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Effect of yoga therapy versus aerobic exercise on climacteric symptoms, perceived stress and quality of life in perimenopausal women

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Abstract
The aim of present study was to compare the effects of yoga therapy versus effect of aerobic exercise on climacteric symptoms, perceived stress and quality of life in Perimenopausal women. Sixty symptomatic women between 40-55 years of age were divided into 2 groups: (A) Yoga group and (B) Aerobic Exercise group. Yoga group performed yoga asanas 5 times a week for 6 weeks, while Aerobic Exercise group walked 5 times a week for 6 weeks. Greene Climacteric Scale (GCS), Perceived Stress Scale (PSS) and MENQOL questionnaire were assessed at the baseline and after 6 weeks of intervention. Statistical analysis revealed that both Yoga and Aerobic Exercise group showed significant improvement in Greene Climacteric Scale (GCS), Perceived Stress Scale (PSS) and MENQOL questionnaire ($p < 0.05$) post 6 weeks of intervention. However, Yoga exercises showed comparatively significant improvement with ($p < 0.05$) in climacteric symptoms, perceived stress and quality of life than aerobic exercise. This study concluded that 6 weeks of Yoga exercises showed comparatively significant improvement in climacteric symptoms, perceived stress and quality of life than aerobic exercise in Perimenopausal women aged from 40-55 years.

Keywords: yoga, aerobic exercise, Perimenopausal, climacteric, stress

Introduction

Menopause is a significant event in a woman's life when her reproductive capacity ceases. During this transitional phase, a woman exhibits several symptoms including physical disturbances such as hot flushes, psychological complaints such as mood swings, anxiety, depression and other changes that affect her social or personal interactions thus diminishing her overall quality of life [1, 2].

A study done by the Indian Menopause Society stated that in India the number of Perimenopausal women will increase considerably [3]. The World Health Organization (WHO) formulated the definition of Perimenopause as the period immediately before the menopause (when the endocrinological, biological and clinical features of approaching menopause commence) and the first year after menopause [4]. According to a study done by Bosworth et al, the rates of psychological distress were highest in early Perimenopause (28.9%) and lowest in Premeno pause (20.9%) and Postmeno pause (22%) suggesting that Perimenopausal depressed women are more likely to report both negative life events and diminished self-esteem [5, 6].

Hormonal therapies have been used extensively to improve the immediate symptoms of menopause and to manage its long-term consequences. However, these therapies have created new concerns about the increased risk of neoplasia of the endometrium and possibly the breast [7-9] and a threefold increased risk of venous thromboembolism thus inducing feelings of fear. Because of the serious adverse effects of hormone therapy, there has been a delay in the management of menopausal symptoms thus emphasizing the need to develop and explore the alternative therapeutic avenues that have recently demonstrated promise in alleviating menopausal symptoms [10].

Among nonpharmacological alternative therapies that have been studied, one study demonstrated significant decreases in hot flush intensity, tension, anxiety, and depression in menopausal women by using relaxation response [11]. Yoga, developed thousands of years ago, is the traditional Indian body-mind science that has been used effectively in various health disorders [12].

Hot flushes have been reported to be more common in women with higher adiposity, and thus weight loss has been associated with decrease in frequency of hot flushes in a randomized trial [13, 14]. Since increased physical activity is instrumental in weight management, it could be used as an alternative treatment to hormone therapy in alleviating Perimenopausal symptoms [15].

Several studies provide evidence that physical activity helps to reduce depression, psychological distress, irritability, and negative mood. Also, physically active women appear to have fewer difficulties with sleep, forgetfulness, concentration, headaches, and decreased sexual desire as well as fewer physical symptoms such as dizziness, rapid heart rate, aches and stiffness in joints, and digestive symptoms [16]. Studies have demonstrated strong positive effects of walking on several indicators of mental health and perceived quality of life in a sample of previously low-active middle-aged women [17]. Furthermore, physical exercise is also known to increase hypothalamic β - endorphin production, which may stabilize thermoregulation known to be disturbed during menopausal hot flushes [18].

Most women in India over the age of 40 years cannot cope with changes taking place in their bodies and spend their valuable years of life battling problems and diseases

associated with Perimenopause. Among non-pharmacological alternative therapies that have been studied, Yoga and walking can be simple techniques that can be used to cope with the Climacteric symptoms without causing any side effects.

