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## Translation into Spanish, cultural adaption and content validity of the Bristol COPD Knowledge Questionnaire

Vilma Gómez  
*University of Northern Iowa*

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TRANSLATION INTO SPANISH, CULTURAL ADAPTATION AND  
CONTENT VALIDITY OF THE BRISTOL COPD  
KNOWLEDGE QUESTIONNAIRE

An Abstract of a Thesis  
Submitted  
in Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

Vilma Gómez  
University of Northern Iowa  
December 2021

## ABSTRACT

COPD is the major cause of respiratory mortality world-wide. The treatment of COPD includes education and self-management to enable patients to control the symptoms, handle the treatment, manage the physical and psychosocial consequences of the disease, and adopt the necessary lifestyle changes for dealing with a chronic condition. Measurement of results of interventions is necessary to demonstrate their effectiveness. Questionnaires help clinicians measure the level of knowledge before and after treatments. However, there are no questionnaires available in Colombian Spanish to measure knowledge of Chronic Obstructive Pulmonary Disease (COPD). This research resulted in the translation into Spanish, cultural adaptation, and content validity of the Bristol COPD Knowledge Questionnaire (BCKQ) which previously did not exist. The process of translation and adaptation followed two forward translations, synthesis of the forward translations, back translation, review of the back-translation, and the consultation with clinicians and informants for the items that were problematic to translate and adapt. Ten health care professionals participated in the content validity evaluation. They ranked the 65 items of the questionnaire as clear, coherent, and sufficient. Two of the 65 items were considered not relevant. The following steps for adopting the questionnaire for clinical use include submitting the questionnaire to patient evaluation and the measurement of other psychometric properties. The researcher expects the Colombian Spanish version of the BCKQ to become a tool for clinicians, academics, and health care institutions to improve the understanding of the disease that may enhance the care offered to patients living with COPD.

Key words: COPD, Lung Disease, Questionnaire, Translation, Cultural Adaptation,  
Content Validity, Spanish.

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Entitled: Translation into Spanish, Cultural Adaptation and Content Validity of the  
Bristol COPD Knowledge Questionnaire

has been approved as meeting the thesis requirement for the  
Degree of Master of Arts

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## CHAPTER 1

### INTRODUCTION

COPD (chronic obstructive pulmonary disease) a chronic respiratory condition, caused mainly by exposure to tobacco smoke, is the major cause of respiratory mortality worldwide (Adeloye et al., 2015). It is estimated that COPD will continue to be among the top five causes of mortality by 2030 (Global Initiative for Chronic Obstructive & Lung Disease [GOLD], 2017). The treatment of this disease includes pharmacological measures, pulmonary rehabilitation, education, and strategies to improve self-management.

Knowledge is an essential component of any behavior change; disease knowledge, defined as facts and insights about a disease (Sharma, 2017) is the first component of the self-management process (Jolly et al., 2016). Disease knowledge usually involves the transfer of information that serves as the base for building skills for patients to manage their disease. Testing the patient's knowledge of the disease is a starting point for planning self-management education programs and patient-centered education. The Global Initiative for Chronic Obstructive & Lung Disease guidelines indicated the importance of personalized education that considers specific issues relating to the individual patients, with the goal to improve health behaviors.

In Spanish, two questionnaires have been used to measure knowledge in COPD: the COPD-Q (COPD-Questionnaire (Maples et al., 2010) known as EPOC-C in Spanish (Puente-Maestu et al., 2016) and the Lung Information Needs Questionnaire (LINQ) (Hyland et al., 2006). Neither of them is completely satisfactory for a number of reasons.

The COPD-Q is a short questionnaire designed to measure knowledge of people with low health literacy. It has the advantage of being short and easy to answer. On the one hand, the questionnaire includes general topics with low details in aspects like causes of COPD and aspects related to breathlessness, the main and disabling symptom in COPD. On the other hand, the COPD-Q includes items about specific treatment like oxygen therapy and the use of salbutamol that might not apply for all patients with COPD. The LINQ Questionnaire has been translated and adapted into Colombian Spanish (Wilches Luna et al., 2014). Although the questionnaire is useful in identifying information needs that are poorly met by patients, it does not measure facts related to knowledge of the disease.

The Bristol COPD Knowledge Questionnaire (BCKQ) (White et al., 2006) includes detailed items related to general epidemiology and different causes of COPD. Additionally, the questionnaire includes detailed sections related to symptoms, treatment of the disease, and exacerbations covering the use of corticosteroids and antibiotics. Finally, the questionnaire includes common misconceptions in COPD. The BCKQ has been used in many studies to measure knowledge and the effects of education and self-management programs in people with COPD. Furthermore, the questionnaire has been used to measure knowledge of COPD in health care professionals.

### 1.1 Purpose of the Study

The objective of this research is to translate the Bristol COPD Knowledge Questionnaire into Colombian Spanish, make the cultural adaptation, and document content validity of the new Spanish version using the expert judgment of health care professionals.



### 1.2 Significance of the Study

The Colombian Spanish version of the Bristol COPD Knowledge Questionnaire will be a useful tool to measure knowledge in people with COPD who speak Colombian Spanish. This questionnaire could be used to measure the base levels of knowledge of COPD in many settings such as self-management, integrated care, and pulmonary rehabilitation programs to offer person-centered education focused in personal gaps. In addition, the questionnaire could be used to measure changes in COPD knowledge after educational interventions commonly offered in these programs.

As the questionnaire contains 13 dimensions, the author considers that fragments of the questionnaire could be used in specific settings like primary care and hospitals, where some specific aspects of the knowledge of the disease could be addressed in each visit. Other health care professionals could use the questionnaire as a whole or fragmented into dimensions at their convenience. Finally, academic and health care institutions can use the questionnaire to gain an understanding of knowledge of COPD in health care professionals and in students. This understanding may improve the care offered to patients living with COPD.

### 1.3 Assumptions of the Study

This study was conducted under the following assumptions:

1. The BCKQ is a valid and a reliable method to measure knowledge in people with COPD.
2. As far as the researcher is aware and based on information received from the original authors of the BCKQ, there is not a Colombian Spanish version of the questionnaire.

3. The methodology used in this study to translate and make the cultural adaptation of the questionnaire followed recognized guidelines for this process.
4. The health care professionals who participated in the measurement of content validity have sufficient experience in the field of education and in the management of people in COPD in different settings and from different Colombian cities.
5. The health care professionals honestly filled in the template provided to document the content validity.

#### 1.4 Delimitations of the Study

The Spanish version of the BCKQ was obtained in the Colombian context; therefore, it is intended to be used with population who speak Colombian Spanish.

#### 1.5 Limitations

The questionnaire was not tested on patients.

#### 1.6 Definitions

1. Knowledge: “Understanding of or information about a subject that you get by experience or study” (Cambridge Dictionary, n.d.). In the context of health promotion and education, knowledge is defined by Sharma (2017, p. 39) as “facts and insights related the action, idea, object, person, or situation.”
2. Self-management: “The individual's ability to manage the symptoms, treatment, physical and psychosocial consequences, and lifestyle changes inherent to living with a chronic condition” (Barlow et al., 2002, p. 178).
3. Pulmonary Rehabilitation: “Comprehensive intervention based on a thorough patient assessment followed by patient tailored therapies that include, but are not

limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors” (Spruit et al., 2013, p. e14).

4. Person-centered care: The care based on the individuals’ values and preferences expressed by the person, that guide all aspects of their health care, supporting their realistic health and life goals (American Geriatrics Society Expert Panel on Person-Centered Care, 2016).
5. Content Validity: The “extent to which an instrument measures the important aspects of concepts developers or users purport to assess” (Patrick et al., 2011, p. 978).
6. Expert Judgment: “An informed opinion of people with experience in a subject, who are recognized by others as qualified experts in it, and that can provide information, evidence, judgments, and evaluations” (translated from Escobar-Pérez & Cuervo-Martínez, 2008, p. 29).
7. PREPOCOL: Acronym for Prevalence of COPD in Colombia.
8. FEV1/FVC ratio: A measurement obtained by spirometry that reflects the amount of air that a subject is able to exhale during the first second (FEV1: Forced expiratory volume in the first second) in relation to their maximum vital capacity (FVC: Forced Vital Capacity).

9. GOLD classification: Global Obstructive Lung Disease classification that ranks COPD into four grades according to the severity of the obstruction measured by spirometry.
10. Item: The individual unit that is part of a list. In the case of the BCKQ it refers to each sentence that makes up the dimensions in the questionnaire. When the word “item” appears in the concept of item equivalence it will refer to word or expression.

## CHAPTER 2

### LITERATURE REVIEW

The current chapter summarizes the burden of Chronic Obstructive Pulmonary disease (COPD, EPOC in Spanish), its causes, and possible treatments. It also provides a review of the concepts of patient education, self-management, and patient-centered care, including a review of the instruments available to measure knowledge in COPD. Finally, it explains the steps to follow in the process of translation, cultural adaptation, and content validity in translated questionnaires.

#### 2.1 Burden, Causes, and Treatment of COPD

Despite the implementation of public policies aimed at maintaining smoke-free environments, and in spite of the decline in smoking rate (World Health Organization, [WHO], n.d.-b), COPD (chronic obstructive pulmonary disease), with a global prevalence of 11.7% in 2010, is the major cause of respiratory mortality worldwide. According to WHO (Adeloye et al., 2015), it is estimated that 3.17 million deaths were caused by COPD in 2015 (that is, 5% of all deaths globally in that year). Adeloye et al. also studied the prevalence of COPD finding that the highest prevalence is in the Americas (15.2%), and the lowest is in Southeast Asia (9.7%). COPD is more common in urban dwellers (prevalence of 13.2%) compared with rural dwellers (prevalence of 8.8%). The overall prevalence in men aged 30 years or more is 14.3% (95% CI 13.3%–15.3%) compared to 7.6% (95% CI 7.0%–8.2%) in women (Adeloye et al., 2015).

