Original Article

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Validity and Reliability of the Vietnamese Version of Chronic Obstructive Pulmonary Disease-Questionair for Measuring Knowledge of Chronic Obstructive Pulmonary Disease Patients

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Abstract:

Objective: The purpose of this study was to translate, and verify the validity and reliability of the Vietnamese version of Chronic Obstructive Pulmonary Disease-Questionair (COPD-Q), so as to measure the knowledge level of COPD patients in Vietnam.

Material and Methods: The adaptation and psychometric characteristics test of Vietnamese-COPD-Q was performed, with 90 participants; from July 2021 to February 2022. Our study included 30 COPD patients for pre-testing and adaptation of the translated version; whereas, 60 patients were considered for test-retest reliability. The content validity of the questionnaire was measured by the opinions of five experts. For concurrent validity assessment, Pearson's correlation coefficient was used to test the association between COPD-Q and the COPD assessment test (CAT) scale; the modified British Medical Research Council (mMRC) dyspnea scale. The Kuder-Richardson 20 (KR20) statistical test was used to measure the internal consistency of the questionnaire, while the test-retest reliability was measured using Intra-Class Correlation.

Results: The Vietnamese version of COPD-Q demonstrated good content validity, with the Items content validity index (I-CVI) score for all 13 items >0.79. Negative, significant correlations with mMRC scale (r=-0.859, p-value=0.000), and

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CAT scale (r=-0.861, p-value=0.000) demonstrated good, concurrent validity. Additionally, internal consistency (KR20 with pre-and post-test as 0.883 and 0.866, respectively) and test-retest reliability (r=0.996, p-value=0.000) was identified with good result.

Conclusion: The knowledge measurement properties of the V-COPD-Q for COPD patients with low health literacy skills were satisfactory.

Keywords: COPD-Q, questionnaire, reliability, validity, Vietnamese

Introduction

Chronic obstructive pulmonary disease (COPD) is of global concern, due to increased morbidity and mortality. The World Health Organization estimates that by 2030, the disease will rank fifth in the global burden of diseases.[1] In Vietnam, COPD has a prevalence of t 6.7%[2], which is the highest in Southeast Asia; with more than half of these cases having experienced at least one episode of severity. [3]

Having sufficient knowledge about COPD; including, COPD disease, changes in treatment, frequent medical examinations, or emergency hospitalization, plays a pivotal role in influencing the progression of the disease.[4-6] However, patients with COPD have poor general disease knowledge.[7,8] A study by Dhand showed that most patients claim to know about their disease and available treatments, but less than half of them know clearly about the reasons and symptoms of COPD.[7] Additionally, Hernandez showed that COPD's patients' knowledge; including, the causes of the disease, the consequences of deficient therapy, and the management of exacerbations was low.[8]

Some studies have used the modified British Medical Research Council (mMRC) dyspnea scale or the COPD assessment test (CAT) to identify the relationship between the patient's knowledge of COPD's disease and the results of treatment, and rehabilitation. As for those authors, patients with high CAT and mMRCs scores were expected to exhibit a much lower level of knowledge than others.[9,10] The knowledge of the patient is an important factor in determining the patient's behavior, and the more knowledge they gain the more likely they are to make decisions that are beneficial for their health. According to some studies, self-management education programs can reduce stress levels, leading to better illness control and improved psychosocial well-being.[6,11] A study based in Spain indicated that when COPD patients with exacerbation periods are admitted to the hospital the education program could truly enhance their health-related quality of life.[4]

However, if the level of disease knowledge in COPD patients was low, it may potentially cause an increase in the rate of deterioration and complications. Additionally, this decreases the quality of life and psychosocial well-being of said patients.[4,11] Therefore, examining a patient's knowledge of the disease is the first criterion for planning self-care education programs.[6]

The COPD-Q was developed by Maples and her colleague (2010).[8] This 13-item questionnaire is an effective and reliable instrument to assess the knowledge of patients with COPD who may have low health literacy skills. The COPD-Q scale has been translated into many languages; however, we have not found a Vietnamese version of COPD-Q (V-COPD-Q). Additionally, to date Vietnam does not have a series of questionnaires to assess the validity and reliability of the knowledge of COPD patients. Therefore, this V-COPD-Q will be the first tool to not only help to assess the knowledge of COPD patients, but also act as a fundamental tool for researchers in designing intervention programs to improve the patient's knowledge. Because of these reasons, we conducted this study to verify

the Vietnamese version of COPD-Q; including, face and content validity, and test and retest reliability.

