Original Article

International Journal of Neurology and Neurosurgery
Volume 14 Number 4, October – December 2022
DOI: http://dx.doi.org/10.21088/ijnns.0975.0223.14422.2

A Study to find out Pulmonary Function Capacity in Parkinson's Disorder Patients: A Pilot Study

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How to cite this article:
Chirag Solanki, Khush Patel, Nilofer Punjani, *et al.*/A Study to find out Pulmonary Function Capacity in Parkinson's Disorder Patients: A Pilot Study/Int J Neurol Neurosurg.2022;14(4): 125-128.

Abstract

Background: Parkinson's disease is a chronic progressive disease of the nervous system characterized by the cardinal features of rigidity, bradykinesia, tremor and postural instability. In Parkinson's disease every year there are less than 10 new cases per 100000 under age of 50. while there are at least 300 new cases per 100000 ages 80 to 99 years annually.

Pulmonary complications associated with Parkinson's diseases a common reason for hospital admission 35.8% reported shortness of breath on exertion, 17.9% reported cough, 13% reported sputum production. Pulmonary function test is mainly used to check the lung function capacity in Parkinson's patients. In Parkinson's patients due to forward head stoop posture there is decrease in lung function capacity.

In Parkinson's disease morbidity and mortality are commonly caused by respiratory disorders from pulmonary function impairments.

Aims: The study aim is to find out pulmonary function capacity in Parkinson's disorder patients.

Objective: (1) To check FVC in Parkinson's disorder patients. (2) To check FEV1 in Parkinson's disorder patients. (3) To check FEV1/FVC ratio in Parkinson's disorder patients.

Method: Pulmonary function test was conducted using PFT software and PFT probe (HELIOS-401) and results of FVC, FEV1, FEV1/FVC ratio were obtained from Parkinson's disease patients.

Result: The data was assessed using PFT; the study showed that there has been a significant reduction in lung function capacity of the Parkinson's disorder patients.

Conclusion: In the present study we concluded that the lung function capacity of Parkinson's disorder patients was very low compared to that of normal individuals.

Keywords: Parkinson's disease; Pulmonary function capacity; Pulmonary function test (PFT); Forced vital capacity (FVC); Forced expiratory volume (FEV1); FEV1/FVC ratio.

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Received on: 17.08.2022

Accepted on: 25.09.2022

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INTRODUCTION

The term Parkinson is used to refer to a group-of disorder that produce abnormalities of basal ganglia function. Parkinson's disorder or idiopathic parkinsonism is the most common form affecting approximately 78% of patients. Secondary parkinsonism result from a number of different identifiable causes including virus, toxins, drugs, tumors, etc. True Parkinson's disorder or paralysis against was first described as the shaking palsy by

James Parkinson in 1817. Etiology is idiopathic. Two distinct sub groups have been identified. One group includes individual whose dominant symptoms includes postural instability and gait disturbances, another group includes individual with tremors as the main feature. Patient who are tremor predominant typically demonstrate few problems with bradykinesia or postural instability.[1]

Epidemiology

PD is a very common neurodegenerative disease that affects more than 2 percent of the population older than 65 years of age. Average age of PD onset is approximately 50 to 60 years. The incidence increase dramatically with increasing age. There are less than 10 new cases per 100,000 under age 50 while there are at least 300 new cases per 100,000 ages 80 to 99 years annually. A small percentage (4-10%) develop young onset PD, which is defined by the appearance of initial symptoms before the age of 40.[2]

Diagnosis

Pulmonary function test is a group of that measures how well your lungs works, how well the lungs taken in and exhale air, and how efficiently they transfer oxygen into blood. Pulmonary complications associated with Parkinson's diseases a common reason for hospital admission 35.8% reported shortness of breath on exertion, 17.9% reported cough, 13% reported sputum production. A higher proportion of patients with Parkinson's diseases die from pneumonia than in general population. Abnormal PFT is interpreted if FVC and FEV1 is less than 80% (total volume of air expelling is approx: 80% within 1sec i.e. FEV1). FEV1 is the volume of air that can forcibly be blown out in 1sec after full inspiration. Values between 80% and 120% are considered to be as normal. FEV1/FVC (FEV1%) is the ratio of FEV1 to FVC in health adults this should be approximately 75-80%. For Obstructive lung complication FEV1/FVC ratio is <70%, FVC is <80%, FEV1=[80-120 (mild), 50-80 (moderate), 30-50 (severe), <30 (very severe)]. For Restrictive lung complication FEV1/FVC ratio is >70%, FEV1 is 80-120%, FVC=[>70 (mild), 60-69 (moderate), 50-59 (moderately severe), 35-49 (severe), <35 (very severe).[3,4]

AIMS AND OBJECTIVES

Aims

The study aim is to find out pulmonary function capacity in Parkinson's disorder patients.

Objective

- To check FVC in Parkinson's disorder patients.
- To check FEV1 in Parkinson's disorder patients.
- To check FEV1/FVC ratio in Parkinson's disorder patients.

Need of Study

The severity of the Parkinson's diseases can be determined by stages of Parkinson's diseases and with the progression of every stage the severity of the disorder also gets increased and with that various lung complications occurs.

The dysfunction of the respiratory system leads to increased morbidity and mortality and deterioration in quality of life so measurement of respiratory function can be used to establish if any abnormality is present and identity particular disorders there for the present study needed to a study to find out pulmonary function capacity in various stages of Parkinson's disorder patients.

HYPOTHESIS

Null Hypothesis

There is no significant change in pulmonary function capacity Parkinson's disorder patients.

Alternate Hypothesis

There is significant change in pulmonary function capacity Parkinson's disorder patients.