According to the PREPOCOL Study (Caballero et al., 2008), in Colombia, the overall COPD prevalence defined by the spirometry functional criteria (post

bronchodilator FEV1/FVC ratio: 70%) is 8.9%. It is higher in men (13.6%) than in women (6.6%). The prevalence in Colombia was studied in five cities ranging from 6.2% in Barranquilla to 13.5% in Medellin. COPD prevalence by GOLD classification of severity was distributed as follows: mild 68.9%; moderate 26.3%; severe 3.4%; and very severe 0.5%. Projections made by the Global Burden of Disease Study (Mathers & Loncar, 2006), predicts that COPD will be the fourth leading cause of death by 2030. It is estimated that the prevalence of COPD will increase over the coming decades due to continued exposure to COPD risk factors and aging of the world's population (GOLD, 2021)

COPD is a chronic respiratory condition, caused mainly by the exposure to tobacco smoke (either active smoking or secondhand smoke), exposure to indoor and outdoor air pollution, and exposure to occupational dusts and fumes (GOLD, 2021). COPD is preventable by avoidance or early cessation of smoking. Although COPD is not curable, treatment can relieve symptoms, improve quality of life, and reduce the risk of death (World Health Organization, n.d.-a). Once COPD has been diagnosed, the goals of treatment are to reduce both current symptoms and future risks of exacerbations. The treatment of the disease includes pharmacological measures (inhalers and oxygen therapy), pulmonary rehabilitation, education, and strategies to improve self-management (GOLD, 2021).

## 2.2 The Role of Education and Self-Management in COPD

Patient education and self-management interventions are an important part of the integrative care of patients living with COPD (GOLD, 2019). The recent review of the

GOLD guidelines pinpoints the importance of personalized education that considers specific issues relating to the individual patients, with the goal to improve health behaviors. Low levels of knowledge of disease have been associated with high risk anxiety and depression in COPD patients (Zhang et al., 2014).

Many studies focused on finding the areas of support for patients with COPD have identified education as an important component of the management of the disease. In a systematic review of 31 papers, Gardener et al. (2018) found 13 domains of support needs. In the first domain, patients manifested inadequate understanding of the disease, ignorance of terms like COPD or emphysema, and low awareness of COPD diagnosis. In the second domain, patients reported inadequate information about managing the illness, controlling breathlessness and panic attacks, using medication and controlling its side effects, using inhalers, and managing exacerbations. Patients also explained that they do not receive enough information about how to change lifestyles, how to exercise at home, and strategies to manage smoking cessation. In the same analysis, researchers found that patients considered that receiving information about the nature of the illness, information sessions with pulmonary rehabilitation classes, guidance and feedback from health care professionals are supportive in the management of the disease.

Self-management is now considered a more effective approach when compared with just education (Jolly et al., 2016) in the comprehensive management of patients with chronic diseases. Self-management is defined as:

The individual's ability to manage the symptoms, treatment, physical and psychosocial consequences, and lifestyle changes inherent in living with a chronic condition. Efficacious self-management encompasses the ability to monitor one's condition and to effect the cognitive, behavioral, and

emotional responses necessary to maintain a satisfactory quality of life (Barlow et al., 2002, p. 178).

Self-management implies improving the skills to carry out disease-specific medical regimens, guide changes in health behavior, and provide different kinds of support to enable patients to adjust their roles for optimal function and control their disease.

The effects of self-management education were studied by Wang et al. (2017).

The authors reviewed 25 articles to find the effectiveness of disease specific self-management education on health outcomes in patients with COPD. The articles had to include at least two of the following components: knowledge of disease, advice on smoking cessation, instructions for pharmacological and (or) non-pharmacological treatments, self-management techniques for acute exacerbations or other physical and emotional distresses in COPD, and advice on regular exercise. The findings of the study showed that self-management interventions in COPD improved quality of life, disease-specific knowledge, and reduced COPD emotional distress (especially anxiety). The authors pointed out that these results were consistent with previous published systematic reviews (Tan et al., 2012 and Effing et al., 2007 as cited in Wang et al., 2017).

A meta-analysis carried out by Hurley et al. (2012) found that self-management education using group or individual education was associated with a reduction in hospital admissions. The authors mentioned that education including the use of pre-defined action plans may lead to a faster and more frequent treatment of COPD exacerbations, thus resulting in a reduction in hospitalizations. Other meta-analysis led by the Cochrane Collaboration (Zwerink et al., 2014) included 29 studies on 3,189 participants. This analysis assessed the efficacy of self-management interventions in people with COPD.



The authors evaluated the impact of self-management interventions with each study including at least two of the following aspects: smoking cessation, self-recognition, and self-treatment of exacerbations, a component of exercise or physical activity, advice about diet, and advice about medication or coping with breathlessness. The content was delivered to study participants verbally, as written material (hardcopy or digital), or via audiovisual media. The authors found with moderate quality of evidence that self-management improved the quality of life, respiratory-related hospital admissions, and all-cause hospital admissions.

Self-management interventions also have demonstrated to be cost-effective. Dewan et al. (2011) evaluated the economic impact of a disease management program for COPD in five Midwest region medical centers in the United States. The authors found that the disease management program produced an average cost savings of \$593 per patient after paying for the cost of the intervention. Likewise, Dritsaki et al. (2016) carried out a cost-utility analysis for a self-management program for COPD in 30 primary care settings in Europe. Although in this study there was a slight increase in the use of respiratory clinic visits, emergency department visits, and community physiotherapist visits, the mean difference in cost between usual care and self-management program was \$32 in favor of the self-management intervention.

Person-centered interventions are now being studied in patients with COPD. Person-centered care involves the consideration of the “preferences, needs, and values of the patient to guide the clinical decisions” (American Geriatrics Society Expert Panel on Person-Centered Care, 2016, p.15). It shifts the traditional health care model where the

health care provider has the main decision-making role to one that supports the patient's autonomy and individual preferences in health care decisions. Individual education in people with COPD, guided by action plans, has been associated with better knowledge of the disease (Choi et al., 2014).

### 2.3 Measuring Disease Knowledge in COPD

Knowledge is an essential component of any behavior change. Disease knowledge, defined as facts and insights about a disease (Sharma, 2017), is the first component of the self-management interventions (Table 1) and usually involves the transfer of information that serves as the base for building skills for patients to manage their disease. Measuring patient knowledge and skill levels for self-management should be the starting point for health education programs. Most of the theories used in health promotion and health education require to improve knowledge with the goal to get a better perception of people to obtain a desirable behavior. Knowledge is required to increase perceived susceptibility and perceived seriousness in the Health Belief Model. Knowledge is the first construct of Social Cognitive Theory.

Table 1. Components of Self-Management

Extracted from: Self-management of health care behaviors for COPD: A systematic review and meta-analysis (Jolly et al., 2016)

<b>Component</b>	<b>Broad inclusion/definition</b>
Disease knowledge	Education about disease, disease management, treatments, self-management, chronic illness, activities of daily life, end of life, self-care tips, travel, and COPD
Self-management unspecified	Self-management education/skills
Respiratory muscle training	Inspiratory muscle training, expiratory muscle training (pressure, threshold, and resistance devices)
Action planning	Managing exacerbations, coping plan, management of COPD symptoms, recognizing when to call a doctor
Breathing management and techniques	Breathing exercises, breathing retraining, respiratory biofeedback, managing breathlessness and coping with triggers for breathlessness, tai chi, vocal exercises
Smoking cessation	Advice, counseling, groups, interventions to help reduce/quit smoking as required
Medication/adherence	Information about medication and adherence, promoting adherence (pharmacological or non pharmacological)
Bronchial hygiene techniques	Postural drainage/coughing techniques
Nutrition	Advice, counseling, groups, supplements as required
Psychological intervention	Psychosocial support, cognitive behavioral therapy, cognitive training, relaxation (including exercises, eg. progressive muscle relaxation), stress management, general goal setting, mood disturbance, handling emotions (how to cope with the disease), psychosocial problems associated with respiratory disability, self-talk and panic control, health qigong
Preventative	Avoiding exacerbations, pollution and environmental hazards, managing infections, and personal hygiene
Inhaler technique and use	Assessing inhaler technique, teaching correct use, and handling of inhalers
Energy conservation	Pacing and good posture, home modifications and activities of daily living, work simplification
Support groups/patient empowerment	Peer support self-help groups/networks, developing confidence to negotiate with clinicians
Exercise – strength	Upper limb, lower limb strength/resistance exercises
Exercise – aerobic	Cycling, walking, stair climbing as aerobic/endurance exercises
Exercise – other	Flexibility and balance exercises, sham training, unspecified exercises
Enhanced access/care	Access to health professionals, access to call center/hotline, health professional home visits and/or telephone support
Other	Any miscellaneous uncommon components, eg, sleep or other symptom control
Usual care	Usual medications and visits to general practitioner or routine secondary care

Assessing knowledge and skills gives an objective measure as a starting point for future interventions and allows programs and professionals to design interventions focusing on knowledge gaps offering person-centered interventions. The process of evaluation in health education generally includes process evaluation, outcome evaluation, and impact evaluation (Sharma, 2017). Evaluation of knowledge (a kind of outcome) is one part of the process of evaluation of education and self-management. Unfortunately, this kind of outcome is not measured systematically. For example, in pulmonary rehabilitation programs, in which education is considered one of the main components, the outcome measures of the program usually include dyspnea, exercise tolerance, and quality of life, with few studies measuring knowledge and self-efficacy (Blackstock et al., 2018; Roberts et al., 2018).

In pulmonary rehabilitation programs Roberts et al. (2018) found that of 14 studies included in their systematic review, only four studies included questionnaires to evaluate the results of the educational interventions. Additionally, Roberts et al. (2018) and Blackstock et al. (2018) revealed that the educational activities in pulmonary rehabilitation generally are designed based on the input of health care professionals without considering patient's feedback or the needs of the subjects attending pulmonary rehabilitation. Considering those results, the authors recommend research into appropriate educational outcomes that capture the impact of education on learning, self-management, and the levels of behavior change achieved by the patients.

Having satisfactory methods of assessing the knowledge attained is important to measure the level of knowledge, interpret the impact of education activities, review, and

improve the content of educational programs (Roberts et al., 2018; White et al., 2006). In COPD, knowledge is measured as understanding of the disease, knowledge learned, self-efficacy around self-management skills, or perceived ability/confidence around being able to self-manage in the future (Roberts et al., 2018). A summary of questionnaires that have been used to measure knowledge in COPD is shown in Table 2.

In Spanish, two questionnaires have been used to measure knowledge in COPD: The COPD-Q Questionnaire (Maples et al., 2010), known as EPOC-C in Spanish (Puente-Maestu et al., 2016), and the Lung Information Needs Questionnaire (LINQ) (Hyland et al., 2006). Neither of them is completely satisfactory for several reasons. The COPD-Q is a short questionnaire designed to measure knowledge of people with low health literacy. It has the advantage of being short and easy to answer. On the one hand, the questionnaire includes general topics, but includes few details such as causes of COPD and aspects related to breathlessness. On the other hand, the COPD-Q includes items about specific treatment like oxygen therapy and the use of salbutamol that may not apply for all patients with COPD. The LINQ questionnaire has been translated and adapted into Colombian Spanish (Wilches Luna et al., 2014). Although the questionnaire is useful in identifying information needs that are poorly met by patients, it does not measure facts related to knowledge of the disease.