Material and Methods

From July 2021 to February 2022, we performed a descriptive cross-sectional study to investigate the levels of knowledge of COPD patients at four different hospitals; including, Hoa Vang, Hai Chau, Da Nang C Hospital, and Da Nang hospital, Vietnam.

We invited a total of 90 patients to participate in the study that was divided into two-stages. In phase 1, we collected information from a total of 30 respondents for the pre-testing and adaptation of the Vietnamese-version of the COPD-Q, within the translation process; and phase 2 was performed on 60 patients for the test-rest reliability. The participants were included in the study, if they were: (1) diagnosed with COPD; (2) aged ≥40 years; (3) using inhaler medications at home in a stable phase with no exacerbations for at least 3 months; (4) able to speak, read and write n the Vietnamese language; 5) consenting to participate in the study. Excluded participants included; those with a history of bronchial asthma, allergic rhinitis, lung surgery, or respiratory disease; experienced exacerbation of COPD and/or comorbidities, or with medication adjustments within the past 3 months or having psychiatric disorders.

Data measurements

The COPD-Q was developed by Maples et al. (2010), with 13 multiple-choice questions to assess COPD knowledge in patients with low health literacy. For each answer, participants received 1 point for a correct answer and 0 points for an incorrect or "not sure" answer. The total maximum and minimum scores were 13 and 0, with higher scores indicating higher knowledge.[12]

The authors evaluated the validity and reliability of the questionnaire on 24 participants diagnosed with COPD, with Cronbach's alpha for internal consistency being 0.72. Using intraclass correlation coefficient, the Test-retest reliability was 0.90. The Flesch Reading Ease (FRE) score of the COPD-Q was 74.7 (equivalent to a fifth-grade reading level).[12]

With the permission of Maples, the researcher translated the entire, original COPD-Q from English to Vietnamese by using the forward and backward method.[13] The cross-cultural adaptation process included six steps: (1) forward translation, (2) synthesis (3) back word translation, (4) pretesting of the translated version with a pilot study (5) researcher and author review, and (6) submission of respective reports, forms, and documents for appraisal, respectively (Figure 1).

After back-translating the items into English, the inconsistency was resolved by keeping only the translated items that exactly matched the original version; producing a final version ready for testing of the validity and reliability tests.

A pilot study was performed on 30 patients to identify the clarity of the items, the format of the questionnaire, and completion time. To make sure that the subjects understood the questionnaire, they were asked the following question: "Did you understand what was being asked on this scale?" The answers were of a Likert scale type, with "0 – I didn't understand anything; 1 – I understood a little; 2 – I understood more; 3 – I understood almost everything but had some doubts; 4 – I understood perfectly and I had no doubts". Patients were requested to record their degree of understanding after completing the questionnaire. The result showed that the participants finished all questions within 7 minutes, without any difficulty related to the Vietnamese version.

As suggested by Lynn and WHO, in this study were the members of the expert panel, and included: 02 doctors (master's degree) having experience with COPD's treatment; 02 nursing doctorates; and 01 doctorate having experience in building and developing toolkits.[13,14]

The relevance of the content of the COPD-Q, with 13 items relating to Vietnamese culture, was assessed by these experts using a content validity, this being the Items Content Validity Index (I-CVI). The I-CVI was counted by dividing the number of experts who gave an item a score of 3 or 4 on the 4-Likert scale to the total number of experts, and using a value from 0 to 1. The I-CVI was compared with thresholds for the clarity of the questions, as >0.79 (clear), 0.70-0.79 (needs correction), <0.70 (should be unusable). If the number of experts was equal to or less than 5, a consensus of all experts was required to demonstrate that the questionnaire achieved content validity (I-CVI=1).[15]

According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) committee report, using the modified British Medical Research Council (mMRC) dyspnea scale or the COPD assessment test (CAT), is provided thorough coverage of the impact of COPD on a patients wellbeing[16,17] However, the mMRC and the CAT were published in Vietnamese by the Ministry of Health, and used in many studies on COPD in Vietnam. Therefore, we assessed the correlation between both scales and the COPD-Q to identify a concurrent validity.

