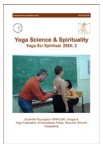
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Respiratory Re-Education Through Yoga Techniques as Prevention of Asthma and Other Lung Diseases

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Abstract

BACKGROUND: Asthma and other chronic respiratory diseases represent major global public health challenges due to their increasing prevalence, morbidity, and socioeconomic burden. Breathing, although a fundamental physiological process, receives limited attention in health promotion and disease prevention. Yoga incorporates a comprehensive system of breathing re-education techniques that may improve respiratory function and contribute to the prevention of respiratory disorders.

AIM: To evaluate the effects of a structured yoga-based respiratory re-education program on respiratory health and function, and to assess its potential role in the primary prevention of asthma and other lung diseases.

METHODS: The study was conducted in two phases. In the first phase, 341 yoga practitioners completed questionnaires before and after participation in yoga courses, reporting respiratory symptoms and perceived improvements. In the second phase, objective respiratory function was assessed through spirometry in healthy adults who participated in specialized yoga breathing re-education programs for either one month (n=15) or three months (n=20). The intervention included psychophysical exercises, asanas, pranayama, bandhas, kriyas, and relaxation techniques. Sessions were held twice weekly under professional supervision, with daily home practice recommended.

RESULTS: Among the 341 participants, 124 reported respiratory problems at baseline, and 80 (64.5%) reported subjective improvement following the yoga program. Spirometric evaluation demonstrated trends toward improved respiratory parameters after both one and three months of practice. In the one-month group, significant improvements were observed in selected expiratory flow measures (FEF75 and FEF50; $p<0.05$), while other respiratory parameters showed non-significant positive changes. In the three-month group, improvements were observed in forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and other dynamic respiratory capacities, although these changes did not reach statistical significance.

CONCLUSION: Yoga-based respiratory re-education appears to improve subjective respiratory well-being and may positively influence objective measures of pulmonary function. The program enhances breathing awareness, respiratory muscle function, airway hygiene, and overall respiratory efficiency. These findings support the potential role of yoga as a complementary strategy for primary prevention and respiratory health promotion. Further studies involving larger samples, longer intervention periods, and patients with asthma or chronic obstructive pulmonary diseases are warranted.

Introduction

Asthma and other lung diseases are among the most common socio-medical problems of the contemporary world. It is assumed with high certainty that asthma is going to be the disease of the 21st century. High morbidity, invalidity and mortality with obvious prevalence and progressive incidence make these diseases a difficult medical, economic, social and humanitarian problem for any society.

This paper aims to show the positive influence of the system of yoga techniques over the overall respiratory function and to present it as a way of primary prevention of asthma and other lung diseases. It is a fact that only negligible attention is given to breathing as one of the basic factors for maintenance of natural and healthy way of living [1], [2].

Materials and Methods

The first phase of this research has been based on the data derived from the answers of 341 yoga practitioners attending common yoga classes who filled questionnaires before they started and after they completed the course. The questionnaire referred to various aspects of respiratory diseases (frequent colds, breathing difficulties, coughs, bronchitis and other respiratory diseases) and the practitioners had an opportunity to report the subjective improvements they noticed (Table 1).

Table 1: Reported subjective respiratory problems at the practitioners (250 females and 91 males, average age 29.88)

Number of reported problems With the lungs	Improvement	Percentage %	Total number of practitioners
124	80	64.5%	341

The subjective improvements described in the first phase of the research necessitated objective spirometry measurements before and after the completion of the courses for basic breathing re-education. This phase was based upon a healthy population of 20 practitioners who practiced for three months and 15 practitioners who practiced one month. They all took part in a specialized yoga program for respiratory re-education developed according to classical Haṭha Yoga methodology [1], [2].

This program concentrates on an integral re-education of all elements connected with breathing, which further enables:

- increased awareness and control of breathing;
- rational and quality hygiene of the respiratory passages;
- better passableness of the respiratory passages;
- revitalization and better use of the respiratory muscles (diaphragm, costovertebral and abdominal muscles); the better use of lungs depends on the ability to activate these muscles;
- improvement of the body posture as a prerogative for unobstructed respiratory movements;
- enhanced elasticity of the lung tissue, which enables its more rational use.

The course went on for a period of three months. Most of the practiotioners wer attending classes at joga society of Skopje, Ohrid, Struga and Prilep. The classes lasted between 60 and 75 minutes and were held twice a week under the professional guidance of a yoga instructor. The practitioners were asked to repeat the same program daily.

Contents and characteristics of the yoga program

The program was especially designed for basic re-education of breathing. It consisted of the following techniques:

1. PREPARATORY PSYCHOPHYSICAL EXERCISES- basic dynamic exercises for re-education of the locomotive system performed with slow and relaxed movements of the various parts of the body. The exercises are performed in coordination with inhaling and exhaling and establish control over the breathing process.

2. ASANAS- specific body postures performed in a slow and controlled manner in order to attain psychophysical stability and breathing awareness. The choice of the asanas was made with an aim to enable maximum stretching and strengthening of the chest.

