

IMPROVEMENT IN RESPIRATORY FUNCTIONS THROUGH PREKSHA MEDITATION

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Abstract: Objective: The objective of the present study was to evaluate the effects of Preksha Meditation practices on Respiratory functions of adults, in terms of Breathing Rate, Peak Expiratory Flow Rate (PEFR), Peak Inspiratory Flow Rate (PIFR), Vital Capacity (VC) and Maximum Voluntary Ventilation (MVV).

Method: 100 undergraduate and postgraduate male and female healthy adults (18 to 25 years of age group) were selected randomly and divided into 2 groups, one group termed as experimental group of 50 subjects who practiced Preksha Meditation for 60 days and another group known as control group consisting of 50 subjects who were not prescribed any intervention. All the parameters (Breathing rate, PEFR, PIFR, VC and MVV) were recorded at the onset and after two months and the data obtained were analyzed with the help of Sandler's 'A' and Student's 't' tests for intra and inter group comparison respectively.

Results: A significant reduction in breathing rate was observed in the experimental group of subjects after practice of Preksha Meditation but no such difference was there in control group. The PEFR, PIFR, VC and MVV of experimental group showed a statistically significant improvement in terms of increased mean values of all these components but control group values remain in same range.

Conclusion: From the results obtained it may be inferred that regular practice of Preksha Meditation results in improvement of Respiratory functions, thereby promoting the physiological health. Detailed pathway of mechanism of action will be discussed.

Keyword: Respiratory functions, Preksha Meditation, PIFR, PEFR, VC, MVV, Breathing Rate.

INTRODUCTION

Praksha Dhyana is a technique of meditation for attitudinal change, behavioral modification, health promotion and integrated development of personality (1). It is based on the wisdom of ancient philosophy and has been formulated in terms of modern scientific concepts. It is based on the principle of engaging one's mind by concentrating on perception rather than on thought. It consists of regulation and ultimate control of (a) respiratory and allied physiological functions, (b) nervous system, (c) endocrine (ductless glands) system and (d) subtle inherent vibrations which produce passions. Practice of self-observation unveils the mysteries of the unconscious mind and brings about catharsis. The technique balances and harmonizes the endocrine system, which in turn control the nervous system. This results in equilibrium of the neuro-endocrine system(2). On physiological level it helps each cell to revitalize itself; it facilitates digestion; it makes respiration more efficient; it improves cardiovascular functions and brings about qualitative changes in blood.

On mental level Preksha Meditation becomes a methodology to train the mind to concentrate; it cleans and relaxes the mind; it offers a way to treat serious psychosomatic illness without drugs, it is an efficient exercise in self discipline leading to the end of addiction and other bad habits; it leads to what lies beyond the conscious mind.

On emotional level the active functioning of reasoning mind controls reactions to environmental conditions, situations and behavior of others. Harmonization of functioning of nervous and endocrine system results in control and ultimate eradication of fear, anger & sexual perversion.

On spiritual level Preksha Meditation establishes the firm control of the reasoning mind, regulation and transformation of blood-chemistry through proper blending of the neuro-endocrinal secretions and production of dispassionate internal vibrations lead to attain infinite compassion, equanimity, bliss and happiness. (3)

Madanmohan(4) have reported that yoga training of six weeks duration attenuates the sweating response to step test and produces a marked increase in respiratory pressures and endurance in 40 mm Hg test in both male and female subjects. In another study, they reported that 12 weeks of yoga practice results in significant increase in maximum expiratory pressure, maximum inspiratory pressure, breath holding time after expiration, breath holding time after inspiration, and hand grip strength(5). In another study the authors have demonstrated that six weeks of pranayam breathing course resulted in improved ventilatory functions in the form of lowered respiratory rate, and increases in the forced vital capacity, forced expiratory volume at the end of experiment, maximum voluntary ventilation, peak expiratory flow rate, and prolongation of breath holding time(6). Similar beneficial effects were observed by Makwana(7) after 10 weeks of yoga practice. Increase in inspiratory and expiratory pressures suggests that yoga training improves the strength of expiratory and as well as inspiratory muscles.

The present study was aimed to explore the effect of two months Preksha Meditation practice on respiratory components of young healthy volunteers.

