Original article:

BODE Index versus GOLD Classification for Explaining Anxious Symptoms in Patients With COPD – A Cross-Sectional Study

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is a progressive disorder leading to substantial mortality and morbidity.

Aim: to test whether the BODE index is superior to the GOLD classification for explaining of anxious symptoms.

Methods: Hospital based prospective cross sectional study on 100 COPD patients by consecutive sampling fulfilling inclusion criteria, conducted from Jan 2018 to Dec 2018 at Department of Respiratory Medicine of S. P. Medical college, Bikaner.

Results: mean age of patients was 62.1±9.01. According to BODE 33.3% cases had anxious symptoms in stage -1 whereas 0 as per GOLD stage, the difference was smaller in other stages.

Conclusion: BODE index have excellent predictive power with regard to outcome.

Keywords: BODE, GOLD stage, Anxity, COPD

Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive disorder leading to substantial mortality and morbidity.[1] According to the World Health Organization, COPD is currently ranked as the fourth cause of death and is predicted to be the third in 2010, after heart disease and cerebrovascular disorders.[2]

Analogously to congestive heart failure, coronary artery disease and diabetes psychological disorders are becoming increasingly recognized as important outcome modifying co-morbidities in COPD.[3] Anxiety is risk factors for rehospitalisation in COPD.[4]

According to WHO guidelines, the GOLD stage, which enables classification of the severity based upon the forced vital capacity in 1.0 second (FEV1.0) % of predicted measured by spirometry, has frequently been used.[5] The BODE index (body mass index, airflow obstruction, dyspnoea, and exercise capacity) is a multistage functional scoring system for COPD comprising an assessment of symptoms, a surrogate of the nutritional state, and exercise capacity together with the spirometric measure of airflow (FEV1).[6]

Aim:

To test whether the BODE index is superior to the GOLD classification for explaining of anxious symptoms.

Methods:

This was a Hospital based prospective cross sectional study conducted from Jan 2018 to Dec 2018 at Department of Respiratory Medicine of S. P. Medical college, Bikaner after taking permission from institutional research board. 100 COPD patients of >18 yrs were included by consecutive sampling fulfilling inclusion criteria (COPD diagnosed according to the GOLD consensus, Stable conditions, had ability to perform a six minute walking test).

Patient with unstable coronary artery disease, history of congestive heart failure, significant pulmonary disease other than COPD (e.g. asthma or lung cancer), significant neurological disease were excluded.

COPD was classified according to the guidelines of the Global Initiative for Obstructive Lung Disease (GOLD). Additionally the BODE index will be calculated for classification of COPD. For calculation of the BODE index, we will be using the empirical model. The self-reported hospital anxiety and depression (HAD) scale will be used to screen for psychiatric co-morbidity. The HAD scale consists of seven questions related to anxiety. Each item is rated on a 4-point scale, yielding maximum subscale scores of 21 for anxiety (anxiety score). Scores on subscale of ≥ 8 describe the presence of symptoms suggestive of anxiety. The HAD scale is a screening tool for anxiety but does not allow a diagnosis of anxiety to be made. Finally after obtaining the BODE index for all patients, quartiles of the BODE index will be used to construct four severity stages :

BODE stage I = BODE index 0 – 2;

BODE stage II = BODE index 3 and 4;

BODE stage III = BODE index 5 – 7;

BODE stage IV = BODE index 8 – 10.

Data Analysis

The information thus collected will be entered into Microsoft Excel spreadsheet. Data on interval scales will be described by means± standard deviations, data on ordinal scales by medians (1st to 3rd quartiles). Differences between means will be tested with Student's t-test and reported with 95% confidence intervals (95%CI). Categorical variables will be described by frequencies and percentages. Differences of proportions between COPD or BODE stages will be compared by the χ^2 test for trend. Significance was accepted at $p < 0.05$.

Results

The mean age of patients was 62.1±9.01. The male to female ratio is 24:1 and 52% patients were smoker. 80% patients had BMI in range of 18.5-24.9 and FEV1/FVC is 62.5±7.3.