Table 2. Questionnaires Used to Measure Knowledge in COPD. Modified from Blackstock et al. (2018)

Questionnaire	Description	Total of items and scoring	Domains	Psychometric Properties	Time to complete
Bristol COPD Knowledge Questionnaire (BCKQ). (White et al., 2006)	Assesses patient knowledge about topics related with COPD	Multiple choice questionnaire. 65 statements grouped in 13 domains. Score range from 0 to 65. Higher scores indicate better knowledge of disease.	Disease knowledge Symptoms Exacerbations Exercise Stopping smoking Vaccination Inhalers Antibiotic and steroids treatment	Cronbach's alpha: 0.73. Test – rest inter-correlation r: 0.71, Intra-correlation r: 0.82	15-20 min
COPD Questionnaire COPD-Q. (Maples et al., 2010)	Assesses patient knowledge about topics related with COPD	Multiple choice questionnaire. 13 statements. Score range from 0 to 13 based on items answered correctly. Higher scores indicate better knowledge of disease.	Not specified. The items include Treatment of COPD (vaccination, oxygen, inhalers, stopping smoking), Symptoms Course of the disease	Cronbach's alpha: 0.72. Test–retest reliability: intraclass correlation r: 0.90.	Not reported
Lung Information Needs Questionnaire (LINQ). (Hyland et al., 2006)	Assesses needs of information	Multiple choice questionnaire. 17 statements. Score range from 0 to 25. Higher scores indicate that the information needed is high.	Perceptions about: Disease Knowledge Medicines Self-management Smoking Exercise Diet	Cronbach's Alfa: 0.62. Retest reliability for the six domains: between 0.66 and 0.98	6 min
Understanding COPD Questionnaire (UCOPD Questionnaire). (O'Neill et al., 2012).	Assesses understanding, confidence about disease and satisfaction with de education component in pulmonary rehabilitation programs.	Visual analogue scale questionnaire. 24 items grouped in four domains. Score range from 0 to 100. Lower scores represent less understanding, confidence, use or satisfaction.	Understanding and confidence about: COPD Managing symptoms of COPD Accessing help and support Satisfaction with the education component	Cronbach's Alpha range: 0.78 to 0.95). test-retest reliability (Section A: ICC range: 0.87 to 0.96; Section B: Wilcoxon: $p > 0.05$ )	10 min

The Bristol COPD Knowledge Questionnaire includes detailed items related to general epidemiology and different causes of COPD. Likewise, the questionnaire includes detailed sections related to the symptoms and treatment of the disease and exacerbations covering the use of corticosteroids and antibiotics. Also, the questionnaire includes misconceptions frequent in COPD, for example that “breathlessness is often assumed to be associated with low blood oxygen levels, that steroid inhalers can be used as needed, and that stopping smoking will result in improved lung function” (White et al., 2006, p. 124). The length of the questionnaire is its major limitation because the questionnaire contains 65 items. However, those items include all the details necessary to establish the gaps in knowledge that can be addressed for the health care professionals in different settings, specially in long term programs like integrated care programs and pulmonary rehabilitation programs. These knowledge gaps can be tailored for the professionals who treat patients with COPD to offer personalized approaches focused on personal goals.

The Bristol COPD Knowledge Questionnaire has been used in many research papers measuring knowledge of the disease in patients (Choi et al., 2014; de Souza et al., 2020; Ivziku et al., 2018; Wang et al., 2011; Zhang et al., 2014), caregivers ( Ivziku et al., 2018; Wang et al., 2011), and in health care professionals (Ma et al., 2019; Staiou et al., 2021). Also, it has been used to measure the results of exercise and education programs (Hill et al., 2010; Janaudis-Ferreira et al., 2018; Lewis et al., 2019; Sajith et al., 2020; Ward et al., 2018), self-management interventions (Bourbeau et al., 2018; Stamenova et al., 2020), and pulmonary rehabilitation programs (Roberts et al., 2018).

## 2.4 Process of Translation and Cultural Adaptation

The process of health evaluation usually implies the use of objective measurements (like arterial pressure or cardiac rate) that allows health care professionals to establish the clinical situation of an individual, make a diagnosis, treat, and follow patients. Objective measures are not always available, for example, when the health measures include perceptions, opinions, or knowledge. In these cases, the health professional must have objective measures to try to approach in as close as possible to the patient's situation. The use of questionnaires helps clinicians to have an approximation to these concepts (perceptions, opinions, or knowledge). In many cases, “the quality of care depends on the accurate assessment and deeper understanding of the individual’s cultural, linguistic and ethnic background” (Sousa & Rojjanasrirat, 2011, p. 268).

To measure knowledge of the disease, it is possible to use questionnaires designed for other populations that must be culturally adapted to the target population (Sousa & Rojjanasrirat, 2011). For the process of translation and cultural adaptation there are some guidelines that can be followed. Most studies about translation and cross-cultural adaptation of instruments in the last century have included one or more of the following techniques: forward-only translation, forward-only translation with testing the instrument in the target language, back-translation, back-translation with monolingual testing, back-translation with bilingual testing, or back-translation with both monolingual and bilingual testing (Maneesriwongul & Dixon, 2004).

Currently, the process of translation and cultural adaptation is seen as part of a comprehensive process in which the researchers follow a series of stages that include



some of the categories aforementioned. Some guidelines (Beaton et al., 2000; Eremenco et al., 2005; Sousa & Rojjanasrirat, 2011; Wild et al., 2005) available to perform the cross-cultural adaptation process to another language are shown in Table 3. These guidelines follow a series of steps and are presented in their 'pure' theoretical form. "In practice, the best attributes of each model are used, in various combinations, in order to produce suitable translations" (Steele, 2003 p. 37). The steps can be adapted with variations in the number or details of the stages. Below an explanation and details of operationalization of each stage is provided.

#### 2.4.1 Preparation

Preparation includes all the necessary work that must be carried out before starting the translation process. This step includes creating an outline of the entire work and contacting the developer of the original questionnaire for permission. In this stage the key in-country person who will support the synthesis and reviews of the translations is recruited (Wild et al., 2005).

Table 3. Stages of the Guidelines Available to the Process of Translation and Cultural Adaptation

Reference	Paper Title	Stages
Beaton et al.(2000)	Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures.	<ol style="list-style-type: none"> <li>1. Initial Translation</li> <li>2. Synthesis of the Translations</li> <li>3. Back translation</li> <li>4. Expert committee</li> <li>5. Pretesting</li> <li>6. Submission of Documentation for Appraisal of the Adaptation Process</li> </ol>
Eremenco et al. (2005)	A Comprehensive Method for the Translation and Cross-Cultural Validation of Health Status Questionnaires.	<ol style="list-style-type: none"> <li>1. Forward Translation</li> <li>2. Reconciliation</li> <li>3. Back Translation</li> <li>4. Review</li> <li>5. Finalization</li> <li>6. Testing of Translations</li> </ol>
Wild et al. (2005)	Principles of Good Practice for the Translation and Cultural Adaptation Process for Patient-Reported Outcomes (PRO) Measures: Report of the ISPOR Task Force for Translation and Cultural Adaptation.	<ol style="list-style-type: none"> <li>1. Preparation</li> <li>2. Forward Translation</li> <li>3. Reconciliation</li> <li>4. Back Translation</li> <li>5. Back Translation Review</li> <li>6. Harmonization</li> <li>7. Cognitive Debriefing</li> <li>8. Review of Cognitive Debriefing Results and Finalization</li> <li>9. Proofreading</li> <li>10. Final Report.</li> </ol>
Sousa and Rojjanasrirat (2010)	Translation, Adaptation and Validation of Instruments or Scales for use in Cross-cultural Health Care Research: a Clear and User-friendly Guideline.	<ol style="list-style-type: none"> <li>1. Forward Translation</li> <li>2. Synthesis I</li> <li>3. Back-translation</li> <li>4. Synthesis II</li> <li>5. Pilot testing of the pre-final version (cognitive debriefing)</li> <li>6. Preliminary psychometric testing of the pre-final version</li> <li>7. Full psychometric testing</li> </ol>

#### 2.4.2 Forward Translation

Existing guidelines generally agree regarding the need for more than one forward translation. All forward translators should be native speakers of the target language with prior experience in the translation of Patient-Reported Outcomes (PRO) measures.

Beaton et al. (2000) recommend that the two translators should have different profiles or

background. One of the translators should be aware of the concepts being examined in the questionnaire being translated. Their adaptations are intended to provide equivalency from a more clinical perspective and may produce a translation providing a more reliable equivalence from a measurement perspective. The other translator should neither be aware nor informed of the concepts being quantified and preferably should have no medical or clinical background. This is called a “naive translator”, and they are more likely to detect different meaning of the original than the first translator. This translator will be less influenced by an academic goal and will offer a translation that reflects the language used by that population, often highlighting ambiguous meanings in the original questionnaire.

If resources are available, translations can also be done by two teams of independent translators (Sousa & Rojjanasrirat, 2011). Each team of translators must have the same characteristics as the two individual independent translators described above.

The translators each produce a written report of the translation that they complete highlighting challenging phrases or uncertainties. Their rationale for their choices is also summarized in the written report. Item content, response options, and instructions are all translated in this step (Beaton et al., 2000).

#### 2.4.3 Reconciliation or Synthesis I

In this stage, the two forward translations are reviewed and a preliminary version in the source language (SL) is generated. The original questionnaire, as well as the first translator’s (T1) and the second translator’s (T2) versions are discussed and analyzed,

and one common translation (T12) is produced. This process must include a written report carefully documenting the synthesis process, each of the issues addressed, and how they were resolved. It is important that consensus is reached rather than one person compromising to resolve issues (Beaton et al., 2000). Another approach to this process is choosing one or other translations for a given question, combining the two translations, modifying a given translation, or generating a completely new one. The ways to do this process differs according to authors.

