

# Effect of yoga therapy on physical and psychological quality of life of perimenopausal women in selected coastal areas of Karnataka, India

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## ABSTRACT

**Background:** Perimenopausal period is characterized by a continuous decline in ovarian function due to which women are vulnerable to various physical and psychological symptoms affecting their quality of life. Currently these symptoms are managed by hormone replacement therapy. However, hormonal therapy can cause complications including malignancy which has resulted in search for various alternative therapies to improve the quality of life (QOL). Yoga is one such alternative therapy shown to enhance the QOL at all stages of human life associated with the chronic illness. There are very few scientific studies regarding the effect of yoga on perimenopause and in this study we investigated the effects of yoga therapy on physical and psychological symptoms using the standardized questionnaire.

**Objective:** To study the effect of yoga therapy on physical, psychological, vasomotor and sexual symptoms of perimenopause.

**Materials and Methods:** It is a prospective non-randomized control study of 216 perimenopausal women with 12 weeks of intervention. The subjects were divided in two groups with either yoga therapy [ $n = 111$ ] or exercise [ $n = 105$ ] as the interventional tool. The symptoms control and QOL before and after intervention in both the groups were assessed by using the menopausal QOL questionnaire.

**Results:** The perimenopausal symptoms in all the four domains were improved by yoga therapy, thus significantly improving the overall QOL compared to the control group.

**Conclusion:** This study clearly demonstrates the effectiveness of yoga therapy in managing the distressing perimenopausal symptoms. It is easy, safe, non-expensive alternative therapy helping the well-being of perimenopausal women and must be encouraged in the regular management of perimenopausal symptoms.

**Key Words:** MENQOL questionnaire, perimenopausal QOL, yoga therapy

## INTRODUCTION

Menopause is an important event in the life of a woman when reproductive capacity ceases. During this transitional phase, woman exhibits severe and multiple symptoms. Frequently reported symptoms fall into several categories, including physical disturbances such as 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.<sup>[1]</sup> In 1990, there were an estimated 467 million women in this state and this number is expected to increase to 1,200 million by the year 2030.<sup>[2]</sup>

According to the Indian Menopause Society,<sup>[3]</sup> there will be a large increase in the perimenopausal women in India also. Most women in India over the age of 45 years do not understand the changes taking place in their bodies and spend their valuable years of life battling problems and diseases associated with perimenopause. Hence it becomes very important to develop methods and treatment plans to control perimenopausal symptoms and thereby to improve the quality of life of this large group of women.

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To improve the immediate symptoms of menopause and to manage its long-term consequences, hormonal therapies have been used extensively. However, these therapies have created new concerns about the increased risk of neoplasia of the endometrium and possibly the breast<sup>[4-6]</sup> and hence several researchers have investigated the role of alternative therapies in the management of menopausal symptoms and quality of life.

Yoga, the traditional Indian body-mind science has been used effectively in various health disorders affecting almost all the major organ system including cardiovascular, respiratory, neuroendocrine, gastrointestinal and musculoskeletal system.<sup>[7-9]</sup> Since perimenopause also affects several organ systems, we conducted this study to evaluate the effects of yoga therapy on menopausal symptoms.

## MATERIALS AND METHODS

This interventional study included 216 perimenopausal women divided into two groups. One group practiced yoga therapy (test group,  $n = 111$ ) and the other practiced a set of physical exercise (control group,  $n = 105$ ). All these subjects satisfied the inclusion criteria of:

1. Aged between 40-60 years,
2. Who were willing and were able to practice yoga or exercise protocols and,

3. Who were having perimenopausal symptoms and were included in this study.

Exclusion criteria were:

1. Women who were already practicing yoga for a month or more,
2. Women with surgical menopause and receiving any kind of hormone therapy and
3. Active psychological disorders or any other medical disorders.

The subjects were from local community and recruited through personal contacts with various women's organizations, clubs (Lion's/Rotary) and self-help groups. Ethical clearance was obtained from the institutional review board (IEC 062/2008) and the informed consent was obtained from the subjects before starting the intervention.