Table 1 Distribution of patients according to BMI, 6 MWT, FEV1%

Particulars	Mean	SD
BMI	22.3	2.7
6 MWT	245.6	80.8
FEV1%	40.4	17.3

In this study, according to BODE stage 33.3% cases had anxious symptoms in stage -1, 50% cases had anxious symptoms were present in stage-2, 63.7% cases had anxious symptoms were present in stage-3 and 75% cases had anxious symptoms were present in stage-4.

Whereas according to GOLD stage 0% cases had anxious symptoms in stage -1, 50% cases had anxious symptoms were present in stage-2, 40% cases had anxious symptoms were present in stage-3 and 72.2% cases had anxious symptoms were present in stage-4.

Table 2

Comparision of anxious symptoms in patients with COPD according to BODE index & GOLD stage
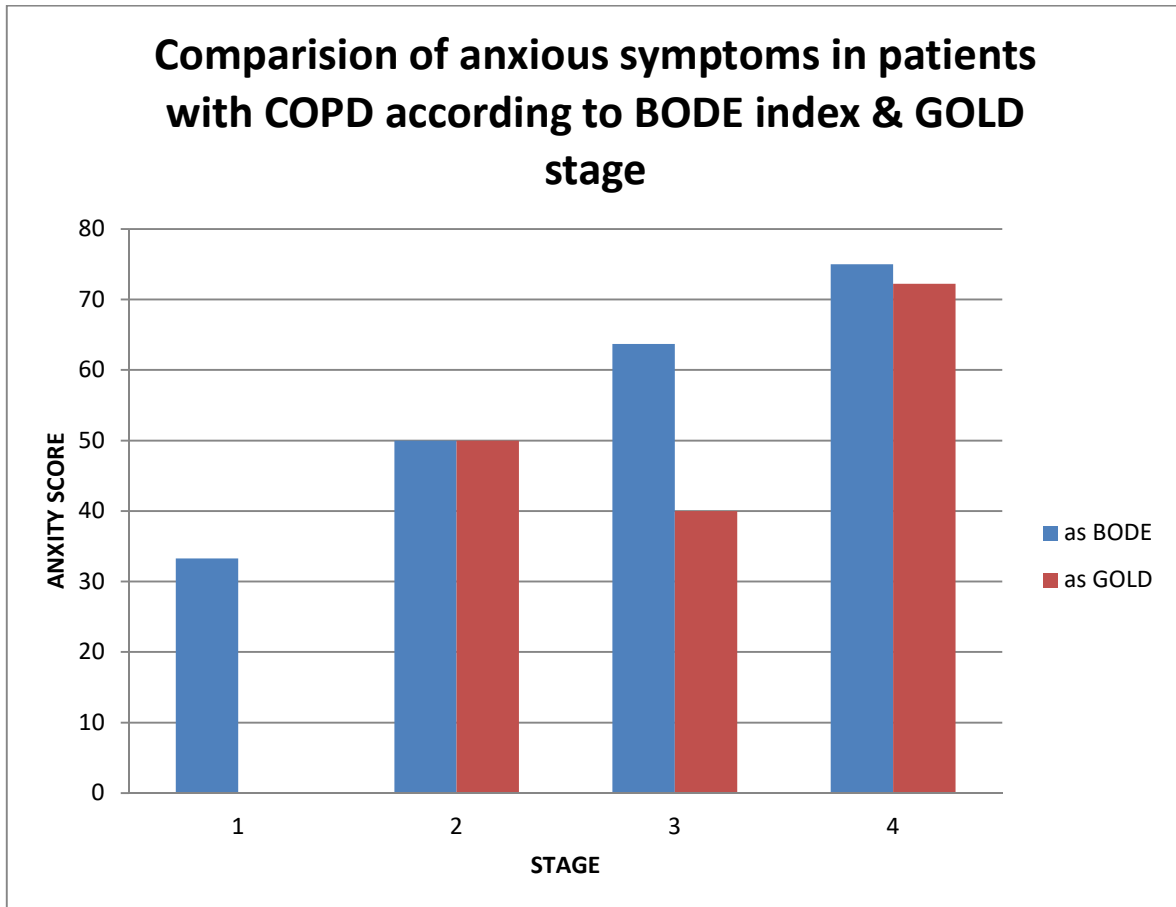
Discussion

