The efficacy of two-year yogic practice on selected pulmonary function test in postmenopausal women

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ABSTRACT

Introduction and Aim: Menopausal transition has been well associated with a series of hormonal changes that has been linked to impairment of respiratory function. The present study was designed to evaluate the cumulative effect of practicing yoga on certain respiratory parameters in postmenopausal women.

Materials and Methods: Sixty postmenopausal women were divided into two groups (n=30 each). Based on the duration of yoga, they were grouped into Group I – (Regularly doing yoga for one year) and Group II (Regularly doing yoga for the two years). The women not doing any yogic exercises were taken as the control group; Group Ia (for One year) and Group II a (for two years). The respiratory parameters were measured with the help of vitalograph.

Results: All the observed respiratory parameters such as vital capacity (VC), Forced vital capacity (FVC), FEV1 (Forced expiratory volume during the 1st second.), FEV1 ratio, PEFR (Peak expiratory flow rate). FEF50 (Forced Expiratory Flow at 50%), showed a significant ($P<0.0001$) improvement in Group II when compared to the Group I.

Conclusion: Yoga practice can be advocated to improve pulmonary function tests in post-menopausal women which might help in preventing respiratory diseases during aging process. Optimum benefit of yoga was observed during the two years of yoga practice in the postmenopausal women. Continued practice of yoga might be also considered as a preventive exercise to impair age related morbidity and improve the quality of life.

Keywords: Post- menopausal; yoga; *pranayama*; pulmonary function test.

INTRODUCTION

Menopause is the phase where the ovarian function declines and the reproductive ability of the women decreases (1). Various menopausal symptoms will be present for a prolonged period of menopausal period (2). In the recent years the increased incidence of cardiovascular diseases in women after menopause is the leading cause of mortality and morbidity. The physiologic function of the respiratory function declines (3). Literature survey shows that with the advancing age the stiffening of the thoracic cage increasing the work of breathing (4, 5). Drastic variations in the respiratory parameters has been observed as the age advances (6, 7). Menopausal period has been linked with the hormonal variations causing weakening of respiratory function (8). Female hormones play an important role in overall lung health. Increased deposition of body fat and central obesity might be related to impairment of lung function via several mechanisms (9, 10).Reduced lung function has

been well associated within creased metabolic risk factors.

The beneficial effect of hormonal replacement therapy has long been controversially discussed. Complementary therapies have been used by the menopausal women to cope with their symptoms and yoga is one among them (11, 12). Yoga is an ancient Indian science as well as the way of life, which includes practice of asanas in specific posture and pranayama which includes the regulated breathing techniques. Breathing maintains the dynamic bridge between body and mind and pranayama is the important yogic practices, which can produce different physiological responses in healthy individuals. The regular practice of yoga has been shown to increase the strength of muscles, flexibility of the body and also improvement in the cardiovascular functions. Overall regular yoga practice indirectly improves the quality of life (13, 14). Simple yoga postures can be easily adopted by physically active and inactive people and also practiced at any time with empty stomach. The outdoor physical activities are restricted by the environmental barriers such as extreme rain, heat or cold. Yogic exercises can be done in the limited space and also in any weather conditions (11, 12).There is an increased need for a safe and effective intervention programmes in postmenopausal women decreasing the adverse effects on pulmonary functions as the age advances. The present study was designed to evaluate the complete and accumulative effect of practicing yoga on certain respiratory parameters in postmenopausal women.

MATERIALS AND METHODS

This study is a randomized controlled trial in postmenopausal women recruited in one center in Mangalore between November 2015 and Aug 2018. The present study was done after obtaining the consent from the Institutional Ethical Committee. The purpose of the study was explained, and written approval of each individual was obtained. Post-menopausal women (48-60 years) who joined for the yoga class were randomly selected. Post-menopausal women having the history of cardiovascular vascular and respiratory diseases were excluded from the study. The respiratory parameters such as Vital capacity, FVC, FEV1, FEV1 ratio, PEFR, FEF 50, was measured with the help of vitalograph (Pneumotrac; 11). The women included in the study group who failed to achieve 80% attendance during the yoga schedule were excluded from the study. They practiced yoga regularly as per the yoga therapy schedule. Yoga was strictly under the supervision of yoga teacher.

Yoga intervention

All the subjects had to practice yoga for 1hour, 20 minutes daily, five days a week between 4:00 pm to 6:00 pm. Procedure of daily yoga sessions are as follows. The subjects were informed about the procedures in brief and were asked to relax physically and mentally for 10 minutes. The yoga practice (1 hour-20 minutes) schedule starting from prayer and followed by warm up exercises, *Surya namaskara, Asanas, Pranayama* and concluded by meditation/laughing exercise as follows:

Yoga	Time in minutes
Prayer	1
Mild warm up exercise (Stretching exercise)	10
Suryanamaskara	15
Asanas: Shavasana, Naukasana, Halasana,	35

Dhanurasana, Bhujangasana, Pavanmuktasana	
Pranayama: Nadi-sodhan, Bhastrika, Kapalbhati, Bahya Pranayam Anulom Vilom, Bhramari pranayama	15
Meditation on Omkar / laughing exercise	5 minutes

Instructions to do yoga was done by certified yoga instructors who had at least 5 years of yoga teaching experience. The intensity of yoga exercise was determined by the instructors in order to provide a progressive level of challenge to the subjects. The performance of the subject was continuously supervised by the attending yoga instructor. All the yogic exercises were stated to be suitable for the post-menopausal yoga beginners and senior individuals included in this study. The effect of yoga was studied in two groups of 30 each. The study group were categorized into Group I – (Regularly doing yoga for one years) and Group II (Regularly doing yoga for the two years). The respiratory parameters such as Vital capacity (VC), FVC (Forced Vital capacity), FEV1 (forced expired volume in 1 second), FEV1 ratio, PEFR (Peak expiratory flow rate), (FEF) 50% (Forced expiratory flow measured at the mid-flow, were measured with the help of computerized vitalometer (Pneumotrac). The women not doing yoga were taken as the control group for the Group Ia (for One year) and Group IIa (for two Years).

