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Practicing Slow Breathing Exercise Regularly Can Improve Lung Function Status in Case of Major Depressive Disorder Patients

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ABSTRACT

Background: *Major Depressive Disorder (MDD) is associated with depressed lung function. This depressed lung function can be improved by slow breathing exercise.*

Objectives: *To observe $FEF_{25-75\%}$ in newly diagnosed Major Depressive Disorder patients and after three months of regular practice of slow breathing exercise.*

Methods: *This prospective study was carried out in the Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU) from January to December, 2014 to assess the lung function status in MDD patients. For this, 30 newly diagnosed MDD patients (group A1), age 20 to 50 years were enrolled from the Department of Psychiatry of BSMMU. $FEF_{25-75\%}$ of all subjects were assessed by a portable digital spirometer (PONY FX, Cosmed, Italy) before and after (A2) three months of regular practice of slow breathing exercise. For statistical analysis, paired sample 't' test was done and p value ≤ 0.05 is considered as level of significance.*

Results: *There was significant improvement of lung function status found when compared between before and after three months of regular practicing of slow breathing exercise.*

Conclusion: *From this study it may be concluded that SBE is very effective and potent method for improvement of poor lung function associated with all types of pulmonary functional disorder in MDD.*

Keywords

Major Depressive Disorder (MDD), Slow Breathing Exercise (SBE).

Introduction

Depression is the most common chronic condition next to hypertension experience in general medical practice. Out of ten patients visiting psychiatric outpatient department; one patient is

suffering from major depression.

Major Depressive Disorder (MDD) is defined by depressed mood or loss of interest in nearly all activities or both for at least two weeks, accompanied by a minimum of three or four of the following symptoms (for a total of at least five symptoms altogether) such as insomnia or hypersomnia, feeling of worthlessness or excessive guilt, fatigue or loss of energy, diminished ability to think or concentrate, substantial change in appetite or weight, psychomotor agitation or retardation and recurrent thoughts of death or suicide [1].

Depression is a major cause of morbidity worldwide. The WHO ranks depression as the fourth leading cause of disability worldwide and by 2020, it will be the second leading cause. Population studies have consistently shown major depression is about twice as common in women as in men, although the underlying cause and factor is unclear. Old age people are more affected. People are most likely to suffer their first depressive episode at about 25.7 years in high income and 24 years in low to middle income country [2].

Depression may affect all the organs of the body and is responsible for different diseases such as Myocardial Infraction (MI), other coronary artery diseases, stroke, diabetes, kidney diseases, arthritis, Parkinson's disease and other autoimmune diseases [3].

Researchers found depressed lung function in depressive illness patients which is more in major depressive disorder [4]. Another study found that Major Depressive Disorder (MDD) was associated with lower FEV_1 [5]. Whereas no difference in lung function was found in MDD patients when compared to control [6].

Chanavirut and his colleagues (2006) investigated the effect of breathing and chest wall expansion exercise (yoga) on lung function parameters in young, healthy volunteers. They found significant increase in FVC, FEV_1, $FEF_{25-75\%}$ after practicing breathing exercise for 6 weeks.

Sayyad and his colleagues (2014) studied lung function parameters on asthma patients after practicing eight weeks of yoga. They found significant increase in FVC and FEV_1.

In 2010, Ahmed and his coworkers studied lung functions in healthy volunteers who were exposed to yoga practice by employing posture and controlled breathing exercise (pranayam) for 30 days and 60 days in two age groups. They found significant increase in all spirometry parameters in all age groups after 60 days but these values were found increased in old age groups after 30 days.

Another study found that after practicing yoga breathing exercise for 4 weeks, all the lung function parameters were significantly increased. Similar findings were observed by Panwar et al (2012) Yadav and Das (2001).

Though there is accumulation of evidence in favor of improvement of lung functions in healthy adults but the effect of slow breathing exercise as a part of yoga on lung function status in depressed patients so far has not been studied.

The ultimate aim of this study is to find out whether this physiological intervention can bring benefit to the MDD patients protecting them from pulmonary dysfunction related complications.

Methods

This interventional study was carried out in the department of Physiology, BSMMU, Dhaka, between January to December 2014.Thirty female newly diagnosed Major Depressive Disorder patients aged 20 to 50 years constituted study group. Study protocol was approved by Institutional Review Board (IRB) of BSMMU, Shahabag, Dhaka. Patients were randomly selected from the OPD of Psychiatry department of BSMMU, Dhaka. Subjects with pregnancy and lactation and history of lung diseases, coronary heart disease, diabetes mellitus, neurological disorders, smokers were excluded from the study. After selection when they agree to participate, an informed written consent was taken from each subject. A detail personal, medical, family, socioeconomic, occupational and drug history were recorded in a preformed questionnaire and through physical examinations were done and were documented. Then the benefit of slow breathing exercise and its useful effect on lung function as well as depression itself explained to the patient and also to their accompanying relatives. In addition, the steps of SBE in detail, the time period and environment of practice was taught. Special emphasis was given to ensure the regular practice of this exercise by the patients. For this, relatives were adequately informed to monitor and ensure it. The subjects were regularly contacted and monitored through telephone and occasionally by visiting home. They were also asked questions to make sure whether the exercise was practiced correctly.