## Yoga and exercise intervention

The yoga therapy module used was developed on the basis of Patanjala yoga<sup>[10]</sup> and Hatha yoga<sup>[11]</sup> to address the physical, psychological and emotional symptoms with suitable practice of asanas, pranayamas and dhyana to result in improvement of overall quality of life. The control group practiced a set of exercise program.<sup>[12]</sup> [Table 1] Both the practices were initially taught under the direct contact of

**Table 1: Practices used for the two interventional groups**

Test group (yoga therapy)	Control group (exercise)
<p><b>ASANAS (Body postures)</b>                      Sitting: Vajrasana, supta vajrasana Pascimottanasana, Poorvatanasana, Janusirsasana, Upavistakonasana, Baddhakonasana, Vakrasana, Ashvinimudra. Standing: Tadasana, Trikonasana, Parshvakonasana. Lying on the back (supine): Pavanamuktasana, Padottanasana. Lying on the stomach (Prone): Bhujangasana, Shalabhasana, Dhanurasana, Paryankasana.</p> <p><b>PRANAYAMA (Breathing practices)</b>                      Anuloma-viloma (alternative nostril), Surya bhedana (right nostril), Chandrabhedana (left nostril), Sheetal (through tongue) and Bhramari (honey bee sound during exhalation).</p> <p>Relaxation: Deep relaxation in shavasana (corpse pose).                      Meditation: 'So Ham' dhyana sitting in meditative postures like swastikasana.</p>	<p><b>Loosening exercises:</b>                      Sitting: Passive rotation of toes, Toe bending, Ankle bending, Ankle rotation, Knee bending, Knee rotation, Knee cap tightening, Half butterfly, Full butterfly, Neck bending, Neck rotation. Standing: Waist rotation, Wrist rotation, Shoulder rotation. Each one repeated for 10 rounds or 10 rotations.</p> <p><b>Strengthening exercises (While standing).</b>                      Wrist — Stretching arms straight in front, make the tight fist, palm facing down, move the fist up and down vigorously from the wrist-10 times.                      Palms — Holding near the chest bending at the elbow, spread the fingers, and move palms up and down vigorously from the wrist.                      Fingers — Throwing out the arms in front, give the fingers of both the arms the shape of the hood of cobra, stiffen the entire length of the arms from the shoulder joints to the finger tips till they start trembling-5 times.                      Elbows — Stretch the arms straight down beside the body, make the tight fist of the palms, and raise the fists forward up to the level of the shoulder with a jerk-10 times.                      Arms — Make the fists of hands with thumb tucked in, bend the elbow and raise the forearms till they parallel to the ground, push both the arms forward forcefully and vigorously to the level of the shoulder-10 times.                      Back — Spreading the legs apart as far as possible, place the hands on the hips bend backward from the waist as far as possible and then forward without bending the knees till head reaches the ground-5 times.                      Thighs — Stretch out the arms facing down straight in front at the shoulder heights, inhaling bend the knees till thighs come parallel to the ground, and then come up exhaling-5 times.                      Calves — Stretch out the arms facing down straight in front at the shoulder heights, inhaling squat and go down as far as possible-5 times. Supine rest 5 to 10 minutes.</p>

the principal investigator for first two weeks and were later continued with the help of suitable hand outs and regular supervision and follow-up.

The intervention program in both groups were started by collecting the baseline data, teaching and practicing the respective protocols for 45 minutes every day, follow-ups and collection of post-interventional data after 12 weeks of practice.

### Menopause-specific quality of life questionnaire (MENQOL)

The self-administered questionnaire utilized in this study included socio-demographic information with menstrual history and the menopause-specific quality of life questionnaire (MENQOL).<sup>[13]</sup> MENQOL is a self-administered, 'scaled' 29-item survey questionnaire, designed to measure quality of life in menopausal women and also to measure the extent to which an individual is affected by menopausal symptoms. It comprises the four domains, Vasomotor, Psychosocial, Physical and Sexual, which are graded separately.