MATERIALS AND METHODS

100 undergraduate and postgraduate male and female healthy students (18 to 25 years of age group) were

selected for the study randomly and divided into 2 groups. The first group consisting of 50 subjects was termed as 'experimental group'. They were put to practice Preksha Meditation for 30 minutes every day for 60 days. The second group consisting of 50 subjects was termed as 'control group'. They were not prescribed any intervention. The Preksha Meditation practice module, mentioned below, was conducted by an expert in every morning for two months continuously:-

1. Kayotsarga (Relaxation with self awareness)– 10 min.
2. Deergha Swas Preksha (Deep scientific breathing)– 20 min.

Parameters of assessment include Breathing rate, Peak Expiratory Flow Rate (PEFR), Peak Inspiratory Flow Rate (PIFR), Vital Capacity (VC) and Maximum Voluntary Ventilation (MVV) were recorded at the onset and after two months with the help of Spirometer and the data obtained were analyzed with the help of Sandler's 'A' and Student's 't' tests to obtain level of significance in the pre and post value of respiratory components by making intra- and inter- group comparison.

RESULTS

Breathing Rate

The basal mean values of breathing rate in experimental and control group of subjects were 22.084 ± 2.55 and 22.084 ± 2.55 breath/min respectively. After 60 days of intervention (i.e. Preksha Meditation module) the values decreased to 19.704 ± 1.291 breath/min. in experimental group showing statistical significance when compared with the mean values of control group which remains in the same range (21.887 ± 2.393 breath/min.)

Table 1. Intra group comparison of breathing rate of both groups

Group	Duration	Mean (breaths/min.)	SD	SE	'A'
Experimental (n=50)	0day	22.084	2.55	0.302	0.021*
	60 days	19.704	1.291	0.153	
Control (n=50)	0day	22.084	2.55	0.302	0.683 ^{NS}
	60 days	21.887	2.393	0.284	

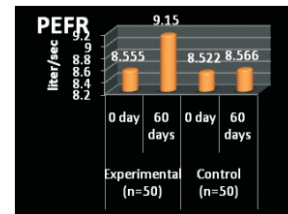
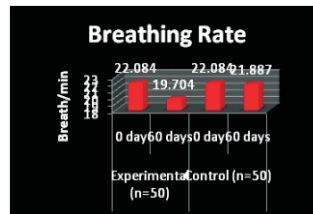
* -p= 0.05; NS – Not significant

The inter-group comparison of the values of breathing rate of both the groups at the beginning of experiment showed a homogeneity and the values were in similar range (22.084 ± 2.55 and 22.084 ± 2.55 breath/min). But the difference in terms of decreased breathing rate was significant when we compared the mean values after 60 days (Table 1 & 2).

Table 2. Inter group comparison of breathing rate of both groups

Group (n=50 each)	Duration	Mean (breaths/min)	SD	SE	't'
Experimental	0 day	22.084	2.55	0.302	0 ^{NS}
Control	0 day	22.084	2.55	0.302	
Experimental	60 day	19.704	1.291	0.153	-10.315*
Control	60 day	21.887	2.393	0.284	

* -p= 0.05; NS – Not significant



Peak Expiratory Flow Rate (PEFR)

The control group of subjects have shown a slight decline in PEFR during experimental period but without any statistical significance and because of unknown reasons. The mean values being 8.522 ± 2.179 and 8.566 ± 2.205 L/sec. Contrary to that there was a significant improvement in the PEFR of experimental group of subjects and values increased to 9.15 L/sec from its basal value of 8.555 L/sec

(Table 3).

Table 3. Intra group comparison of PEFR of both groups

Group	Duration	Mean (L/sec)	SD	SE	'A'
Experimental (n=50)	0day	8.555	2.145	0.254	0.022*
	60 days	9.15	2.113	0.25	
Control (n=50)	0day	8.522	2.179	0.258	0.454 ^{NS}
	60 days	8.566	2.205	0.261	

* -p= 0.05; NS – Not significant

At the onset of experiment both groups are at homogeneity regarding PEFR as shown in table 4 and the mean value of PEFR in experimental group significantly increases when compared with that of control group after 60 days of experimental intervention.