Beaton et al. (2000) and Wild et al. (2005) recommend that the translators and a recording observer sit down to synthesize the results of the translations. An independent native speaker of the target language who had not been involved in any of the forward translations synthesizes and document this process (Wild et al., 2005). Eremenco et al. (2005) suggests that the reconciler works in an independent way of the forward translators so on introduce more objectivity into the process also to leave other possible interpretations of the items being translated. In terms of the qualifications of the person completing this role, it is often either a knowledgeable translator or a health care professional with experience within the translation of patient-oriented instruments that use language familiar to patients. Wild et al. (2005) also suggest that one researcher who may have prepared one of the forward translations, who will also conduct the testing and cognitive debriefing, is the person in charge of synthesizing and document the process.

#### 2.4.4 Back Translation

The back-translation of the reconciled version (T12) must be carried out for one or two translators whose native language be the source language, and who are fluent in

the target language. The back translators must not have been involved in the forward translation process. The back translator only has access to the reconciled version of the forward translations and not to the original forward translations nor to the original English items undergoing translation (Eremenco et al., 2005). The back translators should neither be aware nor be informed of the concepts explored and should preferably be without a medical background (Beaton et al., 2000).

The method of back translation is considered by some authors as a quality assessment method (Beaton et al., 2000; Eremenco et al., 2005); however, the efficacy of back translation method as a translation quality testing tool has been recently questioned (Son, 2018). It is argued that quality translation of a survey instrument would never be achieved through this indirect assessment because the linguistic appropriateness of the translated text itself would have no chance to be addressed through this method (Brislin, 1986). Survey translation is no longer a process of adopting the instrument from the source language directly into a target language to ask the same question, but a process of adapting the instrument into a target language and culture to measure the same construct by achieving functional equivalence (Maneesriwongul & Dixon, 2004; Son, 2018). Therefore, back translation is recently seen as a tool to aid in the cross-cultural adaptation process rather than be a translation quality assessment tool (Son, 2018).

#### 2.4.5 Back Translation Review

In the back translation review, the two versions of the instrument in the source language (the original and the back-translated one) are compared to highlight gross inconsistencies, conceptual errors in the translation, critical words, and sentences that

must be reviewed (Beaton et al., 2000; Steele, 2003). The discrepancies or translation errors identified in this step would lead to further assessment of the reconciled version and to possible revisions to eliminate the discrepancies (Wild et al., 2005).

The review can be done following different approaches. Wild et al. (2005) recommend that this review should be carried out by the project manager and any revision of the translation be agreed upon by the project manager and the key in-country person. Eremenco et al. (2005) recommend that the review must be carried out by independent reviewers (three to four bilingual experts who may include health professionals) that independently analyze the forward translations, reconciliation, and back-translation. They provide commentary and alternative translations if needed. Back-translation could be repeated with different translators until investigators and interpreters are satisfied with the equivalence between the source and target languages (Brislin, 1986). This process could be expensive.

#### 2.4.6 Expert/Team Committee

This step included by Beaton et al. (2000) and Sousa and Rojjanasrirat (2011) is another approach for the back translation review. The expert committee's role is to consolidate all the versions of the questionnaire and develop what would be considered the pre-final version of the questionnaire for field testing. The committee will, therefore, review all the translations and reach a consensus of any discrepancy. The material at the disposal of the committee includes the original questionnaire and each translation together with corresponding written reports (which explain the rationale of each decision at earlier stages). The committee's goal is to find the best equivalence in the target

language without affecting the concept expressed in the source language. The important differences that arise as a result of comparing the two versions should be explained and documented. In this step, the committee must focus their job in achieving equivalence between the source and target version semantic equivalence, idiomatic equivalence, experimental equivalence, and conceptual equivalence. These concepts will be explained later.

It is recommended that the committee must include at least one methodologist (who can be the investigator and or member of the research team), health professionals (familiar with the constructs of the instrument), language professionals, and the translators (forward and back translators) involved in the process up to this point.

If discrepancies cannot be resolved, it may be necessary to repeat the translation and back translation (known as the repetition approach). Alternatively, only items that do not retain their original meaning are re-translated and back-translated (Sousa & Rojjanasrirat, 2011). The authors also recommend that the evaluation of the translated and back-translated versions follows the same validation process described above. This process is repeated until ambiguities or discrepancies are not found.

Both in the review process of the back translation and in the committee review, the researcher can use the help of informants (Steele, 2003). These people must be bilingual and may or may not have health knowledge. The work of these informants is providing services such as the reviewing of translations, explanation of target language concepts, and assisting in the identification and exploration of target language words that could be used in the translation.

#### 2.4.7 Harmonization

Wild et al. (2005) define harmonization as the “comparison of back translations of multiple language versions with each other and the original instrument to highlight discrepancies between the original and derivative translations, as well as to achieve a consistent approach to translation problems” (p. 97). There is disparity in the process through which harmonization is achieved, so this step has been omitted from the other existing guidelines.

#### 2.4.8 Cognitive Interview (Cognitive Debriefing)

The purpose of the cognitive interview is to assess the level of comprehensibility and cognitive equivalence in the patient population. In this step, the researcher can identify words, sentences, and other issues that cause confusion. Also, the researcher can explore any translation alternatives that have not been resolved and items that may be inappropriate at a conceptual level. Furthermore, it is important to check that there are no important elements missing that may influence the evaluation of the concept. This last part is critical in establishing content validity and should be done with the final version of the instrument to avoid the need for replication of quantitative testing (Patrick et al., 2011).

Wild et al. (2005) recommend that the newly translated instrument should be tested for cognitive equivalence on a group of five to eight respondents in the target country. Miller et al. (2014) point out that the sample must be a purposive sample, which means a sample that can reveal all the major problems in the questionnaire, in other words, when a theoretical saturation be found. Respondents should be native speakers of



the target language who adequately represent the target population (sex, age, education, diagnosis).

Cognitive testing is crucial to obtain information regarding “how translated questions are understood, the underlying cognitive processes that respondents undergo to answer them, and how this relates to respondents’ interpretation of the same questions in the source language” (Miller et al., 2014, p. 51). The authors explain that this information can help improve wording choices, improve comparability between the original and the translated instrument, and improves the cultural appropriateness of the questionnaire in a way that cannot be achieved from the bilingual experts’ reviews.

Retrospective debriefing interview is another qualitative technique to test the comprehensibility of the questionnaire. In this technique the patient is asked to complete the questionnaire, then the interviewer reviews the form to check for missing data or other problems. Next, the interviewer uses a retrospective debriefing interview using structured and unstructured questions to ask the patient if there were any items that were difficult to understand or were irrelevant or offensive. Also, the interviewer asks if there were topics that the patient wished to see included, and if the patient had any other comments to make in general (Eremenco et al., 2005).

#### 2.4.9 Review of Cognitive Debriefing Results and Finalization

A review of the cognitive debriefing results against the original version of the instrument is key to assure cultural relevance. This review should be agreed on between the project manager and the key in-country person (Wild et al., 2005). It is desirable that the author knows the source language and the target language to mediate in the process of

adaptation (Steele, 2003). At the end of this process, a pre-final version is generated. The new translated version is sent to the authors of the original version for their approval before testing.

#### *2.4.10 Testing of the Pre Final Version*

Testing gives information about the measurement properties of the translated instrument. The most important part of this process is to check the comprehensibility with patients and experts.

#### *2.4.11 Expert Panel Testing*

The expert panel testing is recommended to determine the conceptual and content equivalence of the pre-final version. Six to ten members of an expert panel assess the conceptual equivalences (clarity) of the instructions, the response format, and the items on the instrument. These members must have knowledge about the content areas of the construction of the instrument, as well as know the target population in which the instrument will be used. Their native language must be the target language of the instrument.

The expert panel is asked to evaluate the content validity of the questionnaire. Each item of the questionnaire is evaluated in its sufficiency, clarity, coherence, and relevance (Escobar-Pérez & Cuervo-Martínez, 2008) using the following scale: 1 = not relevant; 2 = unable to assess relevance; 3 = relevant but needs minor alteration; 4 = very relevant and succinct. Sousa and Rojjanasrirat (2011) explains the process of analysis of content validity as follows:

Items classified as unclear (score 1 (not relevant) or 2 (unable to assess relevance) by at least 20% of the committee members must be revised and re-

evaluated. Each member of the committee who rates any item of the instrument as unclear is asked to provide suggestions as to how to rewrite the statements to make the language clearer. The minimum inter-rater agreement among the experts' panel is 80%). The content validity index at the item level (I-CVI) and at the scale level (S-CVI) could be calculated. Items that do not achieve the minimum acceptable indices are revised and re-evaluated and new content validity indices are calculated. The process continues until acceptable indices of content-related validity or content equivalence are achieved (p. 271).

#### *2.4.12 Patient Testing*

A sample size of 10–40 individuals is recommended for patient testing (Beaton et al., 2000; Eremenco et al., 2005). Participants should be recruited from the target population in which the instrument will be used. Each participant is asked to rate the instructions and items of the scale using a dichotomous scale (response options: clear or unclear). Participants who rate any item of the instrument as unclear are asked to provide suggestions as to how to rewrite the statements to make the language clearer. Instructions, response format, and items of the instrument that are found to be unclear by at least 20% of the sample must be re-evaluated. This step is used to further support the conceptual, semantic, and content equivalency of the translated instrument. Also, this step will help to improve the structure of sentences used in the instructions and will make items easily understood by the target population prior to the final psychometric testing.

The new instrument should retain both the item-level characteristics such as item-to-scale correlations and internal consistency; and the score-level characteristics of reliability, construct validity, and responsiveness. It is possible to work some of these tests of reliability and validity into the pre-testing process (Beaton et al., 2000). Eremenco et al. (2005) recommends a pre-final version testing with a bilingual sample of

patients (if it is accessible). This step may be difficult and unrealistic, and it is rarely used.

#### *2.4.13 Proofreading*

Proofreading is like a final quality control step to ensure that any minor errors are corrected before the translated items are approved (Wild et al., 2005).

#### *2.4.14 Final Testing*

The final step is a full assessment of the psychometric properties. At least 10 subjects per item should be used (Sousa & Rojjanasrirat, 2011). The psychometric properties validity and reliability in measurement scales are explained later in this chapter.

#### *2.4.15 Final Reports: Documenting the Process and Results*

This step is recommended to document the translation process, the testing process, and any changes made to the translation as a result of the testing procedure (Eremenco et al., 2005; Maneesriwongul & Dixon, 2004). In this report, the authors clarify the reasons for translation/word choices made throughout the translation process. The methodology used and an item-by-item description of the translation decisions undertaken during the whole process should be included (Wild et al., 2005).