### Statistical analysis

All pre and post data were analyzed by using SPSS Version 15. The individual variables were evaluated to determine the changes in two groups after 12 weeks. The pre and post data of MENQOL questionnaire total and domain wise was analyzed by using repeated measures of ANOVA. The effectiveness was calculated as 'within the group' (yoga and control group), 'between the groups' (yoga vs. control) and 'Effect size' (mean difference) to deduce the superiority of the methods involved and results are reported as mean  $\pm$  SD.

## RESULTS

The socio-demographic data are shown in Table 2. The mean age of the women in yoga group was  $48.34 \pm 4.63$  and in control group was  $48.30 \pm 5.11$ . Age was statistically comparable between the groups with  $P = 0.15$ . The largest categories of women were between 46 and 55 years of age. No significant difference was observed between the groups regarding body mass index and menstrual history.

The prevalence of vasomotor, psychosocial, physical and sexual domain symptoms and baseline comparison between the groups is shown in Table 3. In the vasomotor domain sweating was the most predominant disturbing symptom complained by women in both the groups followed by hot flushes and night sweats. There was no significant difference between the groups ( $P > 0.05$ ). In the psychosocial domain, large number of women from both

**Table 2: Socio-demographic data**

Variables	Yoga (n = 111) (%)	Control (n = 105) (%)	P value
Age (mean $\pm$ SD)	48.34 $\pm$ 4.63	48.30 $\pm$ 5.11	0.15 (NS)
Age distribution	n	n	
40-45	33 (29.7)	35 (33.3)	
46-50	43 (38.7)	30 (28.6)	0.47 (NS)
51-55	20 (18.0)	22 (21.0)	
56-58	15 (13.5)	18 (17.1)	
Working/House makers	40/71	52/ 53	0.13 (NS)
Body mass index (mean $\pm$ SD)	26.07 $\pm$ 5.19	26.05 $\pm$ 5.54	0.98 (NS)
Menstrual history	n	n	
Regular	36 (32.4)	31 (29.5)	
Irregular	24 (21.6)	26 (24.8)	0.82 (NS)
No menstruation	51 (45.9)	48 (45.7)	
Vegetarian/Non-vegetarian	46/65	46/56	0.49 (NS)

the groups (72% to 79%) complained experiencing poor memory as the most prevalent symptom followed by feeling of anxiety, loneliness, depression and impatience. Two of the questions in this domain that is being dissatisfied with personal life and accomplishing less what I used to do were recorded more significantly by control group compared to the yoga group ( $P < 0.001$ ) while other attributes from this domain were all comparable ( $P > 0.05$ ). All the symptoms in the physical domain except for flatulence and muscles and joint pains were comparable in both groups without any significant difference. No significant difference was observed in the response to sexual domain between the two groups ( $P > 0.05$ ).

The results of effect of yoga therapy (test group) and exercise (control group) on the symptoms of all the four domains are presented in Table 4. The pre and post mean  $\pm$  SD result of vasomotor domain symptoms showed significant decrease in yoga group compared to exercise group. In the psychosocial domain, yoga therapy resulted in the significant difference in all the symptoms while exercise therapy resulted in the improvement of four symptoms but failed to provide relief for the remaining three symptoms. All the symptoms in the physical domain were significantly improved in yoga group, except for increased facial hair. In control group, highly significant ( $P < 0.001$ ) decrease was observed only in one symptom and moderate in other six symptoms. The symptom of aching in muscles and joints was aggravated after physical exercise and no significant change was observed in the remaining eight symptoms. Yoga therapy also resulted in significant improvement in all the symptoms of sexual domain while physical exercise showed no significant improvement.