Materials and Methods

Approval from the institutional ethical committee was taken following which the study was commenced with 60 Perimenopausal women aged 40-55 years. Women between 40 to 55 years of age irrespective of whether they were menstruating regularly or who had stopped menstruating in the last one year and were experiencing one or more Climacteric symptoms like hot flushes, psychological complaints such as mood swings, and other changes that may impair personal or social interactions and diminish the overall quality of life were included in the study. Subjects were excluded if they were already practicing yoga for a month or more, or were physically active (exercising >2 times/week, for at least 30 minutes each time). Women with surgical menopause and receiving any kind of hormone replacement therapy, active psychological disorders or taking psychiatric medication, uncontrolled Hypo-/Hyperthyroidism and uncontrolled Hypertension and gynecological problems were also excluded from the study. Subjects were divided into two groups i.e. Group (A) Yoga- 30 subjects and Group (B) Aerobic Exercise- 30 subjects. The subjects were given a demonstration of testing and intervention procedure. Group A was given yoga asanas (trikonasana, suryanamaskar, vajrasana, pawanmukhtasana, sethu band asana, pranayama- annuloma viloma, sheetali and bhramari pranayama), while Group B was asked to walk for a period of 6 weeks. Rate of perceived exertion (RPE) was used to check the intensity of walking. The participants were instructed to walk for the 1st 3weeks at a level of 11 – 13 (light to somewhat hard) on the scale from 6 to 20. For the next 3 weeks, participants were instructed to walk at a level corresponding to 13 – 15 (somewhat hard to hard) on the 6-20 scale. Both groups performed their respective exercises for 30 minutes each day and then progressed to 45 minutes and then 1 hour along with their warm up and cool down exercises. Participants were assessed for the Perimenopausal, psychological symptoms and quality of life before and after the 6th week of intervention. Both yoga and aerobic exercise groups were given their respective set of exercises, which were done for 5 days per week for 6 weeks under supervision.

