and Hypothalamus which then send signals through ANS to decrease the blood pressure.

The results were not significant on all the parameters analysed between the groups (PSS; $p=0.709$; KI; $p=0.2159$; PSY; $p=0.2697$; VMS; $p=0.597$; SXL; $p=1.00$) except somatic symptoms ($p=0.01824$). Thus both the interventions proved equal beneficial effects, but on somatic symptoms yoga intervention proved little more beneficial. This was due to the increased hamstring flexibility, abdominal strength and endurance and also increased upper body muscular endurance amounted by Surya Namaskar in yoga intervention. In addition, since the stimulated push up portion of the routine specifically works the triceps and serratus anterior muscles, prolonged practice of Surya Namaskar may improve muscle strength and endurance.

The sexual symptoms experienced by the subjects owe to hormonal dysfunction during the perimenopausal period. Reductions in the sexual drive and energy occur due to reduction in the levels of three hormones estrogen, progesterone and testosterone. On the contrary both the interventions failed to produce any kind of relief for sexual incompetence occurring in the subjects. Yoga ($p=0.662$) and relaxation ($p=0.0659$) were ineffective in increasing the levels of these three hormones and thus provided insignificant results.

Thus, yoga and relaxation techniques are working on the same principles affecting the higher centres of the brain i.e Autonomic Nervous System, decreasing adrenergic activities and producing vasodilatation and decreasing oxygen consumption. Hence the effect of both the interventions on psychological, somatic and vasomotor symptoms in perimenopausal women account to these reasons.

V. Conclusion

Both yoga and relaxation therapy can be applied for patients suffering from various symptoms related to menopause. But as both the therapies are equally effective thus women who are not able to follow tough yoga exercises can opt for simple relaxation therapies which can be practiced easily at home. Inclusion of vasomotor diaries as another variable could provide more detailed information about the efficacy of the intervention. Functional studies can be done to look at the neurohormonal changes in the brain and autonomic functions during mental stress challenge before and after administering both the interventions. Follow up studies could be done to check the long lasting effect of the therapies. The women with hypertension, diabetes mellitus and hypothyroidism could also be included for the further study to check the exact efficacy of these alternative interventions.

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