**Table 3: The baseline comparison of perimenopausal symptoms in each domain of MENQOL between test and control group**

Symptoms	Test group no (%)	Control group no (%)	P value
<b>Vasomotor domain</b>			
Hot flushes	43 (38.7)	36 (34.2)	0.5
Night sweats	29 (26.1)	32 (30.5)	1.0
Sweating	50 (45.0)	53 (50.4)	0.5
<b>Psychosocial domain</b>			
Being dissatisfied with my personal life	18 (16.2)	46 (40.9)	0.001
Feeling anxious or nervous	42 (37.8)	43 (41.5)	0.66
Experiencing poor memory	80 (72.1)	83 (79.0)	0.56
Accomplishing less than I used to	73 (65.8)	39 (43.2)	0.001
Feeling depressed down or blue	48 (43.2)	35 (33.3)	0.20
Being impatient with other people	35 (31.5)	33 (31.4)	0.77
Feeling wanting to be alone	30 (27.0)	40 (38.1)	0.26
<b>Physical domain</b>			
Flatulence (wind) or gas pain	71 (64.0)	49 (46.7)	0.001
Aching in muscles and joints	80 (72.1)	48 (45.7)	0.001
Feeling tired or worn out	74 (66.7)	77 (73.3)	0.89
Difficulty sleeping	55 (49.5)	47 (44.8)	0.49
Aches in back of neck or head	62 (55.9)	57 (54.3)	0.50
Decrease in physical strength	69 (62.2)	75 (71.4)	0.48
Decrease in stamina	68 (61.3)	74 (70.5)	0.42
Feeling of lack of energy	56 (50.5)	56 (53.3)	0.42
Drying skin	34 (30.6)	41 (39.0)	0.16
Weight gain	42 (37.8)	52 (49.5)	0.50
Increased facial hair	10 (9.0)	15 (14.3)	0.23
Changes in skin texture or tone	20 (18.0)	28 (26.7)	0.37
Feeling bloated	41 (36.9)	50 (47.6)	0.58
Low back ache	62 (55.9)	55 (52.4)	0.50
Frequent urination	30 (27.0)	36 (34.3)	0.48
Involuntary urination	39 (44.1)	42 (40.0)	0.35
<b>Sexual domain</b>			
Changes in sexual desire	37 (33.3)	28 (26.7)	0.16
Vaginal dryness	27 (24.3)	29 (27.6)	0.55
Avoiding intimacy	33 (29.7)	30 (28.6)	0.60

This study brought out the subtle differences between the efficiency of the two interventions (yoga and exercise) to evaluate the effectiveness, and it has been showed in the form of effect size. The quality of life is the mean of the overall score of each domain. While analyzing the result ‘within the group effect’ yoga therapy showed a significant decrease ( $P < 0.001$ ) in the mean scores of all the domains, whereas control group showed a significant decrease ( $P < 0.001$ ) only in psychosocial and physical domains. The

‘effect size’ was greater in yoga therapy group in all domains compared to the control group. ‘Between the group effect’, there was significant difference between the groups in all domain except for sexual domain ( $P = 0.53$ ) [Table 5].

The overall quality of life is measured by the mean of overall scores of the each domain and yoga therapy group showed a very significant improvement ( $P < 0.001$ ) compared to control group [Table 6].

## DISCUSSION

The present study thus clearly documents the significant presence of various perimenopausal symptoms in the local population severely affecting the quality of life. Many of these women expressed their distress and helplessness regarding these symptoms, which were seriously interfering in their day-to-day living. Thus there is a need to search and develop a cost-effective, simple, community-based therapeutic tool to provide symptom relief and to improve health status, and in this perspective yoga has emerged as the appropriate system to deal effectively with issues related to perimenopause. The present study clearly demonstrates the clinical utility of yoga in significantly reducing the perimenopausal symptom in all domains and thereby improves the overall quality of life.