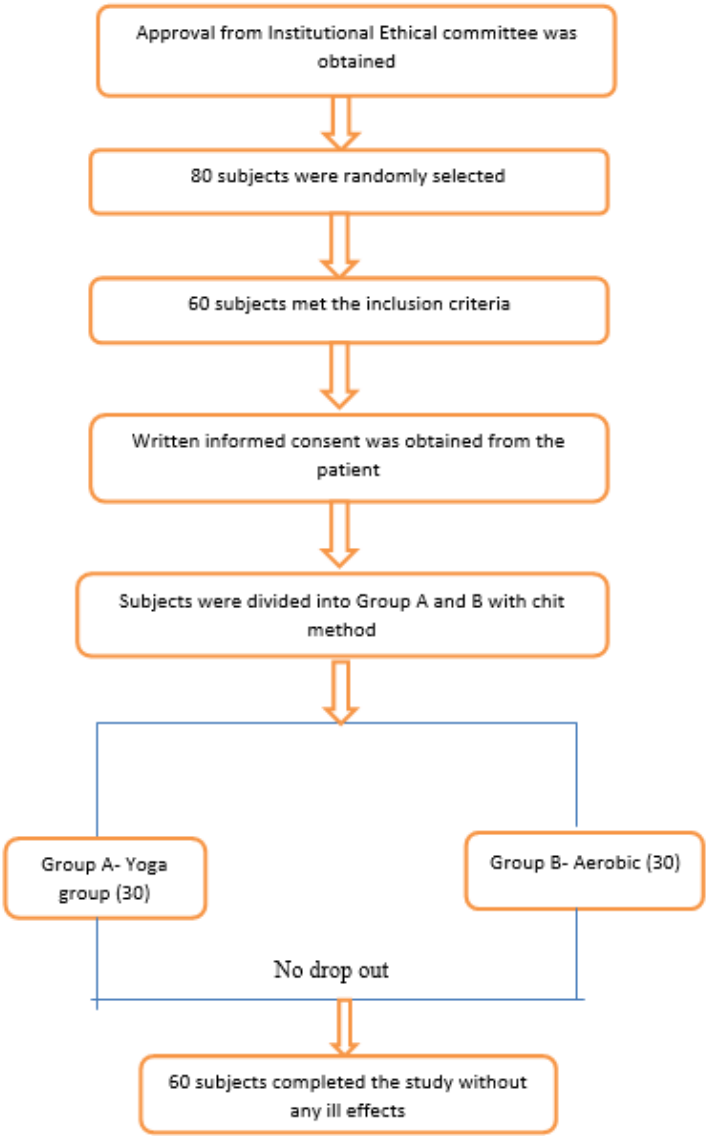

Fig 1

Table 1

Asanas	Week1(30mins)	Week2-4(45mins)	Week4-6 (60 mins)
	Warm up-5-7 inutes	Warm up-5-7 inutes	Warm up-5-7 inutes
Trikonasana	3 repetitions	5 repetitions	8 repetitions
Surya Namaskar	1 repetition	3 repetitions	5 repetitions
Pawan Mukhtasana	3 repetitions	5 repetitions	8 repetitions
Sethu Bandhasana	3 repetitions	5 repetitions	8 repetitions
Bhujangasana	3 repetitions	5 repetitions	8 repetitions
Vajrasana	1 minute	3 minutes	5 minutes
Pranayama	3 minutes	5 minutes	10 minutes
	Cool down-5 inutes	Cool down- 5 inutes	Cool down- 5 inutes

Table 2

Week 1 Aerobic ex(30 mins)	Week2-4 Aerobic ex(45 mins)	Week4-6 Aerobic ex(60 mins)
Warm up-5-7 minutes	Warm up-5-7 minutes	Warm up-5-7 minutes
Walking-20 minutes	Walking-30 minutes	Walking-45 minutes
Cool down-5 minutes	Cool down- 5 minutes	Cool down- 5 minutes

Statistics

- Data was collected and statistical analysis was done using software IBM SPSS statistics 20.0. Level of significance was fixed at p=0.05 and any value less than or equal to 0.05 was considered to be statistically significant.
- The mean age of the subjects in Yoga group was 46.50±3.875 and that of the Aerobic Exercise Group was 44.77±3.002 with a p>0.05 (insignificant).
- Paired t-test was used to compare the pre and post values of Greene Climacteric Scale, Perceived Stress Scale and Menopause Specific Quality of Life Questionnaire (MENQOL) in both yoga and aerobic exercise group (intra-group).
- Unpaired t-test was used to compare the post intervention values of Greene Climacteric Scale, Perceived Stress Scale and Menopause Specific Quality of Life Questionnaire (MENQOL) between yoga and aerobic exercise group (inter-group).

Results

Table 3: Intra group comparison of Mean pre and post 6 weeks of intervention using paired t-test in Yoga Group.

	variables	mean value		p value	t value
		pre	post 6 weeks		
1	greene climacteric scale	27.83	6.6	<0.05	10.673
2	perceived stress scale	18.9	9.17	<0.05	11.297
3	menqol				
	vasomotor	12.27	4.57	<0.05	11.899
	psychosocial	27.87	12.17	<0.05	10.674
	physical	70.8	29.33	<0.05	11.566
	sexual	12	4.83	<0.05	8.012

In our study, paired t- test was done for pre and post Mean values for Greene Climacteric Scale, Perceived Stress Scale and MENQOL questionnaire in the Yoga Group with a P value <0.05 which is Significant.

Table 4: Intra group comparison of Mean pre and post 6 weeks of intervention using paired t-test in Aerobic Exercise Group.

	Variables	Mean Value		P Value	t Value
		PRE	Post 6 Weeks		
1	Greene climacteric scale	22.3	10.37	<0.05	9.877
2	Perceived stress scale	15.8	9.93	<0.05	14.154
3	Menqol				
	Vasomotor	11.03	5.77	<0.05	9.492
	Psychosocial	22.13	13.53	<0.05	8.767
	Physical	57.73	35.3	<0.05	10.094
	Sexual	8.87	6.73	<0.05	4.390

In our study, paired t- test was done for pre and post Mean values for Greene Climacteric Scale, Perceived Stress Scale and MENQOL questionnaire in the Aerobic Exercise Group with a P value <0.05 which is Significant.

Table 3: Inter group comparison of mean difference of variables using un- paired t-test between yoga and aerobic exercise group.

	variables	mean difference		p value	t value
		yoga	aerobic ex		
1	greene climacteric scale	21.23	11.93	<0.05	3.996
2	perceived stress scale	9.73	5.86	<0.05	4.044

3	menqol				
	vasomotor	7.70	5.26	<0.05	2.855
	psychosocial	15.70	8.60	<0.05	4.016
	physical	41.46	22.43	<0.05	4.512
	sexual	7.16	2.13	<0.05	4.944

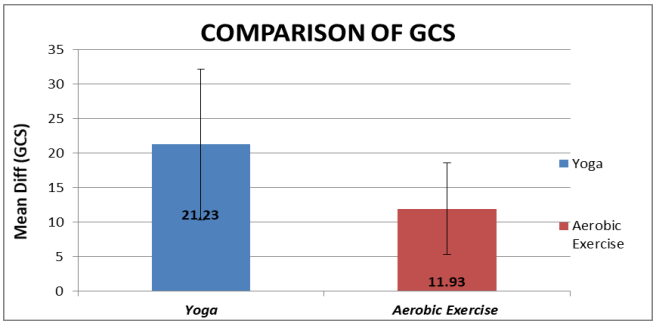

Fig 2: Comparison of Greene Climacteric Scale post intervention between Yoga and Aerobic Exercise Group.

