Peer review file

Article information: http://dx.doi.org/10.21037/jtd-20-2683

Reviewer A

The paper submitted to the Journal of Thoracic Disease addresses the increase of hospitalization increased rate and deterioration of economic status in COPD patients. The paper focused on data retrieved from the Korean National Health and Nutrition Examination Survey (KNHANES) for 2007-2015.

Comment 1: Regarding the Methods section and the diagnosis of COPD. The authors write that the diagnosis of COPD was based on PFT findings under the criteria of the GOLD guidelines. However, the next sentence misses post-bronchodilator PFT evaluation to complete a diagnosis of COPD under GOLD guidelines: "When the ratio of forced expiratory volume in one second (FEV1) to functional vital capacity (FVC) was <0.7, subjects were considered to have COPD." The same post-bronchodilator FEV1 evaluation is needed to assess airflow obstruction severity, which is not clear in the text (lines 115-117).

Reply 1: As the reviewer remarked the GOLD guideline specifies post-BDR FEV1/FVC to be used for the diagnosis of COPD. Unfortunately, only pre-BDR data is available in the KNHANES because it is not specifically designed to the diagnosis of COPD. The use of pre-BDR PFT was specified in the Materials and Methods section (see Page 5, line 73, 74-7) and the limitation of pre-BDR PFT in the diagnosis of COPD was mentioned in the Discussion (see Page 13, line 204-6).

Comment 2: In the Discussion section when the authors try to relate gastrointestinal disorders to use of inhaled long-acting muscarinic antagonists, I think that the use of noninvasive ventilation at home could be also one of the causes of gastro-intestinal disorders in patients with severe COPD.

Reply 2: COPD patients with noninvasive ventilation can develop gastric distention witch might lead to gastro-intestinal disorders. However, the use of NIV among COPD patients has not been evaluated in the KNHANES. Because there was no supporting data of NIV as a possible cause of G-I disorders, it was not mentioned in the context.

Comment 3: In the lines 181-184 the authors mention that a "previous report have shown that the severity of airflow obstruction is associated with the frequency of hospitalization." However, in the next sentence we acquire that the previous study refered to GOLD A-D grades. Consider changing "severity of airflow obstruction" to "severity of COPD" or a similar expression.

Reply 3: As recommended, "severity of airflow obstruction" was changed to "severity of COPD" (see Page 12, line 183).

Reviewer B

Major comments

Comment 1: Page 3, 39th line. There is a recent excellent study regarding the cost of COPD in Korea (Kim C. Tuberc Respir Dis (Seoul) 2019; 82: 27-34.). Please add this reference.

Reply 1: Thank you for the information. It was mentioned in the Introduction (see Page 2-3, line 32-5) and was added to the Reference (see Page 14, line 240-1).

Comment 2: The authors categorized the causes of hospitalization into respiratory, gastrointestinal, cardiovascular, and malignant diseases. However, detailed information will be very informative. I recommend to provide disease name in detail. Can the authors provide top 5 diagnosis in each category? I am especially wondering what was the main causes of the admission in GI disease and malignancy.

Reply 2: The 5 most common diseases of hospitalization for each category was described in the Results (see Page 9, line 139-40) and new table 3 was added in the Tables (see Page 19, line 305-6).

Comment 3: High prevalence of cardiovascular disease and malignancy in COPD is well known. However, gastrointestinal disease is something new. Can the authors explain why there is high prevalence of gastrointestinal admission in COPD patients? Also, adding similar findings (references) will be helpful to understand the result of this study.

Reply 3: The reason for increased admission for gastrointestinal diseases among COPD patients has been already remarked in the Discussion. We found out another article which described the increased peptic ulcer occurrence in COPD patients due to the use of corticosteroids. It was described subsequently (see Page 11, line 174-7). The new reference was added to the Reference (see Page 15-16, line 268-70).

Comment 4: In table 3, the authors only provided odds ratio of total causes and respiratory illness. Please add odds ratio of gastrointestinal illness and malignancy.

Reply 4: In the table 4 (previously table 3), odds ratios were provided for gastrointestinal disease, cardiovascular disease, and neoplasm (benign neoplasm was included in the 5 most common diseases for the admission, therefore "malignancy" was changed to "neoplasm") (see Page 20, line 321-2)

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Comment 5: As the authors mentioned in title, one of the major findings that authors insisted was low economic state in advanced COPD. However, this fact has been already well known. The authors simply showed the percentage of lowest quartile according to COPD stage (Table 2). However, there can be many confounding factors that affect household income. It will be better if the authors perform binary logistic regression analysis regarding the risk factors for lowest quartile income. I am wondering if COPD stage (or FEV1(%)) can still be a significant factor in multivariable analysis.

Reply 5: Multivariate linear regression was performed for age, sex, smoking status, household income, and comorbidity and its significance was displayed as another P-value in the table 2 (see Page 18, line 299-300).

Comment 6: PFT in KNHANES is pre bronchodilator test. This is a definitely limitation of this study. Please add this limitation in discussion.

Reply 6: It was also commented by another reviewer. The use of pre-BDR PFT was specified in the Materials and Methods section (see Page 5, line 73, 74-7) and the limitation of pre-BDR PFT in the diagnosis of COPD was mentioned in the Discussion (see Page 13, line 204-6). Thank you