Asanas, pranayama and dhyana, the components of yoga therapy, seem to improve the symptom profile in the four domains through several physiological and biochemical mechanisms. 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.<sup>[14]</sup> 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.<sup>[15]</sup> 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.<sup>[16]</sup>

Ours is the first study to document the beneficial effects of yoga on perimenopausal-related psychological symptoms. This impact of yoga seems to be due to its effect on the functioning of nervous system leading to increase in alpha rhythm, intrahemispheric coherence and homogeneity in the brain<sup>[17,18]</sup> and increase in P 300 phase amplitude<sup>[19]</sup> all of which seems to enhance the cognitive processes. Menopausal anxiety can be a very difficult symptom to manage, but



**Table 4: The pre and post mean values of MENQOL in both the groups**

Variable	Yoga (n = 111)			Control (n = 105)		
	Pre	Post	P value	Pre	Post	P value
Hot flushes	2.43±2.07	1.53±1.56	0.001*	2.24±1.91	2.00±1.87	0.22
Night sweats	2.12±2.16	1.35±1.07	0.001*	2.11±1.83	2.09±0.83	0.83
Sweating	2.81±2.35	1.58±1.23	0.001*	3.02±2.3	2.96±2.21	0.77
Being dissatisfied with my personal life	1.68±1.70	1.22±0.85	0.004*	2.68±2.2	2.52±2.25	0.54
Feeling anxious or nervous	2.46±2.14	1.59±1.38	0.001*	2.59±2.16	2.13±1.86	0.03*
Experiencing poor memory	4.04±2.32	2.47±1.75	0.001*	4.22±2.11	2.28±1.90	0.001*
Accomplishing less than I used to	3.69±2.36	1.94±1.48	0.001*	2.12±1.71	2.74±2.09	0.003*
Feeling depressed down or blue	2.16±2.1	1.64±1.34	0.001*	2.26±2.0	2.46±1.96	0.25
Being impatient with other people	2.12±1.92	1.27±0.8	0.001*	2.04±1.76	2.90±2.37	0.001*
Feeling wanting to be alone	2.09±2.05	1.33±0.93	0.001*	2.41±2.01	2.53±2.21	0.75
Flatulence (wind) or gas pain	3.95±2.55	2.26±1.72	0.001*	2.82±2.27	3.02±2.22	0.40
Aching in muscles and joints	4.41±2.60	2.64±1.85	0.001*	2.72±2.17	3.89±2.11	0.001*
Feeling tired or worn out	3.94±2.45	2.32±1.65	0.001*	3.99±2.23	3.42±2.33	0.01*
Difficulty sleeping	3.14±2.46	1.96±1.5	0.001*	2.90±2.42	2.62±2.42	0.25
Aches in back of neck or head	3.64±2.71	2.20±1.76	0.001*	3.39±2.53	2.98±2.24	0.04*
Decrease in physical strength	3.55±2.31	2.02±1.53	0.001*	3.77±2.14	3.22±2.21	0.001*
Decrease in stamina	3.49±2.38	2.02±1.53	0.001*	3.74±2.16	3.10±2.17	0.003*
Feeling of lack of energy	3.31±2.55	1.93±1.51	0.001*	3.10±2.27	2.70±2.04	0.04*
Drying skin	2.06±1.79	1.48±1.14	0.001*	2.41±2.02	2.04±1.65	0.09
Weight gain	2.61±2.32	1.47±1.41	0.001*	2.82±2.13	2.10±1.81	0.003*
Increased facial hair	1.23±0.82	1.13±0.56	0.15	1.44±1.18	1.30±0.92	0.13
Changes in skin texture or tone	1.65±1.59	1.25±0.95	0.005*	1.85±1.56	1.72±1.40	0.52
Feeling bloated	2.50±2.23	1.76±1.32	0.001*	2.67±1.96	2.36±2.00	0.10
Low back ache	3.45±2.59	2.18±1.70	0.001*	3.21±2.44	2.90±2.32	0.06
Frequent urination	1.96±1.74	1.40±1.15	0.001*	2.14±1.90	2.05±1.84	0.58
Involuntary urination	2.61±1.32	1.68±1.38	0.001*	2.35±1.91	2.06±1.84	0.05*
Changes in sexual desire	1.63±1.04	1.29±0.68	0.001*	1.44±0.81	1.46±0.88	0.98
Vaginal dryness	1.99±2.0	1.52±1.38	0.004*	1.84±1.35	1.83±1.66	0.94
Avoiding intimacy	2.15±2.08	1.52±1.46	0.001*	2.01±1.82	2.00±1.96	0.87