### 2.5 Evaluation of Readability

The measurement of readability is used to evaluate how easy is to read a document base on the grade level of the reader (Bensley & Brookins-Fisher, 2019). Readability can be evaluated in questionnaires using formulas that rate the health

materials and questionnaires in relation to the education level of the reader. They are based on the fact that a text is easier to read the shorter its words and phrases are.

There are some formulas in Spanish to evaluate readability. The Fry method is a common tool used to measure readability of texts in English. This tool analyzes the text using a graph that evaluate the number of syllables and phrases on a text. Those number are located into the graph to find the grade level necessary to understand the text. This method was adapted into Spanish by Gilliam et al. (1980).

### 2.6 Achieving Equivalence in the Translated Document

The adaptation process should verify that the translated instrument is equivalent to the source instrument. Herdman et al. (1998) points out six equivalences based on a universal approach to cross-cultural research. The universal approach considers that there are changes in content and organization of concepts across cultures. Based on this approach, a questionnaire developed for use in one culture will be not acceptable for use in another culture. The universal approach to cross-cultural research implies the need to establish whether a concept exists and if it is interpreted similarly across cultures.

The following definitions and concepts are mainly extracted from the article: “A Model of Equivalence in the Cultural Adaptation of Health Related Quality of Life (HRQoL) Instruments: the Universal Approach” (Herdman et al., 1998). Also, it includes information extracted from books related to the process of translation and cultural adaptation.

### 2.6.1 Conceptual Equivalence

Conceptual equivalence consists of exploring the construct of interest and the weights given to its different constituent domains in the place of origin and in the target population where the instrument will be used (Reichenheim & Moraes, 2007).

According to Herdman et al. (1998) the conceptual equivalence can be achieved through a variety of approaches. Using local literature, ethnographies, as well as publications of perceptions of health well-being, illness, and disease in the target language and communities. Also, using discussions with a group of experts in the target culture. The range of experts consulted should be broad including, for example, anthropologists, medical sociologists, linguists, as well as health professionals. If the topic is related with perceptions, for example, quality of life, a wider representation of the general population can be involved.

### 2.6.2 Item Equivalence

Item equivalence exists when items/words estimate the same parameters, and they are equally relevant and acceptable in both cultures. When items or parts of items need to be replaced, it is very important to be clear about the purpose of the item. The item equivalence might be explored using different approaches as the Delphi technique. The possible outcomes of investigating item equivalence are:

- a) Items can be used in the target language without modification (other than a translation).
- b) Items require minor modifications but may be used more or less in their original form.

- c) Replacement items must be used.
- d) Neither existing nor replacement items can be used because they are considered offensive or taboo. In this case, it may be possible to omit items, but it would be necessary to revalidate the questionnaire and to re-examine its psychometric properties.

### 2.6.3 Semantic Equivalence

Semantic equivalence aims to explore whether the different domains covered by the original instrument in defining the concepts of interest would be relevant and pertinent to the new context to which it is being adapted (Herdman et al., 1998). The evaluation of semantic equivalence involves the ability to transfer meaning from the concepts contained in the original instrument to the new questionnaire, providing a similar effect on respondents in both cultures (Reichenheim & Moraes, 2007).

Herdman et al. (1998) explain that to achieve semantic equivalence it is important that key words or expressions within the questionnaire be clearly understood. This should be the first task of any translation. When translators become aware of a variety of possible meanings, they can contact the original developers for clarification. Establishing the meaning of items, words, or phrases in the source language is one of the most common problems faced in the process of translation. For example, the word “distress” can be difficult to translate into other languages, because different cultures have different ways of classifying the experience of suffering. The lexical relationships of particular words or phrases in both source and target languages, can be further explored using checklists. Also, it is important that the translator be able to express the original message

as accurately, clearly, and naturally as possible. It may be useful to contact university translation/linguists' departments to help in this process. The possible outcomes of evaluating semantic equivalence are:

- a) Items are easy to translate.
- b) Items are difficult to translate.
- c) Items are impossible to translate.

#### 2.6.4 Operational Equivalence

Operational equivalence refers to the possibility of using similar questionnaire format, instructions, mode of administration and measurement methods (Herdman et al., 1998). The outcomes of assessing operational equivalence are:

- a) The same methods (mode of administration, measurement methods, format, time frame, etc.) can be used.
- b) Some aspects of operationalization need to be different.
- c) It is impossible to achieve operational equivalence.

#### 2.6.5 Measurement Equivalence

Measurement equivalence refers to ensuring that different language versions of the same instrument achieve acceptable levels in terms of their psychometric properties (reliability, responsiveness, and construct validity).

#### 2.6.6 Functional Equivalence

The functional equivalence is an assessment of the degree to which the other types of aforementioned equivalence have been achieved. It is the extent to which an



instrument does what it is supposed to do equally well in two or more cultures (Herdman et al., 1998).

The process of translation and cultural adaptation is not a simple process. The values reflected by an instrument and the meanings of its component constructs may vary from one culture to another. Also, finding the best terms that expressed the equivalence could be time-consuming. However, the more rigor and sensitivity in the process will contribute to having well-adapted instruments that facilitate to the cross-cultural research and the best clinical practices.

### 2.7 Validity and Reliability in Measurement Scales

The quality of a measuring instrument basically depends on two properties: its reliability and its validity. As it is explained by Bhattacharjee (2012), validity ensures that the scale indeed measure the construct that is wanted to be measured (the scale is “valid”). Reliability ensures that the construct is measured consistently and precisely (the scale is “reliable”). Reliability and validity, jointly called the “psychometric properties” of measurement scales, are the yardsticks against which the adequacy and accuracy of the measurement procedures are evaluated in scientific research.

#### 2.7.1 Validity

Validity refers to the extent to which a measure adequately represents the underlying construct that it is supposed to measure. According to Bhattacharjee (2012), validity can be assessed using theoretical or empirical approaches, and it should ideally be measured using both approaches.

Theoretical assessment is called translational validity (or representational validity). Translational validity focuses on how well the idea of a theoretical construct is translated into or represented in an operational measure. Translational validity is established by measuring face and content validity. Content validity is the extent to which a measure appears to measure the characteristic it is supposed to measure. Content validity is examined using an expert panel of judges (Escobar-Pérez & Cuervo-Martínez, 2008; Lynn, 1986). The number of judges to employ varies according to the level of expertise and the diversity of knowledge. The range is between 10 and 20 experts. If 80% of the experts have agreed with the validity of an item, it can be incorporated into the instrument (Escobar-Pérez & Cuervo-Martínez, 2008).

Empirical assessment of validity examines how well a given measure relates to one or more external criterion, based on empirical observations. This type of validity is called criterion-related validity, which includes four sub-types: convergent, discriminant, concurrent, and predictive validity (Bhattacharjee, 2012). The author make the following definitions of these terms:

Convergent validity: “the closeness with which a measure relates to (or converges on) the construct that it is purported to measure”.

Discriminant validity: “the degree to which a measure does not measure (or discriminates from) other constructs that it is not supposed to measure”.

Concurrent validity:” examines how well one measure relates to other concrete criterion that is presumed to occur simultaneously”.

Predictive validity: is “the degree to which a measure successfully predicts a future outcome that it is theoretically expected to predict” (p. 59-60).

### 2.7.2 Reliability

Reliability is the degree to which the measure of a construct is consistent. In other words, “if we use this scale to measure the same construct multiple times, we get pretty

much the same result every time, assuming the underlying phenomenon is not changing” (Bhattacharjee, 2012, p.55). Reliability can be established in four ways: inter-rater reliability, test-retest reliability, split-half reliability, and internal consistency reliability.

Inter-rater reliability or inter-observer reliability is a measure of consistency between more than one independent raters that evaluate the same test. Test-retest reliability is “a measure of consistency between two measurements (tests) of the same construct administered to the same sample at two different points in time. If the observations have not changed substantially between the two tests, then the measure is reliable”(Bhattacharjee, 2012, p. 57).

In split-half reliability the entire instrument is administered to a sample of respondents, later the two halves of a test are compared to evaluate the correlation between them. The two halves could be determined randomly or by choosing odd/even questions; unequal halves are allowed if the total number of items is odd (Bhattacharjee, 2012; Cook & Beckman, 2006). Internal consistency is the most common measure of reliability. It measures how well the score for individual items correlate with the others (Cook & Beckman, 2006). The extent to which respondents rate the items in a similar manner is a reflection of internal consistency (Bhattacharjee, 2012). Internal consistency is calculated using Cronbach’s alpha.

## CHAPTER 3

### METHODOLOGY

The present study had three main goals:

1. To produce the Colombian Spanish translation of the Bristol COPD Knowledge Questionnaire.
2. Complete the cultural adaptation of the Spanish version of the Bristol COPD Knowledge Questionnaire.
3. Measure the content validity of the Colombian Spanish version of the Bristol COPD Knowledge Questionnaire using the expert judgment of health care professionals.

#### 3.1 Participants

- Forward translators: Translator A (the researcher) was a bilingual physiotherapist with 20 years of experience in the field of respiratory care. Translator B was a bilingual woman native and living in Colombia, 30 years old with no medical background. Translator B had master's degree in translation and interpretation and 6 years of experience in the field of translation. Both translators were native speakers of Colombian Spanish.
- Back translator: Bilingual English native person with medical background (nurse).
- Linguist: A native speaker of Colombian Spanish, professional linguist with four years of experience in the cultural adaptation of health questionnaires in topics related to quality of life, self-efficacy, adherence, and behavioral determinants. He was a graduate student in a Master's in education and media program.

- Informants: Following Steele and Edwards's recommendations (2008) the researcher considered important the use of informants. They were people who their first language was Spanish with good knowledge of English. They helped in the process of translation review specifically assisting in the identification and exploration of the meaning of Spanish words or phrases that could be used in the questionnaire. These informants were native people from Colombia with or without a medical background.
- Clinicians The clinicians were used in two moments:
  - Consultation after synthesis meetings and after back translation review: Health care professionals helped in the translation of items that were difficult to translate in the synthesis meetings or that not reach equivalence after the back translation review.
  - Professional pretesting (measurement of content validity): Health care professionals (physiotherapists, respiratory therapists, nurses, physicians) who worked in the area of respiratory care with knowledge and experience in the area of education to people with COPD.

### 3.2. Recruitment Strategies for the Participants

- Translator, back translator, and linguist: The translator and back translators were recruited through the online platform Upwork (<https://www.upwork.com/>). The linguist was recruited through a Colombian university that offers studies in this area.
- Informants: The informants were people with/without a medical background known to the researcher and were reached by phone and e-mail.