Interpretation

The graph 2 shows Inter group comparison of mean difference of Greene Climacteric Scale Score in Yoga and Aerobic Exercise group. Yoga group shows significant ($p<0.05$) improvement than Aerobic Exercise group.

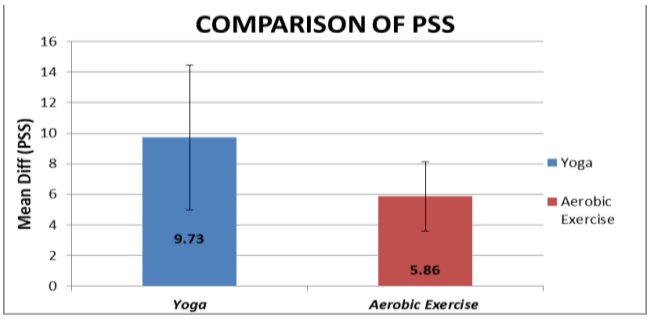

Fig 3: Comparison of Perceived Stress Scale post intervention between Yoga and Aerobic Exercise Group.

Interpretation

The graph 3 shows Inter group comparison of mean difference of Perceived Stress Scale Score in Yoga and Aerobic Exercise group. Yoga group shows significant ($p<0.05$) improvement than Aerobic Exercise group.

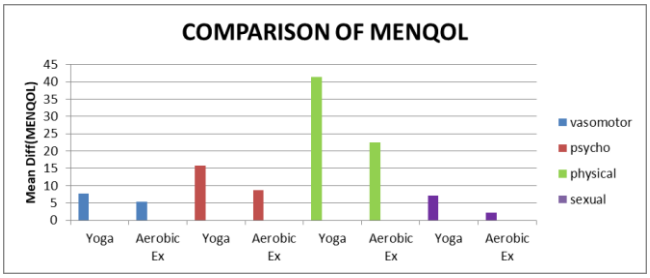

Fig 4: Comparison of domains of Menopause Specific Quality of Life Questionnaire post intervention between Yoga and Aerobic Exercise Group.

Interpretation

The graph 4 shows Inter group comparison of mean difference of domains of Menopause Specific Quality of Life Questionnaire Score in Yoga and Aerobic Exercise group. Yoga group shows significant ($p<0.05$) improvement than Aerobic Exercise group.

Discussion

The study clearly documents the significant presence of various Perimenopausal symptoms in women severely affecting their quality of life. Our study shows significantly reduced values of Greene Climacteric Scale post treatment in Yoga (pre mean 27.83±12.56 and post mean 6.60±2.66) group. The climacteric symptoms like anxiety, stress and vasomotor symptoms like hot flushes experienced during this crucial period is mainly attributed to sympathetic arousal resulting in increased catecholamines and cortisol levels mediated through the hypothalamic pituitary-adrenal axis [5]. Yoga, the traditional Indian body- mind science, has proved to cause a decrease in these neurohumors (catecholamines and cortisol) and electrophysiological changes of sympathetic arousal which in turn has proven to reduce the climacteric symptoms [5].

The present study shows significant reduction in the values of Perceived Stress Scale post treatment in Yoga (pre mean 18.90±6.29 and post mean 9.17±3.80) group. In a study that compared 20 stressed and 20 non stressed, nonsmoking premenopausal women between the ages of 42 and 52 years, the stressed women had elevated evening salivary cortisol levels, indicating sympathetic arousal. An interesting study by Streeter et al. suggests that the practice of yoga may reduce the depressive symptoms of Perimenopause by increasing GABA (inhibitory neurotransmitter) levels in the brain. This study examined the GABA levels by measuring the GABA-to-creatinine ratio in the brain using magnetic resonance spectroscopy in normal adult yoga and non yoga practitioners and showed a 27% increase in GABA levels in the yoga group after a 60-minute yoga session with no change after a reading session in comparison with a non yoga practitioner group [5].

