

FVC, FEV₁ and FEV₁/FVC% in patients with Major Depressive Disorder

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Abstract

Background: Major Depressive Disorder (MDD) is associated with depressed lung function. **Objectives:** To observe FVC, FEV₁ and FEV₁/FVC% in Major Depressive Disorder patients. **Methods:** This prospective study was carried out in the Department of Physiology, Bangabandhu Sheikh Mujib Medical University (BSMMU) in 2014 on 60 newly diagnosed female MDD patients aged 20 to 50 years. They were enrolled from the Department of Psychiatry of BSMMU. Age, BMI, socioeconomic status and occupation matched 30 apparently healthy females were controls. FVC, FEV₁ and FEV₁/FVC% were assessed by a portable digital spirometer. For statistical analysis, Independent sample 't' test was done. **Results:** FVC, FEV₁, FEV₁/FVC% were significantly lower ($p < 0.001$) in all MDD patients than those of control. More over, 54(90%) MDD patients had abnormal pulmonary function test. Among them, 5(9.25%) had obstructive, 32(59.25%) had restrictive and 17(31.48%) had both restrictive and obstructive disorder. **Conclusion:** From this study it may be concluded that significant depression of lung function may be associated with MDD, characterized by restrictive, obstructive and mixed type disorders.

Key words: Major Depressive Disorder(MDD), FVC, FEV₁, FEV₁/FVC%.

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Introduction

Depression is the most common chronic condition next to hypertension experienced in general medical practice.¹

According to DSM IV, Major Depressive Disorder (MDD) is 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 suicide¹.

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According to World health organization (WHO) depression is the fourth leading cause of disability worldwide and by 2020, it will be the second leading cause. Major depression is about twice as common in women as in men and old age people are more affected².

Depression virtually affects all organ system of the body and responsible for Myocardial Infarction (MI), other coronary artery diseases, stroke, diabetes, kidney diseases, arthritis³. In addition to these, lung functions were also found affected in depressive illness patients including in major depressive disorder^{3,4}. Although lower FEV₁ in Major Depressive Disorder (MDD) was reported⁵ but no change in lung function was

also observed in MDD patients when compared to control⁶. In the background of the conflicting reports on lung function in MDD patients, this study has been designed to observe lung function status in MDD patients by spirometry.

Methods

This cross sectional study was carried out in the Department of Physiology, BSMMU, Dhaka, between January to December 2014. Sixty female newly diagnosed MDD patients aged 20 to 50 years were recruited from the Out Patient Department of Psychiatry of BSMMU, Dhaka. Diagnosis was done by the psychiatrist following DSM IV criteria⁷. Thirty age, BMI, socioeconomic status matched healthy female were control. Study protocol was approved by Institutional Review Board (IRB) of BSMMU, Shahabag, Dhaka. Subjects with pregnancy, lactation, history of lung diseases, coronary heart disease, diabetes mellitus, neurological disorders, and any other comorbid psychiatric illness were excluded from the study. After selection, the aim, objectives, benefits of this study were explained to each subjects and encouraged for voluntary participation and informed written consent was taken from each subject. A detail personal, medical, family, socioeconomic, occupational and drug history were recorded and through physical examinations were done and were documented. FVC, FEV₁ and FEV₁/FVC% of all subjects were recorded by a digital spirometer (PONY FX, Cosmed, Italy) with a bronchodilator reversibility test. Data were expressed as mean \pm SE of the percentage of predicted value and also in frequency percent. For statistical analysis, Independent sample 't' test and chi-square test were applied by using SPSS (Windows version 16). In the interpretation of results, p value < 0.05 was accepted as level of significance.

Results

Baseline characteristics of all subjects are presented in Table I. Both control and MDD patients were comparable in respect

of age, BMI, socioeconomic status and occupation. The mean of percentage of predicted values of FVC, FEV₁ and FEV₁/FVC% were significantly lower (P < 0.000) in MDD patients than those of control. (Table II) In this study, 54(90%) MDD patients showed abnormal pulmonary function tests whereas no control subjects had abnormal lung function tests results (Figure 1). Among the MDD patients with pulmonary function disorders, isolated restrictive pattern, or obstructive type and both obstructive and restrictive (mixed) pattern of abnormalities were found in 32 (59.25%), 5(9.25%) and 17(31.48%) respectively in newly diagnosed MDD patients (Figure 2).