Table 4. Inter group comparison of PEFR of both groups

Group (n=50 each)	Duration	Mean (L/sec)	SD	SE	't'
Experimental	0 day	8.555	2.145	0.254	0.169 ^{NS}
Control	0 day	8.522	2.179	0.258	
Experimental	60 day	9.150	2.113	0.250	2.765*
Control	60 day	8.566	2.205	0.261	

* -p= 0.05; NS – Not significant

Peak Inspiratory Flow Rate (PIFR)

Mean PIFR in control group of subjects was found to be 5.123 ± 1.478 L/sec. whereas in experimental group of subjects it was 5.173 ± 1.481 L/sec. at the onset of experiment. After two months of prescribed practice module the PIFR was increased significantly to 6.072 ± 1.424 L/sec. in experimental group of subjects, while it was found to be in similar range in control group (5.196 ± 1.481 L/sec.). The difference in experimental group was statistically significant

(P = 0.005) as shown in Table 5.

Table 5. Intra group comparison of PIFR of both groups

Group	Duration	Mean (L/sec)	SD	SE	'A'
Experimental (n=100)	0 day	5.173	1.481	0.175	0.015*
	60 day	6.072	1.424	0.169	
Control (n=100)	0 day	5.123	1.478	0.175	0.411 ^{NS}
	60 day	5.196	1.481	0.175	

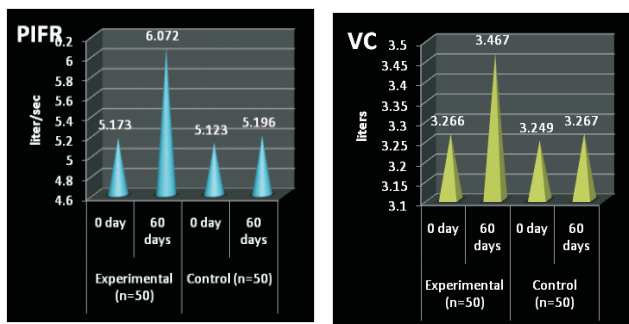
* -p= 0.05; NS – Not significant

The basal mean values of PIFR of both the group of subjects, at the beginning of experiment, were in similar range 5.123 ± 1.478 L/sec and 5.173 ± 1.481 L/sec without any significant difference in between them. But after 60 days of intervention the experimental group showed significant increase in mean values of PIFR as compared to control group (table 6).

Table 6. Inter group comparison of PIFR of both groups

Group (n=50 each)	Duration	Mean (L/sec)	SD	SE	't'
Experimental	0 day	5.173	1.481	0.175	0.424 ^{NS}
Control	0 day	5.123	1.478	0.175	
Experimental	60 day	6.072	1.424	0.169	7.352*
Control	60 day	5.196	1.481	0.175	

* -p= 0.05; NS – Not significant



Vital Capacity (VC)

The basal mean values of VC in control and experimental group of subjects were $3.249 \pm .613$ L and $3.266 \pm .605$ L respectively. After 60 days of Preksha Meditation practice, the values in experimental group increased to $3.467 \pm .586$ L showing statistical significance ($P = 0.001$). In control group it remains in the same range $3.267 \pm .618$ L. (Table 7)

Table 7. Intra group comparison of VC of both groups

Group	Duration	Mean (L)	SD	SE	'A'
Experimental (n=50)	0 day	3.266	0.6	0.071	0.016*
	60 day	3.467	0.586	0.069	
Control (n=50)	0 day	3.249	.613	.072	0.375 ^{NS}
	60 day	3.267	.618	.073	

* -p= 0.05; NS – Not significant

The inter-group comparison of the values of VC of both the groups at the beginning of experiment showed

insignificant difference and the values were in similar range. A significant improvement was observed in experimental group when compared to that of control group after 60 days (Tables 8).

Table 8. Inter group comparison of VC of both groups

Group (n=50 each)	Duration	Mean (L)	SD	SE	't'
Experimental	0 day	3.266	0.6	0.071	0.384 ^{NS}
Control	0 day	3.249	0.613	0.072	
Experimental	60 day	3.467	0.586	0.069	4.308*
Control	60 day	3.267	0.618	0.073	

* -p= 0.05; NS – Not significant

Maximum Voluntary Ventilation (MVV)

At the onset of experiment the mean of MVV of the experimental group was 100.9014 ± 22.43859 lit/min. and it was found increased to 111.154 ± 19.163 lit/min. after 60 days of Preksha Meditation intervention. This change was statistically significant. But the same in control group of subjects were 100.38 ± 22.629 lit/min. at the onset and was found to be almost in similar range 100.971 ± 22.932 lit/min. without any change after 60 days (Table 9).

