A study of correlation of 6 Minutes Walk Test (6MWT) & Spirometry findings in COPD patients

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ABSTRACT
BACKGROUND AND OBJECTIVES: Chronic obstructive pulmonary disease (COPD) is a growing worldwide public health problem. Quantitative assessment of symptoms like dyspnoea, measurement of PEFR and exercise test like 6-minute walk test (6-MWT), which are cheaper modes of diagnosis, can be considered to substitute the spirometry at places where it is not available. To assess severity in correlation of 6 MWT and spirometric findings in COPD patients. To correlate the 6 Minute Walk Test with clinical parameters.

METHODS: In this study 100 patients of COPD coming to OPD as well as indoor cases in NCH, Surat from JANUARY 2016 to NOVEMBER 2016 for correlation of 6 Minutes Walk Test (6MWT) & spirometry for assessment of disease severity and was analysed by SPSS software.

RESULTS: On multiple comparisons, it was found that correlation between 6MWT and spirometry is statistically significant (p Value <0.05), it was found that patient with Mild COPD (Grade I) has mean 6MWD of 379.11m; Moderate COPD (Grade II) has mean 6MWD of 261.85m; Severe COPD (Grade III) has mean 6MWD of 189.27m. All above findings are statistically significant (p Value <0.05).

CONCLUSION: There was inverse relationship between 6MWD and MMRC grade, which means as MMRC grade increases, 6MWD decreases. (p Value <0.05). On correlating 6MWD with multiple spirometry parameters, strong positive correlation was found between 6MWD with %PRED PEFR, %PRED POST FEV1 and %PRED FEF 25-75%. (p Value <0.05).

Keywords: 6 MWT, COPD, Spirometry.

INTRODUCTION
Chronic obstructive pulmonary disease (COPD) is a growing worldwide public health problem.1-5 COPD is a major cause of mortality and morbidity globally. COPD causes 2.7 lac deaths every year in India, hitherto it is underdiagnosed. According to INSEARCH (Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in Adults) Phase I & II, the prevalence of COPD in India according to these studies was 3.7% (4.5% and 2.9% among males and females, respectively).6-10 The estimated burden of COPD in India is about 15 million cases (males and females contributing to 9.1 and 5.8 million, respectively).

In non-smokers, especially women, an exposure to biomass fuels is an important factor. According to GOLD international COPD guidelines, spirometry is the gold standard for accurate and repeatable measurement of lung function. Other measures, such as the MMRC dyspnoea scale for measuring breathlessness, exacerbation frequency, body mass index, quality of life assessment, and exercise capacity all help to build a more complete picture.11-15 Quantitative assessment of symptoms like dyspnoea, measurement of PEFR and exercise test like 6-minute walk test (6-MWT), which are cheaper modes of diagnosis, can be considered to substitute the spirometry at places where it is not available. Recently, guidelines developed under the WHO-Govt. of India committee group also suggest that if spirometry is not available then both staging of the disease and follow up of patient can be done on the basis of severity of symptoms, PEFR and 6 MWT.16-20 Therefore this study aims to find out correlation of Six Minutes
Walk Test with Spirometric and Clinical parameters in COPD patients. While aspects of the oxygen desaturation profile such as decrease in oxygen saturation during the 6MWT have been found to be sensitive in detecting oxygen desaturation compared with maximal incremental exercise testing, the six-minute walk distance (6MWD) reflects functional exercise capacity based on the global and integrated responses of whole systems involved in exercise, including cardiopulmonary systems, systemic and peripheral circulation, blood, neuromuscular units, and muscular metabolism. Actually, in patients with COPD, 6MWD is reported to be the strongest correlate of physical activities in daily life. In addition, the recent Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints (ECLIPSE) cohort study reported that poor 6MWD (< 350 m) in patients with COPD correlates with airflow limitation, degree of emphysema on computed tomography, presence of depressive symptoms, and moderate to severe symptoms of dyspnea, indicating that the 6MWD is a predictive measure of physical activities and functional exercise capacity which depends on these physical and psychological aspects of the disease. However, it remains unclear to what extent individual factors (aging, respiratory symptoms, and abnormalities in pulmonary function) contribute to functional exercise capacity as assessed by 6MWD.

OBJECTIVES
- To assess severity in correlation of 6MWT and spirometric findings in COPD patients.
- To correlate the 6 Minute Walk Test with clinical parameters.