Table I: Baseline characteristics of study subjects (n=90)

Variables	Control (n=30)	MDD patients (n=60)
Age(years)	34.40 \pm 1.72	34.13 \pm 1.49
BMI(Kg/m ²)	27.03 \pm 0.64	27.51 \pm 0.56
SBP(mmHg)	121 \pm 1.79	120 \pm 1.86
DBP(mmHg)	80.83 \pm 1.66	79.00 \pm 1.73

Data were expressed as Mean \pm SE.

BMI= Body Mass Index SBP= Systolic Blood Pressure DBP= Diastolic Blood Pressure

Table II: Percentage of predicted values of FVC, FEV₁ and FEV₁/FVC% in different groups (n=90)

Parameters	Control (n=30)	MDD (n=60)
FVC	89.13 \pm 1.32	69.11 \pm 1.45***
FEV ₁	85.83 \pm 2.24	52.50 \pm 2.60***
FEV ₁ /FVC%	95.40 \pm 2.57	76.55 \pm 3.41***

Data were expressed as mean \pm SE.

Statistical analysis was done by independent sample 't' test

*** p<0.001

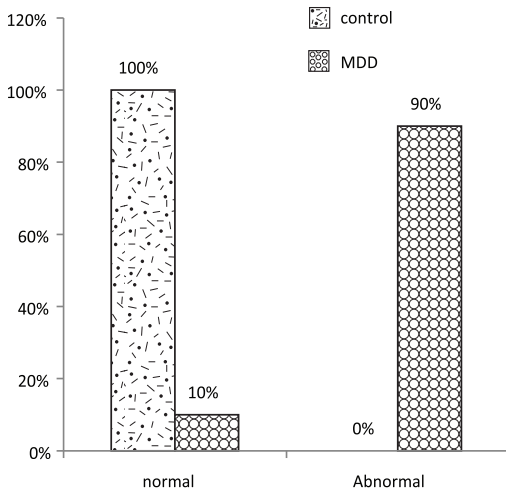


Figure 1: Frequency percent of abnormal lung function tests is showing no control subject had abnormal test

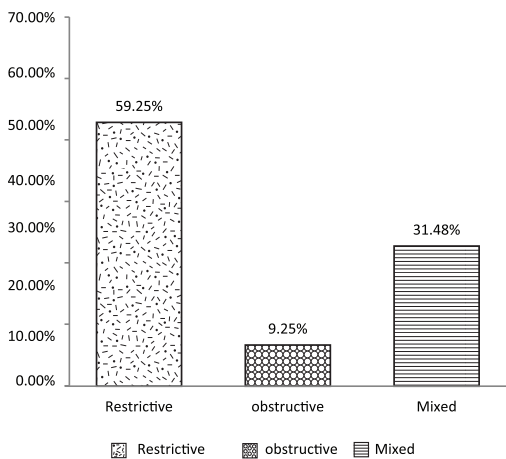


Figure 2: Frequency percent of different type of pulmonary disorders in MDD patients

Discussion

In this study, percent of predicted values of FVC, FEV₁, FEV₁/FVC% in control subjects were within physiological limit and no subjects had any abnormal test result^{7,8}. Significantly lower values of FVC, FEV₁, FEV₁/FVC% in newly diagnosed MDD patients in the present study is partially consistent with Islam et al.⁴ They investigated other varieties of depressive

illness including small number of MDD patients and found significant decreased lung function compared to control. But they did not observe frequency with abnormal test and also pattern of pulmonary disorder. Another study on US soldiers with Vietnam experience, aimed to find out association between MDD with lung function. But they did not find any significant association between MDD and poor lung function⁵. The present result contrast to Calikoglu et al. who also found normal lung function but higher dyspnea in MDD and concluded that dyspnoea was associated with anxiety rather than depression⁶. In this study, among 60 newly diagnosed MDD patients, only 6(10%) patients had normal and 54 (90%) patients had abnormal lung function. The profile of the disaster of lung function in depressed patients in this study is further elaborated by the number of the frequency and type of the pulmonary function disorder observed in MDD patients before undergoing any kind of treatment or intervention. It is noteworthy that majority of the patients suffered from restricted type of disorder and small percentage of patients were presented with severe obstructive disorder and in some patients there were coexistence of both abnormalities. All these patients with obstructive disorder had small airway obstruction according to spirometer⁹. On the other hand, none of the control subjects were with abnormal lung function tests. The apparent impact 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 illness¹⁰⁻¹¹

Conclusion

The results of this study concluded that lung functions were significantly depressed in newly diagnosed MDD patients. All types of pulmonary disorders may affect MDD patients but restrictive type of disorder were more pronounced in MDD patients.

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