MATERIALAND METHODOLOGY

Methodology

- Study Design: Pilot study
- Sample size: 4
- Sample Method: Convenient method
- Study Duration: 1 month
- Study Population: Parkinson's patients
- Study Setting: Rajkot

CRITERIA FOR SELECTION

Inclusion Criteria

- Male and Female Subjects

- Age: 40-60 years

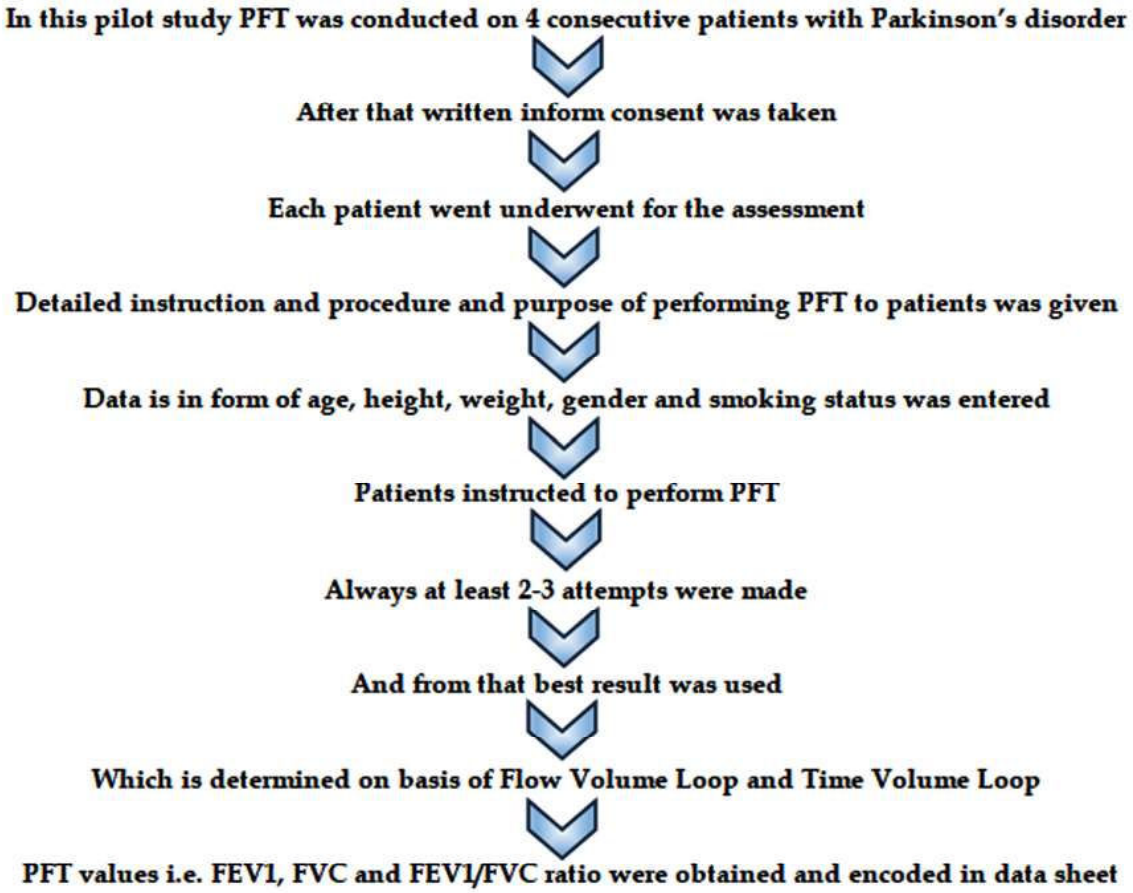
Exclusion Criteria

- Patients with history of any lung disease
- Structural abnormalities of upper airways
- Subjects not able to give desired cooperation for the test procedure

MATERIALS

- PFT Probe and Nose Clip
- Laptop
- Pen and Paper
- Spirit and Cotton
- Consent and Assessment Form

METHOD[5]

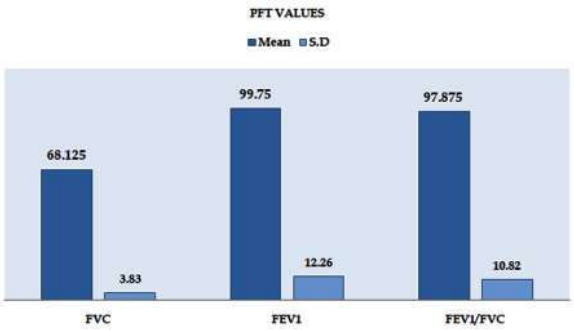


RESULT

Data was collected on data sheet & was encoded for statistical analysis. Microsoft excel and Microsoft word used to generate graph, tables and master chart. Through descriptive statistics, the mean and standard deviation was obtained. The following result was generated.

Table 1: Descriptive analysis of the obtained data

-	Mean	Standard Deviation
FVC	68.125	3.83
FEV1	99.75	12.26
FEV1/FVC	97.875	10.82



Graph 1: Mean and Standard Deviation of PFT VALUES

Interpretation: The above data shows the mean and standard deviation of the subjects.

DISCUSSION

All the Parkinson patients at the time of pulmonary status assessment clearly demonstrated a significant reduction in lung function capacity. In this study, we found out that all 4 patients were having restrictive pattern of pulmonary dysfunction.

M Polatli, a akyol, O cildag, K Bayulkem, European journal of neurology, in 2001: Pulmonary function tests in Parkinson's disease and estimated that decrease in PEF and MEF values and MVV decrease in PD.[6]

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CONCLUSION

In the present study we concluded that the lung volume and the lung function capacity of Parkinson's disorder patients was very low compared to that of normal individuals.

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