Table 9. Intra group comparison of MVV of both groups

Group	Duration	Mean (lit/min)	SD	SE	'A'
Experimental (n=50)	0 day	100.901	22.438	2.662	0.018*
	60 day	111.154	19.163	2.274	
Control (n=100)	0 day	100.380	22.629	2.685	1.6627 ^{NS}
	60 day	100.971	22.932	2.721	

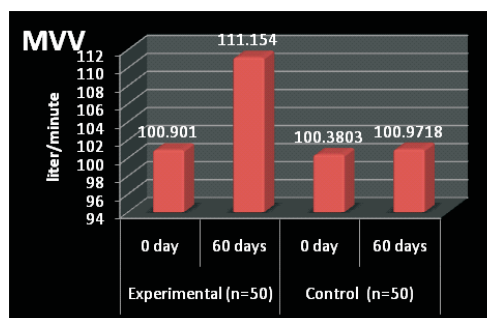
* -p= 0.05; NS – Not significant

At the onset of experiment both groups were at homogeneity as shown in table 10. The mean values of MVV in experimental group of subjects increased significantly after 60 days of experimental intervention as compared to that of control group.

Table 10. Inter group comparison of MVV of both groups

Group (n=100 each)	Duration	Mean (lit/min)	SD	SE	't'
Experimental	0 day	100.901	22.438	2.662	0.265 ^{NS}
Control	0 day	100.380	22.629	2.685	
Experimental	60 day	111.154	19.163	2.274	5.047*
Control	60 day	100.971	22.932	2.721	

* -p= 0.05; NS – Not significant



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The rationale for intra- and inter- group comparison was to prove the fact that changes observed were only because of experimental intervention and not due to any other factor.

DISCUSSION

A gradual and significant improvement in the respiratory functions of the subjects who practiced Preksha Meditation for experimental duration was observed in the present study in terms of PIFR, PEFR, VC and MVV. Sathyaprabha et al (2001)⁸ studied efficacy of naturopathy and yoga in bronchial asthma and showed the significant improvement in PEFR, VC, FVC, FEV1, FEV1/FVC% and MVV. The results of our study are supported by the findings of this study. The changes in the respiratory functions during these practices are of such a nature that they do not lead to any significant disturbance in the body homeostasis⁹. Joshi et al (1992)¹⁰ have reported that pranayama training improves ventilatory functions in the form of increase in FEV, FEV1 and PEFR. Makwana et al (1988)⁷ and Yadav and Das (2001)¹¹ found a significant increase in FEV, FEV1, and PEFR after yoga training.

It may be inferred, from the results obtained, that such short – term but regular practice of Preksha Meditation manifests in overall improvement in respiratory functions. The pathway of mechanism of Preksha Meditation may possibly involve the higher neural centers in the brain. The particular remedial action generated in the cerebral cortex, in terms of thought modulation and pranic balance, is being communicated to the concerned system/organ through the relative center in the brain. The changes observed in the present study might be attributed to such mechanism of action. It may be inferred that whatever changes has been observed following the practice of Preksha Meditation may be the sum total of various neuromuscular control efforts over the respiratory functions of the subject, because practice of Preksha Meditation includes modulation in both muscular and neural performances¹².

Respiratory muscles are like skeletal muscles. Yogic techniques involve isometric contraction which is known to increase skeletal muscle strength. Breath holding time depends on initial lung volume. Greater lung volume decreases the frequency and amplitude of involuntary contractions of respiratory muscles, thereby lessening the discomfort of breath holding⁽⁴⁾. Many studies also reported that yoga and pranayama training improves ventilator functions in the form of increase in FEV, FEV1 and PEFR⁽¹³⁻¹⁵⁾.

Fibers from medulla oblongata (I neurons and E neurons) travel down the spinal cord and synapse with lower motor neurons in the cervical to thoracic regions. From here, nerve fibers travel in the phrenic nerve to the diaphragm and intercostal nerve endings to the intercostal muscles. During quiet breathing impulses transmit to the external intercostal muscles via intercostal nerves and to the diaphragm via the phrenic nerve¹⁶. The improvement in the ventilatory functions may be due to neural changes that send impulses, after getting a stimulus from breathing modulation by meditation practice, to the inspiratory area in the medulla oblongata. The stimulus for these changes in respiratory

centers may also be from input from proprioceptors, which monitor the movements of related joints and muscles. Through these routes after getting impulses from brain centers to neuromuscular centers, the respiratory muscles expand and give space to the lungs for their maximum expansion which may cause an improvement in the pulmonary ventilation capacities¹⁷.

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