This study demonstrates that anxeity symptoms were common in patients with advanced COPD. The BODE index is superior to the GOLD classification for explaining these symptoms. Anxeity symptoms were explained by dyspnoea. COPD is increasingly considered as a disease not only of the lungs but it has been suggested as a part of the 'chronic systemic inflammatory syndrome' together with the metabolic syndrome, coronary artery disease and others. The complexity of COPD and its frequent co-morbidities require assessment and staging of the disease beyond the degree of airflow limitation.[3]

In our study majority of patients were in age group 61-70 years with mean age of 62.1±9.01with a range of 45-79 years. In a study by Funk et al also found a mean age of 65±10 years.[3] Abdel-Aaty et al found mean age was 52.2± 12.5 years with a range of 25–78 years.[7]

There was male preponderance with male to female ratio is 24:1. In a study by Funk et al found almost similar COPD prevalence in male and females with higher number of males. In their study males were 68 and females were 54. But study by Abdel-Aaty et al found results similar to our study showing 89.3% males and 10.7% females.[7]

Here, only 20% non-smoker and rest were smoker and ex-smoker (80%), In concordance with the study by Gunawan et al which found similar results. In their study 89.9% smokers and 10.1% non smoker.[8] Cigarette smoke contains extremely high concentration of oxidants. The reactive oxidant substances generated by smoking induce inflammation in the lung and its airway; cigarette smoking causes an inflammatory process in the central airways, peripheral airways, and lung parenchyma, which is present even in smokers with normal lung function. Studies have shown that in bronchial biopsies obtained from central airways, smokers have chronic inflammatory changes, with increased numbers of specific inflammatory cell types in different parts of the lung, and structural remodeling resulting from repeated injury and repair. The exact role of smoking cessation on the airway inflammation process in COPD is still unknown. Cross-sectional studies suggest that there is still ongoing inflammation in COPD even after smoking cessation. In general, the inflammatory and structural changes in the airways increase with disease severity and persist despite smoking cessation.[9]

The mean BMI in present study is 22.3±2.7. In concordance with this Mean BMI in a study by Funk et al[3] was 25.8±6.8. Helala et al.[10] study of the relation between body mass index, waist circumference and spirometry in COPD patients with BMI mean (±SD) value of 26.6± 9.4 kg/m2. The reasons for relation between BMI and COPD are still unclear. However, several hypotheses have been put forward to interpret this phenomenon, including respiratory muscle weakness, impaired gas exchange, impaired immune response, and loss of metabolically and functionally active fat free mass (FFM). Underweight patients have an increased frequency of exacerbation, which leads to a faster decline in FEV1, impaired quality of life, and high mortality. On the contrary, obese patients with COPD may receive medical attention earlier than normal weight patients possibly because obesity is also associated with dyspnea.[11]

The mean±sd 6MWT of patients in our study was 245.6±80.8. In concordance with studies by Funk et al,[3] Celli et al[12] and Esteban et al[13] where mean±sd 6MWT were found to be 303 ± 140, 264±113 and 408.9 ± 92.4 respectively. The distance walked in six minutes contains a degree of sensitivity not provided by the body-mass index. Its use as a clinical tool has gained acceptance, since it is a good predictor of the risk of death among patients with other chronic diseases, including congestive heart failure and pulmonary hypertension. Indeed, the distance walked in six minutes has been accepted as a good outcome measure after interventions such as pulmonary rehabilitation.[12]

The mean±sd of FEV1% in COPD patients was 40.4±17.3 and FEV1/FVC is 62.5±7.3. In correlation with this mean±sd in study by Funk et al found mean±sd of FEV1% 44.5 ± 19.3 and mean±sd of FEV1/FVC 44.8 ± 11.9. Esteban et al found mean±sd of FEV1% 55.0 ± 13.3 and mean±sd of FEV1/FVC 54.5 ± 9.32.

In majority of cases prevalence of anxiety symptoms were present high in stage 4 followed by stage-3. In correlation with this Funk et al found similar results. They found that prevalence of anxiety symptoms were present high in stage 4 followed by low anxiety symptoms stage-3.[3] The results of the study by An et al provide support for this proposition. A study shows that not only lung function but also several other factors are related to depression in in-patients with COPD.[14]

Conclusion

Besides its excellent predictive power with regard to outcome, the BODE index is simple to calculate and requires no special equipment. This makes it a practical tool of potentially widespread applicability.

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