Original Article

Comparative Study of Thai Validation COPD Symptom Assessment Tools: COPD Assessment Test (CAT), Modified Medical Research Council (mMRC) and Clinical COPD Questionnaire (CCQ) in Srinagarind Hospital

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Objective: To identify the discordance of the GOLD classification while using Thai validated COPD assessment test [CAT], modified Medical Research Council [mMRC] and Clinical COPD Questionnaire [CCQ] assessing the patient's symptoms.

Materials and Methods: This cross-sectional descriptive study was performed at the COPD clinic at Srinagarind Hospital, Khon Kaen University from July 2015 to December 2016. Patients were allocated into each GOLD classification by using the Thai validated CAT, mMRC and CCQ. The cut off points at CAT ≥10, mMMRC2 and CCQ 1.5 were used.

Results: Seventy-eight COPD patients were enrolled in this study. When using CAT, patients were allocated into GOLD A, B, C and D at 52.56%, 8.97%, 19.23% and 19.23%. While using mMRC, the percentages were 50.0%, 11.54%, 24.36% and 14.10%, and 53.85%, 7.69%, 30.77% and 7.69% when CCQ was used. There were 70.51% of the patients that were categorized into the same GOLD classifications when using these three scores. Kappa was 0.69 (95% CI, 0.11 to 0.71).

Conclusion: There was substantial concordance agreement in GOLD classifications whether CAT, mMRC or CCQ were used. CCQ tended to allocate more patients into the lesser symptom group (GOLD A and C) than the other two scores.

Keywords: COPD, COPD assessment test [CAT], modified Medical Research Council [mMRC], Clinical COPD Questionnaire (CCQ)

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Chronic obstructive pulmonary disease (COPD) is currently one of the leading causes of death worldwide and requires high resource utilization as a consequence of its high prevalence and chronicity[(1)]. The impacts of COPD on public health, however, can be alleviated by appropriate treatment. Pharmacological management of chronic obstructive pulmonary disease depends on the Global Initiative for Chronic Obstructive Lung Disease [GOLD] classification. According to the Global Initiative for Chronic Obstructive Lung Disease strategy [GOLD] 2015, COPD patients were categorized into four classification as GOLD A, B, C and D that used combinations of spirometry that determined severity of airway obstruction, frequency of

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exacerbation and clinical assessment scores that can be used either for the COPD assessment test [CAT] as modified by the Medical Research Council (mMRC) or the Clinical COPD Questionnaire [CCQ][2]. The COPD assessment test [CAT] is a questionnaire used to identify COPD symptoms affected by daily life and quality of life, and is composed of 8 questions and classifies more severe patients if this CAT score ≥10. The other two tools, the modified Medical Research Council [mMRC] test is used to clarify the impact of dyspnea which identifies more severe patients if the mMRC score 2 while the Clinical COPD Questionnaire [CCQ] test is used to evaluate the overall symptoms, quality of daily life as well as psychological effect in the last seven days and is considered to be used on more severe patients if the CCQ score 1 to 1.5. These various tools that can be used to assess the patient's symptoms might result in some discrepancies of the GOLD classification in each patient resulting in different treatments provided. In Thailand, these various tools were translated into Thai language as Thai CAT, Thai mMRC and Thai CCQ and were used in the clinical assessment for Thai COPD patients, but there are limited data of the correspondence between these three tools. There was one previous study of Chaicharn Pothirat, et al in 2014 showed that the Thai CAT was moderately correlated with St. George's Respiratory Questionnaire [SGRQ], r = 0.652, Cronbach's a coefficient = 0.853[3]. The present study was aimed to identify the agreements with the GOLD classification while using these tools; CAT, mMRC, CCQ in Thai validation.

Materials and Methods

Patients and study design

This cross-sectional descriptive study was performed at the COPD clinic in Srinagarind Hospital from July 2015 to December 2016. Inclusion criteria were stable COPD patients aged 40 years old who fulfilled the GOLD criteria of exposing the risks factors of COPD such as smoking, having clinical COPD and having a post bronchodilator FEV1/FVC ratio <0.7. COPD patients who had an exacerbation or had been diagnosed pneumonia within the previous six months as well as patients who had other diseases or conditions that might cause dyspnea or breathlessness such as bronchiectasis, interstitial lung diseases, malignancy, heart failure, neuromuscular diseases, liver cirrhosis and chronic kidney disease were excluded. This study protocol was approved by the human research ethics committee of Khon Kaen University and every patient was provided informed consent before being enrolled in this study. The eligible patients were asked to complete the three questionnaires; the COPD assessment test [CAT], modified Medical Research Council [mMRC], and Clinical COPD Questionnaire [CCQ] in the Thai validated version. Each question of the questionnaires was clarified by same specialized COPD health care personnel.