Also, our study showed significantly reduced values of MENQOL domains post treatment in Yoga group (pre mean: vasomotor 12.27±4.91, psychosocial 27.87±10.76, physical 70.80±25.31, sexual 12±6.24 and post mean: vasomotor 4.57±1.68, psychosocial 12.17±3.87, physical 29.33±7.33, sexual 4.83±2.38). In our study, yoga showed significant effect in managing all the three symptoms of vasomotor domain, that is, hot flushes, night sweats and sweating. The vasomotor symptom improvement brought about by yoga intervention maybe attributed to modulation of autonomous nervous system with special attention to decreased sympathetic nervous system activation which in turn seems to affect the thermoregulation centre. The improvement in physical strength and fitness caused by yoga seems to be related to several factors like muscular strength and endurance, flexibility, cardiorespiratory fitness, body composition and pulmonary function [12]. The intense stretching and muscle conditioning associated with attaining and holding yoga postures increases the skeletal muscle oxidative capacity and decrease glycogen utilization, possibly caused by increased vascularization, increased intramuscular oxygen and glycogen stores or by increased numbers of mitochondria. Yoga practice also may increase the absorption of the calcium from the intestine, stimulate bone remodeling and maintain the load bearing capacity of

the bone; reduces the pain in the back of the head, neck, lower back and headache by influencing limbic system modulation of endogenous pain control system [12]. All the three symptoms in the sexual domain were also significantly improved after yoga therapy. The yoga postures used in this study are known to improve the tone of the muscles of pelvic region and enhance the blood circulation to the urogenital area.

The aerobic exercise group showed significantly reduced values of Greene Climacteric Scale post intervention (pre mean 22.30±9.84 and post mean 10.37±5.18). According to a study done by Gold et al., through reduction in body fat, walking may indirectly reduce the rise in core body temperature thought to be responsible for the association between increased weight and vasomotor symptoms and thus help reduce these symptoms. Wallace and colleagues conducted a study which revealed that walking may also help in reducing symptoms by causing an increase in estradiol levels [16]. Estradiol is a form of the hormone estrogen which helps in reducing the symptoms of menopausal transition. Thus by this mechanism, walking may have helped in reducing the climacteric symptoms in our study.

Also, significantly reduced values of Perceived Stress Scale post treatment were observed in Aerobic Exercise group (pre mean 15.80±3.95 and post mean 9.93±3.34). In our study, walking may have reduced symptoms of Perceived stress by several psychological and physiological mechanisms, including diversion from stressful stimuli, improved self-efficacy, enhanced brain aminergic synaptic transmission, and increased levels of endorphins.

Furthermore, significantly reduced values of MENQOL domains post treatment was observed in Aerobic Exercise group (pre mean: vasomotor 11.03±5.16, psychosocial 22.13±8.37, physical 57.73±17.92, sexual 8.87±5.25 and post mean: vasomotor 5.77±2.73, psychosocial 13.53±4.64, physical 35.30±9.13, sexual 6.73±3.81). In our study, Walking may have shown improvement in some symptoms of MENQOL domains by causing a shift in autonomic balance in favour of the parasympathetic nervous system and also release of endorphins thus reducing the symptoms.

According to our study, Yoga shows significant ($p<0.05$) improvement in the value of Greene Climacteric Scale, Perceived Stress Scale and MENQOL questionnaire than the Aerobic Exercise group. In our study, yoga helped by acting on the parasympathetic system in addition to the estradiol and GABA levels which in turn reduced the symptoms of climacteric.

Thus, yoga improved most of the symptom profile thus contributing significantly in the improvement of overall quality of life.

Thus, the present study concludes that 6 weeks of Yoga exercises showed comparatively significant improvement in climacteric symptoms, perceived stress and quality of life than walking in Perimenopausal women aged from 40-55 years.

In our study, there was an absence of vasomotor symptom diaries to assess the efficacy of the intervention on the frequency of vasomotor symptoms. Also, there was lack of diagnostic tools to assess the effects of yoga and walking on serum FSH and estradiol levels in Perimenopausal women. Further studies can be done using diagnostic tools to assess FSH and estradiol levels before and after the intervention which would provide more detailed information about the efficacy of the intervention. Futhermore, outcome measures can be taken at follow up to check if results were sustained.

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Conflict of Interest

The Authors declares that there is no conflict of interest of

Conclusion

The present study concludes that 6 weeks of Yoga exercises showed comparatively significant improvement in climacteric symptoms, perceived stress and quality of life than walking in Perimenopausal women aged from 40-55 years.

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