MATERIALS AND METHODS
The present study titled “A study of correlation of 6 Minutes Walk Test (6MWT) & Spirometry findings in COPD patients” was conducted using following methodology:

Study Design - A Hospital based Cross-sectional Study.

Study Setting - Study Participants were selected from the OPD and Indoor ward of the Department of Pulmonary Medicine, New Civil Hospital, Surat, and participants were enrolled as per below mentioned criteria. Initial verbal and written consent was taken from all the participants before starting the interview. Initial 10 -15 minutes were allotted for consent and privacy setting where Patient Information Sheet was provided and Pretested Semi Structure Questionnaire was filled up.

Selection of Study Participants - Patients who presented to the OPD and Indoor ward with history of breathlessness and other respiratory symptoms with spirometry proven COPD cases were enrolled in the study.

Inclusion criteria
a) All confirmed cases of COPD
b) Willing to participate and willing to give written consent.
c) Age >18 years.

Exclusion criteria
- Patients with very severe COPD cases who are not able to perform 6 Minutes Walk Test (6MWT) and Spirometry.
- Patients with Tuberculosis
- Patients with other secondary pulmonary infections
- Patients refusing to participate in the study
- Age group < 18 years
- Patients with contra-indication to spirometry and six minute walk test.
- Patients with acute Exacerbation.
- Patients with known case of Ischemic Heart Disease, cardiac arrhythmia, congenital heart disease.

Sample size - 100 patients of COPD coming to OPD 11 in NCH, Surat.

Study Period - Study was conducted over a period of 11 months (JANUARY 2016-NOVEMBER 2016).

Sampling Technique - Convenient Sampling Method which is a Type of Non-Probability Sampling was used and study participants were conveniently recruited into the study as per the inclusion and exclusion criteria.

Study Tool - A pre-tested standardized semi-structured questionnaire was used.
Data Collection
Data was collected in the Department of Pulmonary Medicine, NCH, Surat from the patients presenting to the OPD or admitted in ward.

Data Entry and Analysis
Data entry was done in Microsoft Excel Sheet 2010. Some of the preliminary analysis was done with the help of MS excel 2003 and SPSS software. Graphs were prepared in MS excel 2010.

Ethical Consideration
Study was approved by Human Research Ethics Committee of Government Medical College, Surat. Study participants were included in the study only after written informed consent was obtained from them. Participants were given the choice whether to take part or not in the study.

Methodology
1. Detailed history
2. Detailed physical examination
3. All patients will undergo detailed clinical examination. Then they will undergo for spirometry test. Six minute test will be performed after adequate rest after doing spirometry.

Spirometry
• The simple spirometry is a pulmonary function test measuring the air inhaled and exhaled by the lungs and the following pulmonary volumes and capacities: forced vital capacity (FVC); forced expiratory volume in one second (FEV1); forced expiratory flow between 25% and 75% of the FVC (FEF25-75%); FEV1/FVC ratio.

Six Minute Walk Test technique
• Flat, straight corridor 25 m in length
• Turnabout points marked with a cone
• Patient should wear comfortable shoes and clothes
• Patient rests in chair for at least 10 minutes prior to test (i.e. no warm up period.)
• Record baseline heart rate and pulse oxygen saturation (SpO2); monitoring pulse oxygen saturation during test is optional
• If patient is using supplemental oxygen, record the flow rate and type of device.
• Set lap counter to zero and timer to 6 minutes.

• Instruct the patient: Remember that the object is to walk AS FAR AS POSSIBLE for 6 minutes, but don’t run or jog. Pivot briskly around the cone
• At each minute mark, inform the patient of the time remaining. It is okay to say, „You are doing well“ or „keep up the good work”, but don’t use words of encouragement to speed up.
• At the end of test, mark the spot where the patient stopped on the floor.
• If using a pulse oximeter, measure the pulse rate and SpO2 and record
• Ask „what, if anything, kept you from walking farther?
• Calculate the distance walked and record.
• If in case, the patient stops walking and rests, keep the timer on and record the total distance or laps covered at the end of 6 minutes.

OBSERVATIONS
I have selected 100 COPD cases coming to new civil hospital, Surat conveniently which met the inclusion and exclusion criteria.