Statistical analysis

The characteristics of study populations were summarized using descriptive statistical methods with percentage, mean and standard deviation [SD]. The agreement between these three questionnaires was determined with a Kappa agreement with a 95% confidence interval. Spearman correlation was used to find a correlation between each of two scores. All calculations were performed using of STATA version 11.

Outcome measures

The primary outcome was to determine the concordance of the GOLD classification while using these tools; COPD assessment test [CAT], modified Medical Research Council [mMRC], and Clinical COPD Questionnaire [CCQ] in the Thai validation version. The cut off points at CAT10, mMMRC2 and CCQ 1.5 were used to allocate patients into each GOLD classifications.

Results

A total of 78 COPD patients were enrolled in the present study. Patients' baseline characteristics are demonstrated in Table 1. The average age of COPD patients in the present study was 68.5 years old. Most of the patients were male (80.77%). The mean (SD) of weight and height of the COPD patients were 59.91 (11.89) kilograms and 162.75 (7.08) centimeters. Most of the patients had been smokers (71.79%) but only 7.96% were current smokers. Sixteen patients (20.51%) in the present study had been exposed to noxious or biomass fuels. The mean percentage of post bronchodilator FEV1 of the patients was 67.92%. Spirometry put half of the patients (55.13%), into GOLD II staging. Most of the patients did not have an exacerbation in the previous year (69.23%). The patients were mainly stable COPD patients. Only a few patients had ever been intubated (11.54%). The mean (SD) mMRC, CAT, CCQ scores were 0.88 (1.03), 7.41 (6.98), 0.83 (0.86). Overall 60.26% of the patients had been classed into the same low severity group by those three scores; mMRC < 2, CAT <10 and CCQ <1.5 while only

10.26% of the patients had been ranged into the same more severe group, as shown in Table 2.

When using CAT, patients were allocated into GOLD A, B, C and D as 52.56%, 8.97%, 19.23% and 19.23% (Figure 1). While using mMRC, the percentages were 50.0%, 11.54%, 24.36% and 14.10%, and 53.85%, 7.69%, 30.77% and 7.69% when CCQ was used. There were 70.51% of the patients who were categorized into the same GOLD classification when using these three scores. Kappa was 0.69 (95% CI, 0.11 to 0.71) which meant a substantial concordance agreement. The correlations between CAT and CCQ, CAT and mMRC, CCQ and mMRC were r = 0.734, 0.547 and 0.495 (Figure 2).

Table 1. Patient baseline characteristics

Factors	n = 78
Age, years, mean (SD)	68.5 (±9.45)
Male gender, n (%)	63 (80.77%)
Weight, kg, mean (SD)	59.91 (11.89)
Height, cm, mean (SD)	162.75 (7.08)
Smoking history, n (%)	56 (71.79%)
Current smoker, n (%)	6 (7.69%)
Exposure to other noxious/ biomass fuels, n (%)	16 (20.51%)
Spirometry (post-bronchodilator)	
FEV1, %, mean (SD)	67.92 (±18.72)
FVC, %, mean (SD)	79.41 (±17.22)
Gold staging, n (%)	
I	21 (26.92%)
II	43 (55.13%)
III	13 (16.67%)
IV	1 (1.28%)
Exacerbation in the previous years, times, n (%)	
0	54 (69.23%)
1	6 (7.69%)
2	12 (15.38%)
3	5 (6.41%)
4	1 (1.28%)
Previous intubation history, n (%)	8 (10.26%)

SD = standard deviation; kg = kilogram; cm = centimeter; FEV1 = force expiratory volume measured in 1 sec; FVC = force vital capacity

Discussion

The aim of the present study was to clarify as to whether any score to classify the patients into the GOLD classification would produce the same result. It is an important issue because the treatment is different in these different GOLD classifications. The use of the mMRC score is the simplest one and it is easy to perform and it is used to evaluate breathlessness unlike the other two scores which are more complex but cover more features including other symptoms, health conditions and quality of life. The preseny study was the first study that compared these three scores in the Thai validated version which showed substantial agreement between CAT, mMRC and CCQ. This study also supported the previous studies performed in another language by Sarah Wilke, et al in 2014 which showed a Kappa of agreement between the scores ranging from 0.60 to 0.83[4]. In Spain, Miravitlles et al, study showed a good correlation between CAT and CCQ scores (r = 0.72)[5]. In China, South Korea and Spain, the correlations between CAT and mMRC and GOLD were r = 0.58, 0.51 and 0.61[6-8]. Although, these

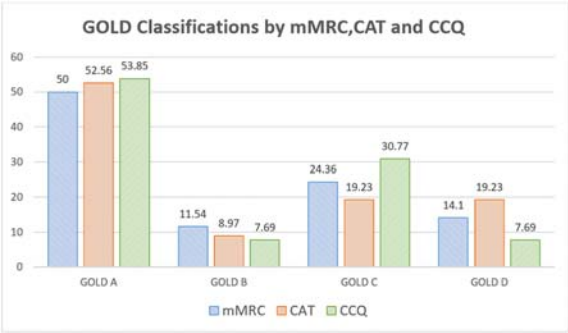

Figure 1. Percentage of the patients that alloocated in to each GOLD classification using three difference clinic assessment tools; mMRC, CAT and CCQ.