yoga therapy showed significant improvement compared to physical exercise. Several mechanisms like altered neurotransmitters,<sup>[20]</sup> changed brain blood flow and brain metabolism<sup>[21]</sup> and sympathetic activation<sup>[22]</sup> seems to be responsible for this improvement brought by yoga practice.

Compared to physical exercise group, yoga showed most significant effect in managing the symptoms of vasomotor domain. All the three symptoms in this domain, that is, hot flushes, night sweats and sweating were significantly reduced in the yoga group while no improvement was observed in any of the symptoms in control group. Especially, the improvement in hot flushes through yoga was very rewarding, since this is most difficult symptom to manage and affects the overall quality of life. The vasomotor symptom improvement brought about by yoga intervention seems to be due to its effect in modulating autonomous nervous system with special attention to decreased sympathetic nervous system activation<sup>[23,24]</sup> which

in turn seems to affect the thermoregulation resulting in vasodilatation and sweating.<sup>[25]</sup>

All the three symptoms in the sexual domain were also significantly improved after yoga therapy. Though the reported prevalence of sexual complaints in Asian woman is lower than in their Caucasian counterparts, improvements in these symptoms contribute to the overall quality of life. 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.<sup>[26]</sup>

Thus, yoga improved most of the symptom profile thus contributing significantly in the improvement of overall quality of life. Yoga is relatively simple to learn and is economical, non-invasive with multiple collateral lifestyle benefits. Group and individual practice may also help to improve lifestyle choices and health-related attitudes in part, by enhancing psychological well-being and thereby contributing significantly to chronic disease protection

**Table 5: The QOL of each domain in both the groups**

Domain	Results	Yoga (n = 111)	Control (n = 105)	P value
Vasomotor	Pre	2.01±2.31	2.02±2.15	0.03**
	Post	0.87±1.53	1.93±2.08	
	P value	0.001*	0.65 <sup>a</sup>	
	Effect size	1.41	0.08	
Psychosocial	Pre	2.57±1.53	2.89±1.59	0.001**
	Post	1.36±1.16	2.45±1.54	
	P value	0.001*	0.001*	
	Effect size	1.22	0.44	
Physical	Pre	2.96±1.18	2.89±1.40	0.03**
	Post	1.72±1.08	2.48±1.48	
	P value	0.001*	0.001*	
	Effect size	1.24	0.41	
Sexual	Pre	1.57±2.16	1.33±1.84	0.53 <sup>b</sup>
	Post	0.80±1.51	1.32±2.00	
	P value	0.001*	0.93 <sup>a</sup>	
	Effect size	0.77	0.01	

\*Significant decrease within the group, \*\*Significant difference between the groups  
a: No significant change within the group, b: No significant difference between the groups

**Table 6: Overall quality of life (Total)**

QOL	Yoga (n = 111)	Control (n = 105)	P value
Pre	2.29±1.36	2.21±1.31	0.02**
Post	1.12±0.93	2.02±1.41	
P value	0.001*	0.13	
Effect size	1.17	0.19 <sup>a</sup>	

\*Significant decrease within the group, \*\*Significant difference between the groups, a: No significant change within the group, QOL= Quality of life

and health promotion. Though most of the clinical effects of yoga are probably brought about by vagal stimulation and parasympathetic activation, the complete mechanisms underlying the reported benefits remain poorly understood. Clearly, additional high-quality research is warranted to confirm and further explore the putative beneficial effects of yoga in perimenopausal women.

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