The mMRC scale was developed by the UK Medical Research Council to assess the degree of dyspnea associated with physical activity in patients with COPD. This scale consists of 5 questions with scores ranging from 0-4; higher scores indicate greater dyspnea.[16]

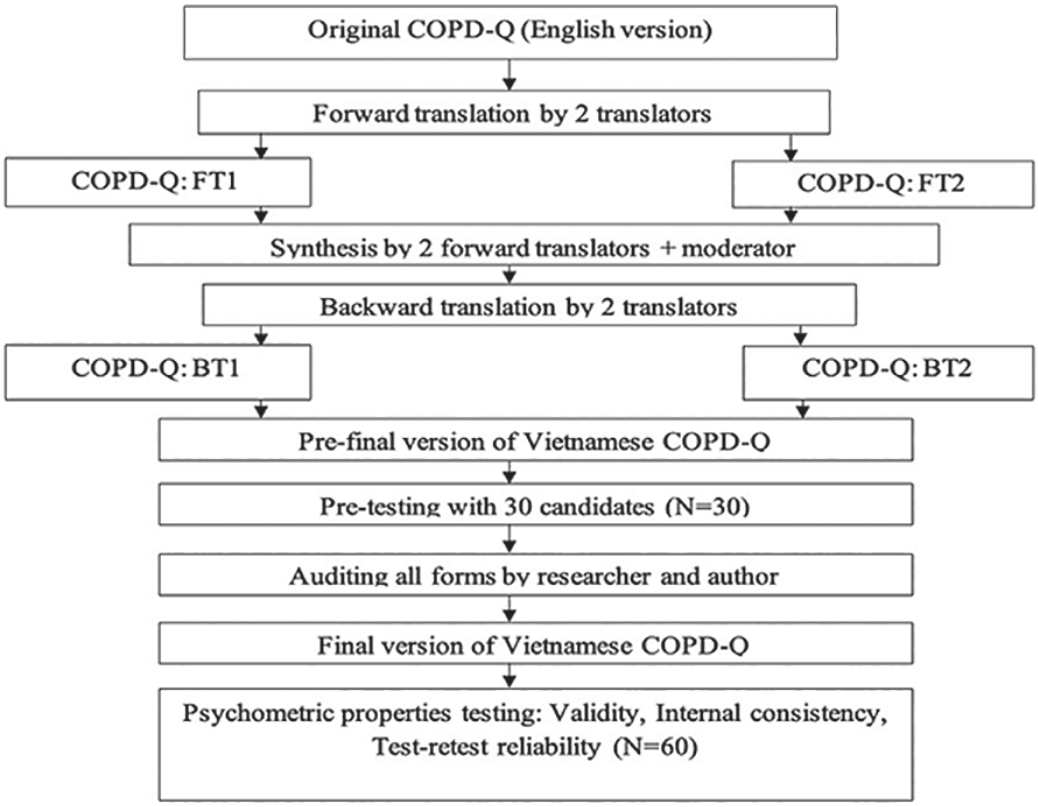

Figure 1 Translation, adaptation and psychometric properties testing process

However, the CAT Scale includes eight questions, with 6 levels from 0 to 5, to assess the impact of COPD on a patient's life. Patients self-assess from mild to severe status with a total score of 0 to 40, with the result classification as low (<10), median (11-20), high (21-30), and very high (>40).[17]

The reliability of the Vietnamese version of COPD-Q was conducted as a test measured over time. The test was repeated twice on the same patient over a four-week interval. The first time this was conducted was when 60 COPD's patients received treatment in a hospital, while the second time was during the time patients were being discharged from the hospital to their home. The internal consistency of the questionnaires was measured by the Kuder-Richardson 20 (KR20) statistical test, while the Intra-Class Correlation index (ICC) was used to measure the test-retest reliability.

The panel of experts also rated the 13-item COPD-Q semantic equivalence using a 4-point Likert scale, wherein: 1=not appropriate, 2=somewhat appropriate, 3=quite appropriate, and 4=very appropriate. Based on their answers, an equivalence ratio was calculated (percentage of the total number of items rated by experts as 3 or 4). Any item found to be non-equivalent and rated as 1 or 2 by more than 20.0% of the respondents would be changed.[18]

Descriptive statistics were used to analyze the data; including, socio-demographic data and participants' reactions to the COPD-Q.

To check the concurrent validity, Pearson's correlation coefficient was used to test the correlation between COPD-Q, and both CAT and mMRC scale scores. Patients with high CAT and mMRCs scores were expected to exhibit a much lower level of knowledge than others.[9,10]

Two methods were used to assess the internal consistency of COPD-Q: the KR20 calculation and the item-to-total corrected correlations (using Pearson's correlation coefficients). A value of 0.80 has been suggested as an acceptable coefficient of KR20.[19] The ICC was used to evaluate the test-retest reliability over a space of 4 weeks, and any ICC above 0.75 indicated good reliability.[20]

This study was approved by the Ethical Review Committee of Nam Dinh University of Nursing (no.1681/GCN-HĐĐD), and permission for data collection from the authorities of all hospitals. All participants received a full explanation concerning the study, with assured confidentiality, and had the right to refuse or withdraw from the study at any time.