Table 2. Number of patients allocated to less severe or more severe groups using three scores; mMRC, CAT and CCQ

	mMRC <2		mMRC ≥2	
	CCQ <1.5	CCQ 1.5	CCQ <1.5	CCQ 1.5
CAT <10	47 (60.26%)	1 (1.28%)	8 (10.26%)	0 (0%)
CAT ≥10	7 (8.97%)	3 (3.85%)	4 (5.13%)	8 (10.26%)

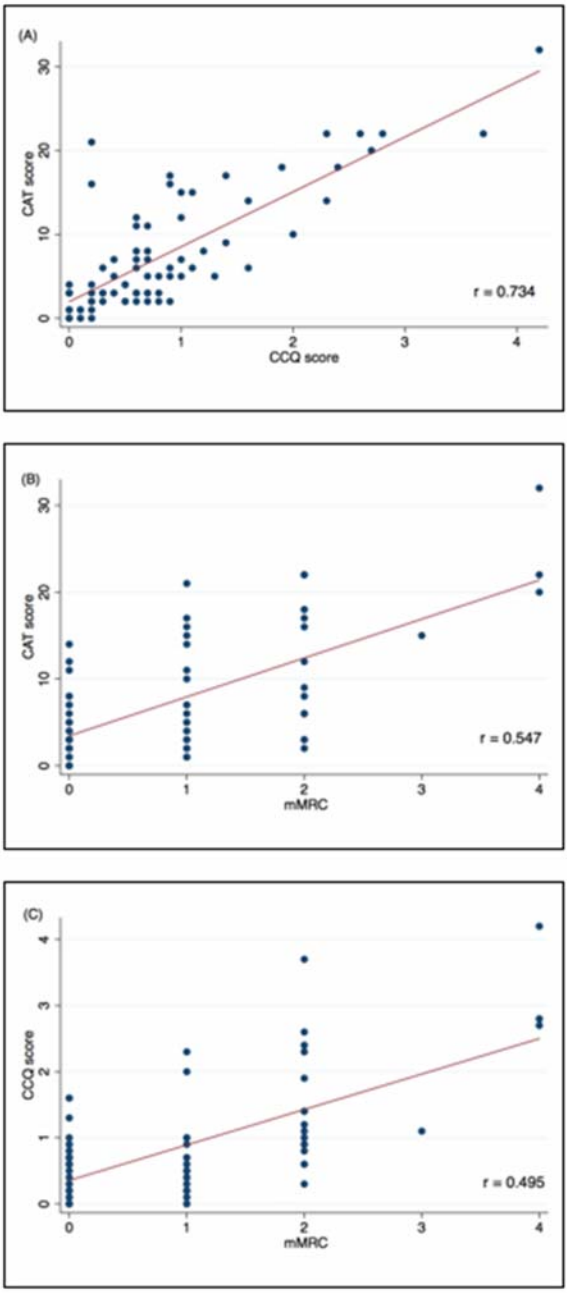

Figure 2. Correlation graphs between (A) CAT and CCQ (B) CAT and mMRC (C) CCQ and mMRC.

three scores seemed to be correlated but these were not strong correlations nor were in perfect agreement. So, there were some recommendations in various papers suggesting changing the cut off values, but they were still not a standard recommendation[2,7,9]. Choosing among these three scores should be performed with caution and considered with patient clinical data because they may appear correlated but were still not identical. CCQ in the present study seemed to classify patients into more in the low severity group (GOLD A and C) but it might be the effect of the much smaller number of the patients who had more severe symptoms compared with those with fewer symptoms. A larger study which contained the same number of the patients in each group are needed to confirm this hypothesis. The limitation of this study was the small number of the patients enrolled as mentioned earlier. Another limitation was asking the patients all of these questions at the same time so that patients might easily have become confused because the questions were quite similar. This might cause mistakes in scoring. The strong point of the present study was that this is the first paper that studied the agreement of these three scores in Thai validated versions. This could help physicians in clinical situations.

Conclusion

There was substantial agreement in the GOLD classification whether CAT, mMRC or CCQ were used. CCQ tended to allocate more patients into the less symptomatic group (GOLD A and C) than the other two scores.

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Potential conflicts of interest

The authors declare no conflict of interest.

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