3. PRANAYAMA- breathing techniques that re-teach the right way of breathing and enhance lung capacity, better exchange of gases and physical and mental calmness. Yoga distinguishes:

- Lower, abdominal or diaphragmatic breathing, which is the best and the deepest way of breathing. It stretches the lower parts of the lungs towards the abdomen. It activates the diaphragm and the abdominal muscles, which enhances their elasticity and results in better control over them;
- Middle, chest or thoracic breathing, which activates the muscles of the chest and improves their elasticity, as well as the mobility of the costovertebral joints;
- Upper or sternoclavicular breathing, which is the shallowest of the three. It activates only the upper parts of the lungs and moves the clavicles only slightly;
- Having gained control over these three different ways of breathing, the participants were taught complete yoga breathing. It incorporates all of the above-mentioned ways of breathing following one another.

4. BANDHAS - neuromuscular contractions practiced because of their positive influence over the whole body. In our case uddiyana bandha was practiced because it enables:

- maximum exhalation of the air from the lungs;
- decreasing the amount of residual air;
- better blood circulation of the lungs;
- strengthening of the diaphragmatic muscle;
- better elasticity of the lung tissue;
- better elasticity of the smooth muscles of the respiratory tract.

5. KRIYAS- techniques for clearing breathing passages. They ensure better passableness of these passages, make breathing easier and are beneficial for the whole body. Kapalbhati is a technique for clearing lower breathing passages. The inhaling is natural, but

the exhaling is forced and quick and clears mechanically all obstacles (mucous, small particles and similar). Jala neti is a technique for clearing the upper breathing passages, the nose and the sinuses. It uses the process of osmosis to clear all impurities, mucous and edematous liquids from the nasal mucous membrane and makes breathing easier and more pleasant.

6. RELAXATION TECHNIQUES - enable the body to relax and rest in a short time. They decrease the physical and mental strain, balance the activity of the nervous system and remove any spasms of the muscles of the breathing system. As a result, the breathing becomes slow, calm and balanced and enables rational exchange of gases on the alveolar-capillary level.

Results

The first stage of the study shows the subjective improvements achieved by the practitioners at the common yoga courses. They mentioned various problems regarding the respiratory system, such as frequent colds, breathing difficulties, coughs, bronchitis and other lung diseases at the beginning of the courses and their subjective improvements after the finishing of the courses (Table 2-4).

The second stage of the research shows the results of spirometry done at the practitioners before and after the yoga course (Table 2-4).

Table 2: Mean values and standard deviations of some dynamic respiratory capacities before and after 3 months of yoga exercises in 14 female adults (age - 30.57 ± 9.61, height – 166.71 ± 5.09). n.s., no significance

3 Months	FVC 1	FVC %	FEV1 1	FEV1 %	FEV1/ FVC	FEV1/ FVC%	FEF1/s 25-75	FEF 25-75%	FEF1/s 75	FEF 75%	FEF1/s 50	FEF 50%	FEF1/s 25	FEF 25%
Before	4072.71 ± 722.25	97.93 ± 20.1	3399.29 ± 655.39	96.29 ± 22.55	83.42 ± 7.29	102.36 ± 8.35	3.84 ± 0.95	87.5 ± 23.86	5.52 ± 1.90	76.14 ± 34.03	4.33 ± 1.06	81.79 ± 25.67	2.23 ± 0.63	83.21 ± 29.98
After	4182.5 ± 670.36	101.2 ± 24.2	3566.21 ± 623.41	101.5 ± 24.56	85.30 ± 7.77	104.64 ± 8.78	4.01 ± 1.06	91.57 ± 26.87	5.74 ±1.43	78.29 ± 25.04	4.71 ± 1.28	89.36 ± 32.82	2.34 ± 0.76	86.86 ± 33.15
P < 0.05	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

Table 3: Mean values and standard deviation of some dynamic respiratory capacities before and after 3 months of yoga exercises in 6 male adults (age 30.33 ± 9.42; height-177.83 ± 8.47). n.s., no significance

3 Months	FVC 1	FVC %	FEV1 1	FEV1 %	FEV1/ FVC	FEV1/ FVC%	FEF1/s 25-75	FEF 25-75%	FEF1/s 75	FEF 75%	FEF1/s 50	FEF 50%	FEF1/s 25	FEF 25%
Before	5543.83 ± 901.65	110.8 ± 20.1	4770.17 ± 824.61	113.83 ± 19.16	86.08 ± 6.51	104.17 ± 7.73	5.35 ± 1.43	113.33 ± 32.31	8.85 ± 2.19	105.67 ± 23.18	6.39 ± 1.94	110.67 ± 39.97	3.14 ± 0.92	110.5 ± 47.20
After	5908.33 ± 457.47	118.5 ± 12.8	4838.33 ± 531.04	115.83 ± 9.62	81.95 ± 7.96	100 ± 9.25	5.37 ± 1.41	114.67 ±33.07	9.26 ± 1.20	111.17 ± 13.82	5.87 ± 1.88	101.17 ± 35.95	2.75 ± 1.10	94.67 ± 42.86
P < 0.05	n.s..	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