- Health care professionals: The researcher reached out to the health care professionals working in the respiratory area through messages by social media, e-mail, or by phone.

### 3.3 Procedures

#### 3.3.1 Phases

Table 4 shows the steps taken for translation, cultural adaptation, and measuring of content validity of the Colombian Spanish version of the BCKQ.

Table 4. Steps for the Process of Translation, Cultural Adaptation, and Measurement of Content Validity of the BCKQ

<b>Activity</b>	<b>Date</b>	<b>Description of the activity</b>	<b>People involved in the process</b>
Preparation	May 2020	<ol style="list-style-type: none"> <li>1. Contacting the author of the original questionnaire for permission</li> <li>2. Contacting the forward translators and back translator</li> <li>3. Contacting the support people in the process of translation (key in-country person, translator B, and linguist)</li> <li>4. Submission to the research proposal to the Institutional Review Board (IRB)</li> </ol>	Researcher
<u>Phase 1</u> Forward translation and Synthesis I	June 2020	<ol style="list-style-type: none"> <li>1. Process of forward translation. Obtaining two translations of the questionnaire Documentation of the process of translation</li> <li>2. Synthesis of forward translations. Obtaining the reconciled version in Spanish Documentation of the synthesis process</li> <li>3. Reaching out informants to help in the translation of items pending after the synthesis meeting</li> </ol>	2 forward translators  Researcher (translator A) Translator B Key in-country person Linguist  Researcher

(table continues)

Activity	Date	Description of the activity	People involved in the process
<u>Phase 2</u> Back translation. Review and synthesis II.	July 2020	1. Back translation  2. Back translation review. Collect the item history options in each translation and synthesis to detect items difficult to translate  3. Reaching out informants to help in the translation of items pending after the back translation review  4. Obtaining a Spanish pre-final version to be tested with health care professionals	1 Bilingual English native person with medical background (nurse).  Researcher (translator A) Key in country person  Researcher Informants  Researcher
<u>Phase 3</u> Measurement of content validity	Aug. 2020-  Mar. 2021  June 2021	1. Record the video with the instructions to the health care professionals 2. Design of the Excel template  3. Contact of health care professionals to measure content validity  4. Compile the Excel templates to conduct the statistical analysis	Researcher  Researcher and 10 Health care professionals  Researcher
<u>Phase 4</u> Statistical analysis and interpretation of results	July 2021	Data Analysis: Measurement of content validity indexes Measurement of readability	Researcher
Proofreading and approval from BCKQ authors	August 2021	The Spanish final version was sent to the author of the original version for approval	Researcher
Final report	July – Sep. 2021	Documentation of the process, review of results	Researcher

### 3.4 Data Collection

This research project received approval from the Institutional Review Board of the University of Northern Iowa on July 10, 2020.

The process to obtain the content validity rating was designed following the steps proposed by Escobar-Pérez and Cuervo-Martínez (2008) with modifications as noted:

1. Define the objective of expert judgment: The purpose of the judgment experts was a) rate the clarity, coherence, relevance, and sufficiency of the questionnaire and (b) evaluate the cultural adaptation (evaluating if the items measure the same constructs from the original culture in the Colombian culture).
2. Selection of judges. 10 experts were chosen: physicians, physiotherapists, respiratory therapists, and nurses from different cities in Colombia with experience in the field of education to people with COPD. In the case of the non-medical health care professionals, it will be mandatory that they have at least three years of experience in the field of education to people with COPD. In the case of physicians, the criteria to be included should be having at least three years of experience in the management of people with COPD in pulmonary rehabilitation programs, integrated care programs, or in primary care settings.
3. Explanation of the dimensions and the indicators that each of the test items is measuring. This information was extracted from the original questionnaire, and it was explained to the health care professionals in the video.
4. Specify the objective of the test: The objective of the test was to evaluate knowledge in people in any stage of COPD.
5. Design of the evaluation template: A template in Excel was designed to measure the clarity, coherence, relevance of the items and sufficiency of the five items of each dimension. The template also included the measurement of clarity of the instructions.
6. The answers from the health care professionals were compiled in an Excel document to facilitate the data analysis.



7. Measurement of Agreement: Escobar-Pérez and Cuervo-Martínez (2008) recommend to measure concordance between judges using Kappa statistics. However, in this research the concordance between judges was measured using content validity indexes.
8. Elaboration of the conclusions of the content validity of the test.

The health care professionals who took part in process of measurement of content validity were contacted by the researcher via email or social media through a cover letter (See Appendices C and D) explaining the objectives of the research. After agreeing to participate, the researcher sent the informed consent and the video explaining the goals of the study. In the video the health care professionals received information about the objectives of the study and the explanation of the criteria to be used in the qualification of the items of the questionnaire. Also, in the video the researcher explained how to fill in the template to evaluate the content validity of the questionnaire. The researcher used a script to explain the process of rating the questionnaire. The duration of the video was 15 minutes. Once the health care professional watched the video and sent back the informed consent, the researcher sent the evaluation template (in Excel format) so that the clinician could proceed independently to carry out the judgment. The researcher's contact information was provided for the resolution of questions. The following data of the clinicians were obtained: name, age, academic training, area of work (outpatient, inpatient, pulmonary rehabilitation, integrated care, home care), and years of experience in the management of people with COPD.

### 3.5. Instruments

The following documents are included to this document as appendices:

1. Informed consent for the translator and linguist English version (APPENDIX A)
2. Informed consent for the translator and linguist Spanish version (APPENDIX B)
3. Cover letter for health care professional's English version (APPENDIX C)
4. Cover letter for health care professional's Spanish version (APPENDIX D)
5. Informed consent for health care professional's English version (APPENDIX E)
6. Informed consent for health care professional's Spanish version (APPENDIX F)
7. Criteria to elaborate the Excel template to rank the content validity of the questionnaire English version (APPENDIX G).
8. Criteria to elaborate the Excel template to rank the content validity of the questionnaire Spanish version (APPENDIX H).
9. Original English Version of the Bristol COPD Knowledge Questionnaire (APPENDIX I)
10. Colombian Spanish Version of the Bristol COPD Knowledge Questionnaire (APPENDIX J)

### 3.6. Data Analysis

After receiving the answers, the researcher reviewed and double-checked that the Excel templates had no missing answers. The researcher reached out to the health care professionals to obtain any missing answers. After that, the data were grouped into one Excel document to proceed with the calculation of content validity indexes.

For the measurement of content validity the author followed the recommendations of Almanasreh et al. (2019). The clarity, coherence, and relevance for each item was calculated counting the number of experts that rated each item as 3 or 4 (valid) and dividing them by 10 (the total of experts). Then the average content validity index (Avg.-CVI) was calculated per each dimension adding each item-CVI dividing them by 5 (the number of items in each dimension). Finally, the average content validity for clarity, coherence, and relevance for the whole questionnaire was calculated adding the results of each item-CVI and dividing them by 65 (the total number of items of each dimension in the questionnaire.)

For the sufficiency and the clarity of instructions, the number of experts that rated each item as 3 or 4 (valid) was counted, and then that result was divided by 10 (the total of experts).

## CHAPTER 4

### RESULTS

#### 4.1. Process of Translation and Cultural Adaptation

The researcher carried out the process of translation and cultural adaptation in seven stages to produce a good-quality translation and adaptation of the questionnaire into Colombian Spanish.

##### 4.1.1 Preparation

The original author of the of the Bristol COPD Knowledge Questionnaire (BCKQ) Dr. Roger White granted permission to perform the translation. The support people for the process (linguist, translators, and the key in country person) agreed to participate in the translations and in the synthesis meetings.

##### 4.1.2 Initial Forward Translations

Translator A made the translation of each item consulting four internet translators (Bing, Collins, deepL, and Google Translate). The translation for each item was chosen using the words/phrasing that best approached to the terms used by patients in the Colombian context. The translator B used the software Omega T for professional translators and the terminological dictionary Proz (<https://www.proz.com/search>). Also, she consulted US government web resources in the National Library of Medicine with information for patients in Spanish and in English to find equivalent terms from English to Spanish. Translators A and B used literal translation, transposition, and equivalence as translation techniques. The report made by the translator B is available in Appendix K.

Literal translation is the translation that follows closely the form and words of the source language. An example of this translation technique is shown in item 4d:

Breathlessness is a normal response to exercise. The item translated into Spanish was: *La falta de aire es una respuesta normal al ejercicio.*

For the transposition technique the order of the subject or verb are changed in the translated item. For example, in item 5e: Clearing phlegm can be assisted by breathing exercises, the translation of breathing exercises was put at the beginning to the sentence: *Algunos ejercicios respiratorios pueden ayudar a expulsar las flemas.*

In equivalence, any words that cannot be literally translated from the source language into the target language, are replaced with words or phrases that maintain the meaning in the target language. For example, in item 6a: Chest infections often cause coughing of blood, the word coughing of blood cannot be translated as *tos de sangre* because that term is not used in Colombian Spanish. For this item the phrase chose was *tos con sangre*. The item was translated: *Las infecciones respiratorias suelen provocar tos con sangre.*

#### 4.1.3 Synthesis Meeting

The synthesis meetings were held to review the Spanish translation A and B of the questionnaire and to obtain a first BCKQ synthesized version in Spanish. The meeting took place via Zoom in two sessions with a total of 3.5 hours. During the meeting each participant chose one of the translated options (translation A or translation B), looking for an agreement. If there was no agreement, the participants discussed the arguments for choosing each option. When neither of the two translations satisfied the participants, they

made a new translation for the item looking for words and phrases that maintain the meaning of the items in Colombian Spanish.

After the synthesis meeting just one item did not reach consensus. It was item 8b: stopping smoking will slow down further lung damage. For this item, it was necessary to consult with two pulmonologists who are experts in tobacco addiction. The translation chosen for this item after their feedback was: *Dejar de fumar disminuye el riesgo de un mayor daño pulmonar*. Comparison of the two forward translations, the original version in English and the post-synthesis meeting version is in Table 5. The written report made by the linguist summarizing the linguist adaptations during the synthesis meeting is available in Appendix L.