Results

Clinical and demographic data

This present study enrolled 30 respondents to pre-test the pre-final version of the Vietnamese-translated COPD Knowledge Questionnaire. In addition, the study included 60 respondents to assess the test-retest reliability of the Vietnamese version of the questionnaire. The mean age of respondents was 60.7; standard deviation (S.D.) ±8.1 years. Most respondents were male (86.7%). Approximately, 73.4% of participants completed high school, while 15.0% were classified as illiterate. The majority of patients were retired (48.3%) and living with COPD disease for under 10 years (60.0%). While the level of dyspnea in those patients that was presented by the mMRC scale was quite high, with 80.0% for 3 and 4 points; the impact of COPD on the patient's life (CAT scale) was serious: accounting for over 90.0% of the sample. The socio-demographic status of patients with COPD is presented in Table 1.

Responses to the V-COPD-Q

The mean score for the V-COPD-Q questionnaire was 9.7 (S.D.=0.466). Among 60 participants, the minimum score was 4 points, and 13 points was the maximum.

Table 1 Socio-demographic characteristics of patients with COPD

Characteristics	Number	%
Gender		
Male	52	86.7
Female	8	13.3
Education level		
Illiterate	9	15.0
Primary school	16	26.7
Junior high school	19	31.7
Vocational school	4	6.7
College, University	12	20.0
Occupation		
Worker	18	30.0
Public servants	11	18.3
Retired	29	48.3
Trader	2	3.3
Number of years of diagnosis		
<10 years	36	60.0
>10 years	24	40.0
mMRC		
2	12	20.0
3	45	75.0
4	3	5.0
CAT	Mean 2.93±.312 (S.D.)	
Median	5	8.3
High	54	90.0
Very high	1	1.7

mMRC=the modified British Medical Research Council dyspnea scale
CAT=the COPD assessment test scale

Validity

Content validity

All 13 items of the Vietnamese version of the COPD-Q questionnaire showed a content validity index higher than 0.79, indicating that the items' content validity was at an acceptable level (Table 2).

Concurrent validity

At the first stage, the concurrent validity registered for the overall population (r=-0.859; p-value=0.000; r=-0.861; p-value=0.000) showed statistically significant negative correlations between the knowledge regarding COPD and the level of dyspnea in COPD patients (mMRC), and the impact of COPD on the patient's life (CAT). After a 4-week interval, the relationship between V-COPD-Q, mMRC and CAT was still negative, with r=-0.853; p-value=0.000; r=-0.833; p-value=0.000, respectively (Table 3).

Table 2 Content validity of the V-COPD-Q scale

Item of the V-COPD-Q questionnaire	Obtained score (I-CVI)
Q1 People with COPD should get a pneumonia shot.	1 (>0.79)
Q2 COPD medicines keep the disease from getting worse.	1 (>0.79)
Q3 COPD can be prevented.	1 (>0.79)
Q4 Using oxygen at home can help people with COPD live longer.	1 (>0.79)
Q5 People can stop taking their long-acting breathing medications (inhalers) when their COPD symptoms get better.	1 (>0.79)
Q6 People with COPD often have a cough that won't go away.	1 (>0.79)
Q7 Stopping smoking will keep COPD from getting worse.	1 (>0.79)
Q8 People with COPD may feel short of breath.	1 (>0.79)
Q9 People with COPD should have a flu shot every year.	1 (>0.79)
Q10 People should only use their COPD inhalers (medicines) when they can't breathe.	1 (>0.79)
Q11 COPD can be reversed.	1 (>0.79)
Q12 Cigarette smoking or second-hand smoke causes most COPD.	1 (>0.79)
Q13 The medicine albuterol (inhaler) can be used anytime you are short of breath.	1 (>0.79)

V-COPD-Q=Vietnameses-Chronic Obstructive Pulmonary Disease-Questionair, I-CVI=the Items Content Validity Index, COPD=chronic obstructive pulmonary disease

Table 3 Correlation between knowledge concerning COPD and the level of dyspnoea in COPD's patients, and the impact of COPD on a patient's life.