Table 1: Sex Distribution

<table>
<thead>
<tr>
<th>Sex</th>
<th>No of Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

In this study 80% of the patients were males and 20% were females

Figure 1:

Table 2: Age Distribution

<table>
<thead>
<tr>
<th>Age Group (In Years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>31-40</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>41-50</td>
<td>24</td>
<td>7</td>
<td>31</td>
</tr>
<tr>
<td>51-60</td>
<td>27</td>
<td>4</td>
<td>34</td>
</tr>
<tr>
<td>61-70</td>
<td>18</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>&gt;70</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

The mean age was 55.39(±11) years, range 37-86 years. The maximum incidence of COPD in this study is among the age group 41-60 years i.e. in the 4th and 5th decade (65%). No patients were less than
30 years, only 7% of the patients were ≥ 70 years.

**Figure 2:**

![Agewise Distribution of Patients](image)

### Table 3: Correlation between 6MWT and Gold Staging Based On Spirometry

<table>
<thead>
<tr>
<th>Gold Staging</th>
<th>6 Minute Walk Test Distance (6MWTD)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;101 m</td>
<td>101-200 m</td>
</tr>
<tr>
<td>I (Mild)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>II (Moderate)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>III (Severe)</td>
<td>3</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>30</td>
</tr>
</tbody>
</table>

In present study, it was found that in patient with Mild (GRADE I) COPD 77.78% has 6MWD between 301-400m. In patient with Moderate (GRADE II) COPD 74.47% has 6MWD between 201-300m. In patient with Severe (GRADE III) COPD 63.64% has 6MWD between 101-200m.

**Figure 4:**

![Patients with History of Tobacco Smoking](image)

### Table 5: History of Chulha Smoking In Non-Smoker COPD Patients

<table>
<thead>
<tr>
<th>H/O Chulha Smoking</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

Out of 30% of Non-smoker COPD, history of chulha smoking has been found in 66.67% of patients and all the patients were females.

**Figure 5:**

![Patients with History of Chulha Smoking](image)

### Table 6: Chest X-Ray Findings in COPD Patients

<table>
<thead>
<tr>
<th>Chest X-Ray Finding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>25</td>
</tr>
<tr>
<td>Changes of Copd</td>
<td>75</td>
</tr>
</tbody>
</table>

The 75% of patients has been found to have changes of COPD (emphysematous lungs), while 25% patients having normal chest x-ray despite symptoms of COPD.
A study of correlation of 6 Minutes Walk Test & Spirometry findings in COPD patients

Figure 6: CHEST X-RAY FINDINGS

Table 7: Severity of Disease

<table>
<thead>
<tr>
<th>Gold Staging</th>
<th>Fev1</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (Mild)</td>
<td>&gt;80</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>II (Moderate)</td>
<td>50-80</td>
<td>37</td>
<td>10</td>
<td>47</td>
</tr>
<tr>
<td>III (Severe)</td>
<td>30-50</td>
<td>38</td>
<td>6</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

The mean Post FEV1 was 59 (± 16.28) % of predicted, range 31 to 87 % of predicted. From the above chart it is apparent that maximum number of patients (47%) had Moderate airflow obstruction at the time of presentation and only 9% had mild disease.

Figure 7: SEVERITY OF COPD ACCORDING TO GOLD CLASSIFICATION

Table 8: Body Mass Index (BMI) In COPD Patients

<table>
<thead>
<tr>
<th>Gold Staging</th>
<th>Under weight (&lt;18.5)</th>
<th>Normal (18.5-22.9)</th>
<th>Over weight (23-24.9)</th>
<th>Pre-Obese (25-29.9)</th>
<th>Obese (&gt;30)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (Mild)</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>II (Moderate)</td>
<td>10</td>
<td>21</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td>III (Severe)</td>
<td>10</td>
<td>19</td>
<td>9</td>
<td>6</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>35</td>
<td>17</td>
<td>14</td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

The mean BMI of study patients were 24.20( ± 4.072) with highest BMI of 34.72 and lowest BMI of 13.67. Majority of patients (35%) in this study were of normal BMI of 18.5 to 22.9. Only 3% of patients in this study were Obese (>30 BMI).

Figure 8: BMI WITH GOLD STAGING

Table 9: MMRC Grades in COPD Patients

<table>
<thead>
<tr>
<th>Gold Staging</th>
<th>MMRC Grade</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>I (Mild)</td>
<td>8(88.89%)</td>
<td>0</td>
</tr>
<tr>
<td>II (Moderate)</td>
<td>9(74.46%)</td>
<td>8</td>
</tr>
<tr>
<td>III (Severe)</td>
<td>2(56.81%)</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>47</td>
</tr>
</tbody>
</table>

Figure 9: DISCUSSION

Chronic obstructive pulmonary disease is one of the leading causes of chronic morbidity and mortality worldwide.