Table 5. Comparison of the Two Forward Translations, the Original Version in English, and the Post-Synthesis Meeting Version

Original version	Translation 1	Translation 2	Synthesis version
This questionnaire is designed to find out what you know about your lung problem. It should be completed without help from anyone else. This usually takes between 10 and 20 minutes. Your answers will help us to find out what information you need to help you to understand and manage your lung condition. Mark the circle which you think is the correct answer.	<i>Este cuestionario está diseñado para averiguar lo que usted sabe sobre su enfermedad pulmonar. Debe ser completado sin ayuda de nadie más. Responder el cuestionario le tomará entre 10 y 20 minutos, Sus respuestas nos ayudarán a averiguar qué información necesita para ayudarle a entender y controlar su condición pulmonar. Marque el círculo que cree que es la respuesta correcta.</i>	<i>Este cuestionario está diseñado para averiguar lo que sabe sobre su problema pulmonar. Debe ser completado sin ayuda de nadie más. Esto suele tardar entre 10 y 20 minutos. Sus respuestas nos ayudarán a descubrir la información que necesita para ayudarle a entender y manejar su condición pulmonar. Marque el círculo que crea que es la respuesta correcta.</i>	<i>Este cuestionario está diseñado para averiguar lo que usted sabe sobre su condición pulmonar. Debe ser completado sin ayuda de nadie más. Responder el cuestionario le tomará entre 10 y 20 minutos. Sus respuestas nos ayudarán a averiguar qué información necesita para ayudarle a entender y controlar su condición pulmonar. Marque el círculo que considera que es la respuesta correcta.</i>
True/False/I don't know	<i>Verdadero/Falso/No sé.</i>	<i>Verdadero/falso/No sabe</i>	<i>Verdadero/Falso/No sé.</i>
<b>1. In COPD:</b>	<b><i>1. En EPOC:</i></b>	<b><i>1. En la EPOC:</i></b>	<b><i>1. En la EPOC (Enfermedad Pulmonar Obstructiva Crónica):</i></b>
a. In COPD the word “chronic” means it is severe.	<i>a. En EPOC la palabra "crónica" significa que la enfermedad es severa</i>	<i>a. En la EPOC la palabra "crónica" significa que es grave.</i>	<i>En la EPOC, la palabra "crónica" significa que la enfermedad es grave.</i>
b. COPD can only be confirmed by breathing test.	<i>b. La EPOC solo se puede confirmar por medio de una prueba de respiración</i>	<i>b. La EPOC sólo puede confirmarse mediante pruebas respiratorias.</i>	<i>b. La EPOC solo se puede confirmar por medio de una prueba de respiración.</i>
c. In COPD there is usually gradual worsening over time.	<i>c. En la EPOC generalmente hay un empeoramiento gradual con el tiempo.</i>	<i>c. La EPOC suele empeorar gradualmente con el tiempo.</i>	<i>c. En la EPOC, generalmente hay un empeoramiento gradual con el tiempo.</i>
d. In COPD oxygen levels in the blood are always low.	<i>d. En la EPOC, los niveles de oxígeno en la sangre siempre son bajos.</i>	<i>d. En la EPOC los niveles de oxígeno en la sangre siempre son bajos.</i>	<i>d. En la EPOC, los niveles de oxígeno en la sangre siempre son bajos.</i>
e. COPD is unusual in people less than 40 years old.	<i>e. La EPOC es rara en personas menores de 40 años</i>	<i>e. La EPOC es inusual en personas menores de 40 años.</i>	<i>e. La EPOC es poco común en personas menores de 40 años.</i>

<b>2. COPD</b>	<b>2. EPOC</b>	<b>2. EPOC:</b>	<b>2. EPOC:</b>
a. More than 80% of COPD cases are caused by cigarette smoking.	<i>a. Más del 80% de los casos de EPOC son causados por fumar cigarrillo.</i>	<i>a. Más del 80% de los casos de EPOC son causados por fumar cigarrillos.</i>	<i>a. Más del 80% de los casos de EPOC son causados por fumar cigarrillo.</i>
b. COPD can be caused by occupational dust exposure.	<i>b. La EPOC puede ser causada por la exposición a polvos en el trabajo.</i>	<i>b. La EPOC puede deberse a la exposición al polvo en el trabajo.</i>	<i>b. La EPOC puede ser causada por la exposición a ciertos tipos de polvos en el trabajo.</i>
c. Longstanding asthma can develop into COPD.	<i>c. El asma de larga duración puede convertirse en EPOC</i>	<i>c. El asma crónico puede convertirse en EPOC.</i>	<i>c. El asma crónica puede convertirse en EPOC.</i>
d. COPD is commonly an inherited disease.	<i>d. La EPOC es generalmente una enfermedad hereditaria.</i>	<i>d. La EPOC es por lo general una enfermedad hereditaria.</i>	<i>d. La EPOC es generalmente una enfermedad hereditaria.</i>
e. Women are less vulnerable to the effects of cigarette smoking than men.	<i>e. Las mujeres son menos vulnerables que los hombres a los efectos del consumo del cigarrillo.</i>	<i>e. Las mujeres son menos vulnerables que los hombres a los efectos del cigarrillo.</i>	<i>e. Las mujeres son menos vulnerables que los hombres a los efectos de fumar cigarrillo.</i>
<b>3. The following symptoms are COMMON in COPD:</b>	<b>3. Los siguientes síntomas son COMUNES en la EPOC:</b>	<b>3. Los siguientes síntomas son COMUNES en la EPOC:</b>	<b>3. Los siguientes síntomas son COMUNES en la EPOC:</b>
a Swelling of ankles	<i>a. Inflamación de los tobillos.</i>	<i>a. Hinchazón de los tobillos.</i>	<i>a. Inflamación (hinchazón) de los tobillos.</i>
b Fatigue (tiredness)	<i>b Fatiga (cansancio).</i>	<i>b. Fatiga (cansancio).</i>	<i>b Fatiga (cansancio).</i>
c Wheezing	<i>c. Sibilancias (pitos o silbidos en el pecho)</i>	<i>c. Sibilancias o un silbido al respirar.</i>	<i>c. Sibilancias (pitos o silbidos al respirar).</i>
d Crushing chest pain	<i>d. Dolor opresivo en el pecho</i>	<i>d. Dolor aplastante en el pecho.</i>	<i>d. Dolor opresivo (presión) en el pecho.</i>
e Rapid weight loss	<i>e. Pérdida rápida de peso</i>	<i>e. Pérdida rápida de peso.</i>	<i>e. Pérdida rápida de peso.</i>
<b>4 Breathlessness in COPD:</b>	<b>4. Dificultad para respirar (ahogo) en la EPOC</b>	<b>4. La falta de aliento en la EPOC:</b>	<b>4. La falta de aire (ahogo) en la EPOC:</b>
a Severe breathlessness prevents travel by air.	<i>a. La dificultad respiratoria severa impide viajar en avión.</i>	<i>a. La falta de aliento grave impide viajar en avión.</i>	<i>La falta de aire grave impide viajar en avión.</i>
b Breathlessness can be worsened by eating large meals.	<i>b. La dificultad para respirar puede empeorar si se comen grandes cantidades de comida.</i>	<i>b. La falta de aliento puede empeorar si se come mucho.</i>	<i>La falta de aire puede empeorar si se comen grandes cantidades de comida.</i>
c Breathlessness means that your oxygen levels are low.	<i>c. La dificultad para respirar indica que sus niveles de oxígeno son bajos.</i>	<i>c. La falta de aliento significa que sus niveles de oxígeno son bajos.</i>	<i>La falta de aire indica que sus niveles de oxígeno en la sangre son bajos.</i>



d Breathlessness is a normal response to exercise.	<i>d. La dificultad para respirar es una respuesta normal al ejercicio.</i>	<i>d. La falta de aliento es una respuesta normal al ejercicio.</i>	<i>La falta de aire es una respuesta normal al ejercicio.</i>
e Breathlessness is primarily caused by a narrowing of the bronchial tubes.	<i>e. La dificultad para respirar es causada principalmente por un estrechamiento de los bronquios</i>	<i>e. La falta de aliento es causada principalmente porque los bronquios se estrechan.</i>	<i>la falta de aire es causada principalmente por un estrechamiento de los bronquios.</i>
<b>5 Phlegm (sputum):</b>	<b>5 Flema (Esputo):</b>	<b>5 Flema (esputo):</b>	<b>5 Flema (esputo):</b>
a Coughing phlegm is a common symptom in COPD.	<i>a. La tos con flema es un síntoma común en la EPOC.</i>	<i>a. La tos con flema es un síntoma común en la EPOC.</i>	<i>a. La tos con flema es un síntoma común en la EPOC.</i>
b Clearing phlegm is more difficult if you get dehydrated.	<i>b. Expulsar las flemas es más difícil si usted está deshidratado.</i>	<i>b. Eliminar la flema es más difícil si está deshidratado.</i>	<i>b. Expulsar las flemas es más difícil si usted está deshidratado.</i>
c Bronchodilator inhalers can help clear phlegm.	<i>c. Los inhaladores broncodilatadores pueden ayudar a eliminar las flemas.</i>	<i>c. Los inhaladores broncodilatadores pueden ayudar a eliminar la flema.</i>	<i>c. Los inhaladores broncodilatadores pueden ayudar a expulsar las flemas.</i>
d Phlegm causes harm if swallowed.	<i>d. Las flemas causan daño si se tragan</i>	<i>d. La flema causa daño si se ingiere.</i>	<i>d. Las flemas causan daño si se tragan.</i>
e Clearing phlegm can be assisted by breathing exercises.	<i>e. Hay ejercicios respiratorios que pueden ayudar a expulsar las flemas</i>	<i>e. Los ejercicios de respiración pueden ayudar a eliminar la flema.</i>	<i>e. Algunos ejercicios respiratorios pueden ayudar a expulsar las flemas.</i>
<b>6 Chest infections / exacerbations:</b>	<b>6 Infecciones / exacerbaciones respiratorias</b>	<b>6 Infecciones de pecho / exacerbaciones:</b>	<b>6 Infecciones respiratorias y exacerbaciones:</b>
a Chest infections often cause coughing of blood.	<i>a. Las infecciones respiratorias suelen provocar tos con sangre.</i>	<i>a. Las infecciones en el pecho suelen provocar tos con sangre.</i>	<i>a. Las infecciones respiratorias suelen provocar tos con sangre.</i>
b With chest infections phlegm usually becomes coloured.	<i>b. Con las infecciones respiratorias, las flemas generalmente cambian de color (amarillo o verde).</i>	<i>b. En las infecciones en el pecho, la flema suele ser de color amarillo o verde.</i>	<i>b. En las infecciones respiratorias, las flemas generalmente cambian de color (amarillo o verde).</i>
c Exacerbations (episodes of worsening) can occur in the absence of a chest infection.	<i>c. Las exacerbaciones (episodios de empeoramiento) pueden ocurrir aunque no haya una infección respiratoria.</i>	<i>c. Las exacerbaciones (episodios de empeoramiento) pueden ocurrir aún cuando no hay una infección en el pecho.</i>	<i>c. Las exacerbaciones (episodios de empeoramiento) pueden ocurrir incluso cuando no hay una infección respiratoria.</i>
d Chest infections are always accompanied by a high temperature.	<i>d. Las infecciones respiratorias siempre van acompañadas de temperatura alta.</i>	<i>d. Las infecciones en el pecho siempre van acompañadas de una temperatura alta.</i>	<i>d. Las infecciones respiratorias siempre van acompañadas de temperatura corporal alta.</i>
e Steroid tablets should be taken whenever there is an exacerbation.	<i>c. Siempre que haya una exacerbación deben tomarse pastillas de esteroides</i>	<i>e. Las pastillas de esteroides deben tomarse siempre que haya una exacerbación.</i>	<i>e. Cada vez que haya una exacerbación se deben tomar pastillas de esteroides.</i>