Criteria	Knowledge about COPD	
	R	p-value
mMRC*	-0.859	0.000
CAT*	-0.861	0.000
mMRC**	-0.853	0.000
CAT**	-0.833	0.000

Pearson's correlation test *pre-test **post-test
COPD=chronic obstructive pulmonary disease, mMRC=the modified British Medical Research Council dyspnea scale, CAT=the COPD assessment test scale

Table 4 Test-retest reliability of the Vietnamese translated Questionnaire for COPD knowledge

	Intra-class correlation	95% confidence interval		F test with true value			
		Lower bound	Upper bound	Value	df1	df2	Sig
Average measures	0.996	0.994	0.998	262.6	61	61	0.000

Reliability

The internal consistency of V-COPD-Q using the KR20 index was high at the time of pre-test and post-test, with 0.883 and 0.866, respectively. The test-retest reliability of the COPD-Q with the Vietnamese version indicated good reliability at a 4-week interval among 60 COPD patients, with an intra-class correlation coefficient between the first and second total scores being very high: 0.996; p-value=0.000 (Table 4).

Semantic equivalence

All items of the COPD-Q were found to have semantic equivalence, with all experts giving 4 scores for each item; indicating that each item of the questionnaire remained conceptually and idiomatically the same as in the English version.

Discussion

COPD is a common disease that is detrimental to human health, and negatively affects both the duration and quality of life of patients. During the stable period, knowledge and the behavior of patient's self-management ability is critical in halting disease progression and for preventing exacerbations and hospitalization. Most patients reported understanding their illness and the treatments available; however, few patients applied this knowledge fully while caring for themselves at home; particularly among those with a low level of education.[19] We conducted this study with the aim to evaluate the validity and reliability of the COPD-Q of knowledge related to COPD in lower educated Vietnamese people.

Comparing the validity and reliability of the original COPD-Q, of an author named Maples that developed

and tested on COPD patients with low-literacy, and the Spanish version of the COPD-Q conducted by Puente-Maestu[12,21], the translated version of COPD-Q performed on Vietnamese people also showed the same findings, with good content validity, concurrent validity, and high reliability. However, research results demonstrate that the objective of this study was met with 73.4% of the participants just completing high school, and 15.0% having little to no formal education. No participants had a college degree, or were enrolled in a college course at the time of this study. These criteria matched that of the original questionnaire author, Maples.[12]

This study demonstrated that according to experts' opinion, each question and the whole V-COPD-Q questionnaire gave I-CVI and Scale content validity index (S-CVI) results that were equal to 1. Additionally, all patients indicated that the questionnaire was easy to understand, which provided confirmation of the content of the V-COPD questionnaire as being able to fully cover the necessary content to assess knowledge of COPD as well as being suitable for the low education level of participants. This conclusion also coincides with the assessment results of Puente-Maestu when comparing the Spanish version of the COPD-Q questionnaire to the current Vietnamese translation under study.[21]

The reliability of the V-COPD-Q that was analyzed with Kuder-Richardson 20 index was 0.88, and the re-evaluation result after 4 weeks was 0.86. This result indicates that the V-COPD questionnaire has good internal reliability and good reproducibility (with ICC=0.826). These findings were again similar to the Spanish version of the COPD questionnaire, with Cronbach's alpha=0.85, kappa coefficient >0.6 and the ICC being 0.84 for all items.[21]

The results of our study show that knowledge n concerns to COPD is negatively related to the CAT scale and mMRC at both time points. This finding suggests that patients with less knowledge of the disease will have higher CAT and mMRC scores, and the higher the score, the greater the impact of the disease on the patient's health. This finding was also consistent with other studies, explaining that people with less knowledge about the disease have a lower level of behavioral management, have more symptoms; including, severe dyspnea, a higher risk of exacerbations, prolonged hospitalization, and reduced quality of life.[9,10]

This study evaluated many attributes of the V-COPD questionnaire; including, internal consistency and reliability, face validity, content validity, and concurrent validity. The research results show that the V-COPD questionnaire has good concurrent and content value along with high reliability. Therefore, it appears that V-COPD-Q could be a valid and reliable instrument to measure the knowledge of patients with COPD. However, the results of this study should be considered with the limitation that native English speakers did not participate in the translation phase. Although, the study was corrected by inviting translators who have lived and worked in English-speaking countries for a long time; nevertheless, there may be certain differences with native English language speakers.

In summary, V-COPD-Q is a valuable and reliable toolkit to measure knowledge of COPD patients in Vietnam.

Conclusion

Given the validity and reliability reported by the V-COPD-Q and its ease of use in less educated COPD patients, this self-report measure could serve as a screening tool in clinical settings to identify patients who have low knowledge for self-managing COPD disease.

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Conflict of interest

The author declares that there are no conflicts of interest in this study.

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