Sex Distribution

In this study the male: female ratio was 4:1, i.e. males form 80 % (80/100) of the study subjects. This higher incidence of COPD in males can be attributed to smoking. In our study none of the females were smokers but all of them had history of cooking with dried cow dung or dried wood fuel. Males: Females ratio in other studies.

Table 9: Sex Distribution

<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Percentage of Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. C. Banergea 1966</td>
<td>80</td>
</tr>
<tr>
<td>Chappell A. G. 1966</td>
<td>81.25</td>
</tr>
<tr>
<td>Benjamin Burrows et al 1972</td>
<td>92</td>
</tr>
<tr>
<td>V. K. Singh et al 1989</td>
<td>94.6</td>
</tr>
<tr>
<td>Present study</td>
<td>80</td>
</tr>
</tbody>
</table>

Age Distribution

The maximum number of COPD patients (34/100) in this study were in the age group of 51-60 years with mean age 55.39 years, which is similar to previous studies.
history of COPD and has important implications on health-related quality of life, hospitalization rate and survival. The 6-Min Walk Test (6MWT) is a simple tool for the evaluation of functional exercise capacity, which reflects the capacity of the individual to perform activities of daily living. Since the 6MWT is a self-paced test, the results are influenced by external factors such as energy expenditure, operator encouragement and subject motivation. The inconsistencies resulting due to gait speed (height), body weight and gender are sources of error to calculate exercise tolerance by 6MWD alone.

(i) Correlation of 6MWD with Gold Staging Based On Spirometry:

<table>
<thead>
<tr>
<th>Gold Staging</th>
<th>I (Mild)</th>
<th>II (Moderate)</th>
<th>III (Severe)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>9</td>
<td>47</td>
<td>44</td>
<td>100</td>
</tr>
<tr>
<td>Mean (In Meter)</td>
<td>379.11</td>
<td>261.85</td>
<td>189.27</td>
<td>240.47</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>65.589</td>
<td>55.152</td>
<td>67.488</td>
<td>82.877</td>
</tr>
<tr>
<td>95% Confidence Interval For Mean</td>
<td>328.7</td>
<td>245.66</td>
<td>168.75</td>
<td>224.03</td>
</tr>
<tr>
<td>Lower Bound</td>
<td>429.53</td>
<td>278.04</td>
<td>209.79</td>
<td>256.91</td>
</tr>
<tr>
<td>Upper Bound</td>
<td>500</td>
<td>425</td>
<td>402</td>
<td>500</td>
</tr>
</tbody>
</table>

*The mean difference is significant at the 0.05 level

(ii) Correlation Of 6MWD With MMRC Grade

<table>
<thead>
<tr>
<th>6 Minute Walk Test Distance (In Metres)</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>-0.899**</td>
<td>0</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
Manojkumar et al 2013, study concluded negative correlation between MMRC grade and 6MWD, which was also found in present study. In present study, there was STRONG NEGATIVE CORRELATION between 6MWD and MMRC grade found, which means as MMRC grade increases, 6MWD decreases. (p Value <0.05)

(iii) Correlation Of 6MWD With Spirometry Parameters:
Manojkumar et al 2013, study correlated various spirometry parameters with 6 Minute Walk Test, which was concluded that. There was statistically significant association between 6MWD to spirometry parameters like forced expiratory volume in one second (FEV1 % predicted), PEFR % predicted, FEF(25%-75%) % predicted, (p<0.05).

History of Tobacco Smoking In COPD Patients:
History of cigarette smoking has been found to be 70 % in this study, which is similar to previous studies. And 30% of COPD patients have been found to be Non-smoker.

History of Chulha Smoking in Non-Smoker COPD Patients:
In Methew N. et al 2015 Study, they found 76.98% of patients had history Chulha exposure. In present study, 30% of Non-smoker COPD, 66.67% of patients has been found to have history Chulha smoking. Out of these patients, all patients were females.

Chest X-Ray Findings in COPD Patients:
Most of the patients in the present study had X-ray evidence of emphysema i.e. signs of hyperinflation like low flat diaphragm, hypertranslucency etc. The lower incidence of X-ray evidence of emphysema and Chronic Bronchitis in Gupta and Khastgir’s study is due to the inclusion of other etiologies of chronic al.2013, study concluded that there is a Strong correlation between MRC dyspnea grade and post-bronchodilator % predicted FEV1. In present study, STRONG NEGATIVE CORRELATION is found between MMRC grade and FEV1. It
cor pulmonale (e.g. Bronchiectasis fibrosis etc), where as the present study includes only COPD cases.