Table 4: Mean values and standard deviation of some dynamic respiratory capacities before and after 1 month of yoga exercises in 15 female adults (age-31.44 ± 7.40; height-167±7.85). n.s., no significance

1 Month	FVC 1	FVC %	FEV1 1	FEV1 %	FEV1/ FVC	FEV1/ FVC%	FEF1/s 25-75	FEF 25-75%	FEF1/s 75	FEF 75%	FEF1/s 50	FEF 50%	FEF1/s 25	FEF 25%
Before	3985.06 ± 799.31	90.56 ± 16.2	3186.12 ± 576.19	85.5 ± 13.04	80.96 ± 12.03	100.69 ± 15.46	3.84 ± 0.89	83.44 ± 18.11	5.1 ± 1.69	63.56 ± 1.69	4.25 ± 21.18	73.12 ± 1.16	2.38 ± 18.40	79 ± 0.53
After	3983.19 ± 580.62	91.25 ± 14.3	5638.75 ± 911.51	92 ± 15.07	85.77 ± 8.62	106.5 ± 11.49	3.78 ± 0.76	82.44 ± 16.43	5.64 ± 1.33	70.5 ± 16.13	4.21 ± 0.88	72.81 ± 15.59	2.22 ± 0.67	72.87 ± 21.56
P < 0.05	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	P < 0.05	P < 0.05	n.s.	n.s.	n.s.	n.s.

We found that only FEF1/s 75 (increased from 5.1 ± 1.69 to 5.64 ± 1.33) and FEF 75% (increased from 63.56 ± 1.69 to 70.5 ± 16.13) were significantly increased before and after 1 month of yoga exercises (P < 0.05) in 15 female adults (Table 4, Figure 1).

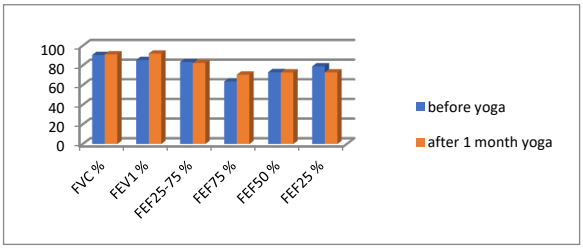


Figure 1: Dynamic respiratory capacities of female adults before and after 1 month of yoga exercises

Discussion

The positive results of this research emphasize the significance and the importance of breathing as a physiological process. The process of prevention is mostly justified if it is applied to a healthy population, and the application of the yoga techniques enables complete primary prevention [1], [2] because:

- It presents an already approved, well-designed and gradual method of breathing education;
- It re-educates because people are taught to become aware of their breathing potential and thus improves the quality of their breathing;

- It transforms automatic breathing into a conscious. deep and controlled inhaling and exhaling according to the needs of the individual;
- It enhances the function and the elasticity of the diaphragmatic muscle that takes an important part in respiration. It strengthens the chest muscles and leads towards a growing amplitude of inhaling and exhaling. It improves one's awareness and control of the work of the abdominal muscles;
- Active breathing has beneficial influence on the function of the other organs abdominal breathing gives a gentle massage to the abdominal organs and improves peristalsis; chest breathing massages the organs of the mediastinum the heart, the large blood vessels and the esophagus;
- If improves one's awareness about his/her way of living and working and increases the responsibility for one's health and life.

That is the reason why the subjective improvements gained after following a yoga program and the positive experiences from the respiratory re-education of healthy population should make us consider for a wider secondary and tertiary prevention of patients suffering from asthma [5] and another patient with lung fibrosis [6] show that there were significant subjective improvements in both cases. The significance and the importance of yoga is due to the fact that:

- It is a complex system of psychophysical and respiratory techniques that embraces all aspects and functions of the human organism;
- It involves a detailed and methodologically designed approach that gradually leads the practitioner into these techniques;
- It has a complex insight of physiological mechanisms based on an accumulated knowledge and experience gained through an empirical approach more than 4000 years ago.

Conclusion

We observe our research as contribution of yoga to modern science, which at this moment is mature enough to open up and accept contemporary holistic treatment in everyday health protection.

We would like to emphasize that this was only preliminary pilot research based on the former experiences of several yoga centers, which shows objective improvements with the application of respiratory re-education. The period of three months in practicing yoga is relatively short to attain better objective results with healthy population, although subjective results were noticed immediately after the first month of yoga practice. We will continue our research to investigate the influence of respiratory re-education after a longer period of yoga practice. The second phase of this research would involve practitioners with asthma and chronic obstructive diseases and investigate the influence of the breathing techniques, as well as the whole complex of other yoga techniques on the complementary therapy and rehabilitation of these diseases.

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