RESULTS

Group I showed significant (P<0.001) improvement in VC and FVC but did not show any significant changes in the other parameters such as FEV1, FEV1 ratio, PEFR, FEF50 (Table 1).Women belonging to the group II showed a significant improvement (P<0.0001) in all the respiratory parameters when compared to respective control group (Table 2).Comparatively group II showed a significant improvement in the respiratory parameters while compared to group I (Table 3).

Table 1: Effect of one-year yoga therapy on respiratory parameters

Parameters	Group I (n=30)	Group I A (n=30)
VC	2.40 ± 0.3	2.21±0.3**
FVC	2.51±0.4	2.30±0.3**
FEV1	2.09±0.4	1.94±0.3NS
FEV1 ratio	0.78±0.13	0.77±0.03 NS
PEFR/m	359.04±41.5	346.7±21.9 NS
FEF 50 L/S	3.61±0.52	3.54±0.3 NS

**P<0.001; Group I versus Group I A. NS (Not significant); Group I versus Group I A

Table 2: Effect of two-year yoga therapy on respiratory parameters

Parameters	Group II (n=30)	Group II a (n=30)
VC	2.91±0.5	2.38±0.3***
FVC	2.83±0.5	2.40±0.30***
FEV1	2.38±0.4	2.03±0.3***
FEV1 ratio	0.91±0.07	0.78±0.03***
PEFR/m	398.7±64.5	351.8±21.5***
FEF 50 L/S	4.05±0.66	3.58±0.32***

***P<0.0001; Group II versus Group IIa

Table 3: Comparative effect of one year and two-year yoga therapy on respiratory parameters

Parameters	Group I	Group II
VC	2.91±0.5	2.40 ± 0.3***
FVC	2.83±0.5	2.51±0.4***
FEV1	2.38±0.4	2.09±0.4***
FEV1 ratio	0.91±0.07	0.78±0.13***
PEFR/m	398.7±64.5	359.04±41.5***
FEF50 L/S	4.05±0.66	3.61±0.52***

***P<0.0001; Group I versus Group II

Statistical analysis

Statistical analysis was done using one-way ANOVA following which post hoc test to compare mean between the groups using SPSS version 18.0 (SPSS, Chicago, IL, USA). Data were expressed in mean ± standard deviation. Significant level was set as P <0.05.

DISCUSSION

The autonomic function that can be consciously controlled harmonizing the sympathetic and parasympathetic nervous system together is breathing (15, 16).The involuntary nervous system is influenced by various breathing mechanisms. Evaluation of lung function test is a valued tool for assessing the respiratory system. It is a simple screening method which can be performed by using standardized equipment to measure pulmonary functions. This study was planned to determine the impact of one year and two-year regular yoga practice on certain respiratory parameters in postmenopausal women. Literature survey shows that yogic practice will cause progress in the overall respiratory functions (17-20).Yogic breathing moves have impressive valuable effects on respiratory muscle efficiency (20). Yogic practice improves lungs and chest expansion to the greatest conceivable degree. Yogic form of breathing exercise is *pranayama.* It is an art of prolongation and control of breath,

which helps to bring the conscious awareness in breathing; to reshape breathing habits and patterns. The persistent conditioning of breathing pattern of *pranayama* increases the pulmonary function in healthy individuals. Prolonged breath holding *Pranayama* like *Kapalbhati* and *Nadisodhan* included in our present study schedule involves powerful strokes of exhalation, which trains the subject to make full use of diaphragm and abdominal muscles (21). Slow, deep and full inhalation and exhalation as in *Anulom-vilom* and *Bhastrika pranayama* also improves respiratory muscle efficiency. The results observed in our present study are in accordance with the other reports. Maximum inflation and deflation during the breathing exercise is an important physiological stimulus for the release of surfactants and prostaglandins into the alveolar spaces causing the drastic rise in the lung compliance (22).Activation of the stretch receptors reflex decrease the tracheobronchial smooth muscle tone leading to the diminished air flow resistance and augmented airway caliber profoundly influencing the pulmonary function test.

CONCLUSION

Optimum benefit of yoga was observed during the two years of yoga practice in the postmenopausal women. Continuing practice of yoga in post-menopausal women might be considered as a preventive exercise to reduce the age-related complications in respiratory diseases preventing mortality and morbidity, thus improving the quality of life. More studies are required for further understanding the genuine adjustments in the respiratory muscles and changes in execution in the larger group. The results of the present study might gain attention in to the possible importance of yoga practice in the Post-menopausal women as a preventive exercise to impair age associated illness and improve the quality of life by creating awareness.

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