Severity of Disease
In the present study, 44% (44/100) of the patients had FEV1 < 50% of the predicted i.e. severe obstructive disease. As we already know, according to Gold criteriapatient usually experience worsening dyspnoea when the patient has FEV1 < 50% of predicted. Thus they tend to seek medical attention during this stage, accounting for the majority of patients who have severe obstructive defect. Patients with mild obstructive defect, that is FEV1 80% of predicted are usually in the presymptomatic stage and are not likely to come to medical attention, unless they develop an exacerbation or lower respiratory tract infection. This accounts for the fact that only 9% of the patients are in mild category, in this study.

Body Mass Index (BMI) in COPD Patients:
Mitra et al 2013, they found that there was a positive correlation present between BMI and severity of obstruction in COPD patients. While, another study Ischakiet al, demonstrated that there was no correlation between BMI and severity of obstruction in COPD patients.

*Correlation is significant at the 0.01 level
In present study, it has been found that there is no correlation between BMI and severity of obstruction of COPD. (P Value > 0.05).

MMRC Grades in COPD Patients:
In present study, mean MMRC grade in COPD patients is 1.21 ± 0.81 and most patients having MMRC grade 1. While in Dr. D. Dhanalakshmi.etal.study, mean MMRC grade was 2.16 ± 1.05. This difference is because patient with MMRC grade 4 breathlessness were not able to walk for 6 minutes. So, those patients were excluded in this study. Bhanurekha. Bet et al. study concluded that there is a Strong correlation between MRC dyspnea grade and post-bronchodilator % predicted FEV1. In present study, STRONG NEGATIVE CORRELATION is found between MMRC grade and FEV1. It

SUMMARY:
This study was conducted in patients with diagnosed COPD on basis of symptoms and spirometry findings and all the patients were subjected to spirometry
A study of correlation of 6 Minutes Walk Test & Spirometry findings in COPD patients

which includes PEFR, FEV1, FVC, FEV1/FVC, FEF 25-75%, Post FEV1, Post FVC, Post FEV1/FVC, Post PEFR. All this patients were then subjected to 6 Minute Walk Test. There were 80% of patients were male with Male: Female ratio of 4:1. Mean age of patients was 55.39 ± 11 years with maximum numbers of patients were between 5th and 6th Decade. Out of all COPD patients 70% of patients were Tobacco smoker or had history of tobacco smoking. While 66.67% of non-smoker COPD has history of Chulha smoking, and surprisingly all females in Nonsmoker-COPD had history of Chulha smoking.

There were 75% of COPD patients has changes of COPD (emphysematous lungs) on chest X-ray. In present study, most of patients (47%) had Moderate COPD according to GOLD classification, while 44% of patients having Severe COPD. And only 9% of patients had Mild COPD. There was no correlation found between Body Mass Index (BMI) and severity of COPD patients in present study (p Value >0.05) on correlating 6 Minute walk test and Spirometry findings, it was found that patient with Mild COPD (Grade I) has mean 6MWD of 379.11m. Moderate COPD (Grade II) has mean 6MWD of 261.85m. Severe COPD (Grade III) has mean 6MWD of 189.27m. On multiple comparisons, it was found that correlation between 6MWT and spirometry is statistically significant (p Value <0.05). There was inverse relationship between 6MWD and MMRC grade, which means as MMRC grade increases, 6MWD decreases. (p Value <0.05) On correlating 6MWD with multiple spirometry parameters, strong positive correlation was found between 6MWD with %PRED PEFR, %PRED POST FEV1 and %PRED FEF 25-75%. (P Value <0.05).

CONCLUSION
In present study, on correlating 6 Minute walk test and Spirometry findings, we found that patient with In Mild COPD (GOLD Grade I) patients, most patients has 6MWD between 301-400m. In Moderate COPD (GOLD GradeII) patients, most patients has 6MWD between 201-300m. In Severe COPD (GOLD Grade III) patients, most patients has 6MWD between 101-200m. 6MWT is simple and safe test. In our study overall 6MWD had linear relationship with FEV1, PEFR, grading of dyspnoea and GOLD stages. In conclusion, in COPD patients 6MWT is useful test to assess severity of disease.

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9. Asmita M, Indira KS. Correlation of Six Minute Walk Test with Spirometry and DLCO in Chronic Respiratory Disease: a tertiary care hospital experience. Pulmon 2011; 13(2)