For this assessment of lung function $FEF_{25-75\%}$ of all the subjects were recorded by a digital spirometer before and after three months of antidepressive medication. Data were expressed as mean ± SE (Standard Error). Paired sample 't' test was done to compare between the groups by using SPSS (Windows version 16). In the interpretation of results, p value < 0.05 was accepted as level of significance.

Result

Significant improvement found in patients practicing slow breathing exercise when compared between before and after three months of practicing slow breathing exercise.

Table 1: Baseline characteristics of study subjects.

Groups	Age (years)	BMI (Kg/m2)	SBP (mmHg)	DBP (mmHg)
MDD patients	34.13 ± 1.49 (22-50)	27.51 ± 0.56 (20.16-32.2)	120 ± 1.86 (100-140)	79.00 ± 1.73 (60-90)

Data were expressed as Mean ± SE. Figures in parentheses indicate ranges.
BMI= Body Mass Index; SBP= Systolic Blood Pressure; DBP= Diastolic Blood Pressure

Table 2: Percentage of predicted values of $FEF_{25-75\%}$ in different groups.

Parameters	MDD newly diagnosed (A1)	MDD after three months of SBE (A2)	P value
$FEF_{25\%}$	47.40 ± 5.22 (13-121)	66.66 ± 4.82 (26-149)	0.000***
$FEF_{50\%}$	38.76 ± 5.18 (4-119)	58.53 ± 4.90 (8-126)	0.000***
$FEF_{75\%}$	34.40 ± 4.67 (4-95)	53.43 ± 4.59 (14-122)	0.000***
Data were expressed as mean ± SE. Figures in parenthesis indicate ranges.			
φ = paired sample 't' test			
***	:	Significant (p≤0.001)	
**	:	Significant (p≤0.01)	
*	:	Significant (p≤0.05)	
ns	:	Nonsignificant	
n	:	Number	

Discussion

The present study has been undertaken to observe pulmonary functions in 30 female MDD patients before and after three months of practicing a yoga-based relaxation technique, slow breathing exercise. Pulmonary functions were assessed by measuring $FEF_{25-75\%}$ with a portable micro spirometer. Different researchers found that pulmonary functions are significantly reduced in patients with depressive illness especially in major depressive disorder patients. Islam and his colleagues investigated lung function by spirometry in depressive disorder patients and found lung function parameters were significantly lower in depressive disorder patients in comparison to healthy subjects [4]. Another study was done on US soldiers with Vietnam experience to find out association between MDD with lung function. But they did not find any significant association between MDD and poor lung function [5]. Calikoglu and his colleagues investigated lung function test by spirometry in 30 female MDD patients. After comparing with control group, they found that dyspnea was higher in MDD. In this study, PEFR in newly diagnosed MDD patients were significantly lower than those of apparently healthy subjects [6]. The apparent effect of depression on poor lung function in MDD patients may be explained by the reduced psychomotor activity along with poor respiratory muscle strength in depressive illness [7]. It is surprisingly noted that in MDD patients after 3 months of slow breathing exercise (Anuloma Viloma) beside medicine, overall lung function was significantly improved, evidenced by the significantly higher values of all spirometric indices. The benefit of SBE for improvement of respiratory efficiency is derived from multiple factors. One of the suggested causes for improvement of respiratory efficiency by SBE is, its deep inhalation and prolonged expiration cause efficient use of diaphragm and abdominal muscle and intercostals muscle which ultimately improves the strength of this respiratory muscles. In addition, the stress on more prolonged expiration deep inspiration trains the respiratory apparatus for more efficient and complete emptying and filling of airways.

The poor strength for spirometric performance due to poor muscular strength due to depression is thus overcome by the increased strength of respiratory muscle achieved by SBE.

In slow breathing exercise procedure, deep breathing at slow phase reduces dead space and increased alveolar ventilation. Consequently, this increases vital capacity. The significant improvement of FVC and FEV_1 after practicing SBE for 3 months provides the evidence of improved ventilator function of lung.

During SBE, the thoracic and lung compliance increases, airway resistance decreases which is supporting the increased value of FEV_1, FEV_1/FVC ratio in MDD patients in the present series [8].

Conclusion

Therefore finally it can be concluded that SBE is a very effective and potent method for improvement of poor lung function associated with all types of pulmonary functional disorder in MDD.

Thus, SBE can be strongly advocated as an alternative or adjunct to ant depressive medication in the MDD for improvement of their respiratory efficiency.

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