<b>7 Exercise in COPD:</b>	<b>7. Ejercicio en EPOC</b>	<b>7. Ejercicio en la EPOC:</b>	<b>7. Ejercicio en la EPOC:</b>
a Walking is better exercise than breathing exercises to improve fitness.	<i>a. Caminar es mejor ejercicio que los ejercicios respiratorios para mejorar la condición física.</i>	<i>a. Caminar es mejor que los ejercicios de respiración para mejorar la condición física.</i>	<i>a. Caminar es mejor que los ejercicios respiratorios para mejorar la condición física.</i>
b Exercise should be avoided as it strains the lungs.	<i>b. Se debe evitar el ejercicio, ya que esfuerza los pulmones.</i>	<i>b. El ejercicio debe evitarse ya que sobrecarga los pulmones.</i>	<i>b. Se debe evitar el ejercicio, ya que esfuerza los pulmones.</i>
c Exercise can help maintain your bone density.	<i>c. El ejercicio puede ayudar a mantener la densidad de los huesos</i>	<i>c. El ejercicio puede ayudar a mantener la densidad ósea.</i>	<i>c. El ejercicio puede ayudar a mantener la densidad de los huesos.</i>
d Exercise helps relieve depression.	<i>d. El ejercicio ayuda a aliviar la depresión.</i>	<i>d. El ejercicio ayuda a aliviar la depresión.</i>	<i>d. El ejercicio ayuda a aliviar la depresión.</i>
e Exercise should be stopped if it makes you breathless.	<i>e. El ejercicio debe detenerse si causa dificultad para respirar.</i>	<i>e. Se debe detener el ejercicio si éste causa falta de aliento.</i>	<i>e. El ejercicio debe detenerse si siente que le falta el aire.</i>
<b>8 Smoking:</b>	<b>8. Fumar</b>	<b>8. Fumar:</b>	<b>8. Fumar:</b>
a Stopping smoking will reduce the risk of heart disease.	<i>a. Dejar de fumar reduce el riesgo de enfermedades del corazón.</i>	<i>b. Dejar de fumar reducirá el riesgo de enfermedades cardíacas.</i>	<i>a. Dejar de fumar reduce el riesgo de enfermedades del corazón.</i>
b Stopping smoking will slow down further lung damage.	<i>b. Dejar de fumar enlentecerá el daño pulmonar.</i>	<i>c. Dejar de fumar reducirá un futuro daño pulmonar.</i>	<i>b. Dejar de fumar disminuye el riesgo de un mayor daño pulmonar.</i>
c Stopping smoking is pointless as the damage is done.	<i>c. Dejar de fumar es inútil porque el daño ya está hecho.</i>	<i>d. Dejar de fumar no tiene sentido puesto que el daño ya está hecho.</i>	<i>c. Dejar de fumar es inútil porque el daño ya está hecho.</i>
d Stopping smoking usually results in improved lung function.	<i>d. Dejar de fumar generalmente resulta en una mejor función pulmonar.</i>	<i>e. Dejar de fumar suele producir una mejora de la función pulmonar.</i>	<i>d. Dejar de fumar generalmente resulta en una mejor función pulmonar.</i>
e Nicotine replacement therapy is only available on prescription.	<i>e. La terapia de reemplazo de nicotina sólo se puede adquirir con fórmula médica.</i>	<i>f. La terapia de reemplazo de nicotina sólo está disponible con receta médica.</i>	<i>e. La terapia de reemplazo de nicotina sólo se puede conseguir con fórmula médica.</i>
<b>9 Vaccination:</b>	<b>9. Vacunación</b>	<b>9. Vacunación</b>	<b>9. Vacunación:</b>
a A flu jab is recommended every year.	<i>a. Se recomienda vacunarse contra la gripa (influenza) todos los años.</i>	<i>a. Se recomienda una vacuna contra la gripa cada año.</i>	<i>a. Se recomienda vacunarse contra la gripa (influenza) cada año.</i>
b You can get flu from having a flu jab.	<i>b. Usted puede contraer la gripa (influenza) por aplicarse la vacuna antigripal.</i>	<i>b. Puede contraer la gripa por una vacuna contra la gripa.</i>	<i>b. Usted puede contraer la gripa por aplicarse la vacuna antigripal.</i>

c You can only have a flu jab if you are 65 or over.	<i>c. Usted sólo puede recibir la vacuna antigripal si tiene 65 años o más.</i>	<i>c. Sólo puede recibir una vacuna contra la gripa si tiene 65 años o más.</i>	<i>c. Usted sólo puede recibir la vacuna antigripal si tiene 65 años o más.</i>
d A pneumonia jab protects against all forms of pneumonia.	<i>d. Una vacuna de neumonía protege contra todas las formas de neumonía.</i>	<i>d. Una vacuna contra la neumonía protege contra todas las formas de neumonía.</i>	<i>d. Una vacuna contra la neumonía protege contra todas las formas de neumonía.</i>
e You can have a pneumonia jab and a flu jab on the same day.	<i>e. Usted puede recibir una vacuna de neumonía y una vacuna de gripa (influenza) el mismo día.</i>	<i>e. Puede vacunarse contra la neumonía y la gripa en el mismo día.</i>	<i>e. Usted puede vacunarse contra la neumonía y contra la gripa el mismo día.</i>
<b>10. Inhaled bronchodilators:</b>	<b>10 Broncodilatadores inhalados</b>	<b>10. Broncodilatadores inhalados</b>	<b>10 Broncodilatadores inhalados:</b>
a All bronchodilators act quickly (within 10 minutes).	<i>a. Todos los broncodilatadores actúan rápidamente (dentro de los primeros 10 minutos).</i>	<i>a. Todos los broncodilatadores actúan rápidamente (en 10 minutos).</i>	<i>a. Todos los broncodilatadores actúan rápidamente (dentro de los primeros 10 minutos).</i>
b Both short and long acting bronchodilators can be taken on the same day.	<i>b. Los broncodilatadores de acción corta y de acción prolongada se pueden tomar el mismo día.</i>	<i>b. Los broncodilatadores de corta y larga duración se pueden tomar el mismo día.</i>	<i>b. Los broncodilatadores de acción corta y de acción prolongada se pueden tomar el mismo día.</i>
c Spacers (e.g. volumatic, nebulizer, aerochamber) should be dried with a towel after washing.	<i>c. Los espaciadores (inhalocámaras) deben secarse con una toalla después de lavarlos.</i>	<i>c. Se deben secar los espaciadores (por ejemplo, volumáticos, nebulizadores, aerocámaras) con una toalla después de lavarlos.</i>	<i>c. Las inhalocámaras (espaciadores) deben secarse con una toalla después de lavarlas.</i>
d Using a spacer device will increase the amount of drug deposited in the lungs.	<i>d. Usar un dispositivo espaciador (inhalocámara) aumentará la cantidad de medicamento que llega a los pulmones.</i>	<i>d. Usar un dispositivo espaciador aumentará la cantidad de medicamento depositada en los pulmones.</i>	<i>d. Usar una inhalocámara aumentará la cantidad de medicamento que llega a los pulmones.</i>
e Tremor may be a side effect of bronchodilators.	<i>e. El temblor puede ser un efecto secundario de los broncodilatadores.</i>	<i>e. Los broncodilatadores pueden causar temblores.</i>	<i>e. El temblor puede ser un efecto secundario de los broncodilatadores.</i>
<b>11 Antibiotic treatment in COPD:</b>	<b>11 Tratamiento con antibióticos en la EPOC:</b>	<b>12. Tratamiento con antibióticos en la EPOC</b>	<b>11 Tratamiento con antibióticos en la EPOC:</b>
a. To be effective, the course should last at least 10 days.	<i>a. Para que sea efectivo, el tratamiento con antibióticos debe durar al menos 10 días.</i>	<i>a. Para ser efectivo, el tratamiento debe durar al menos 10 días.</i>	<i>a. Para que sea efectivo, el tratamiento con antibióticos debe durar al menos 10 días.</i>
b. Excessive use of antibiotics can cause resistant bacteria (germs).	<i>b. El uso excesivo de antibióticos puede causar bacterias (gérmenes) resistentes.</i>	<i>b. El uso excesivo de antibióticos puede causar bacterias resistentes (gérmenes).</i>	<i>b. El uso excesivo de antibióticos puede causar bacterias (gérmenes) resistentes.</i>

c. Antibiotics will clear all chest infections.	<i>c. Los antibióticos eliminarán todas las infecciones respiratorias.</i>	<i>c. Los antibióticos eliminarán todas las infecciones del pecho.</i>	<i>c. Los antibióticos eliminan todas las infecciones respiratorias.</i>
d. Antibiotic treatment is necessary for an exacerbation (worsening) however mild.	<i>d. El tratamiento con antibióticos es necesario para una exacerbación aunque sea leve.</i>	<i>d. Es necesario un tratamiento con antibióticos en caso de una exacerbación (empeoramiento), aunque sea leve.</i>	<i>d. Es necesario un tratamiento con antibióticos en caso de una exacerbación (empeoramiento), aunque sea leve.</i>
e. You should seek advice if antibiotics cause severe diarrhea.	<i>e. Usted debe consultar al médico si los antibióticos causan diarrea severa.</i>	<i>e. Debe buscar atención si los antibióticos causan diarrea grave.</i>	<i>e. Usted debe consultar al médico si los antibióticos causan diarrea severa.</i>
<b>12 Steroid tablets given for COPD (eg. Prednisolone):</b>	<b><i>12 tabletas de esteroides administradas para la EPOC (por ejemplo, prednisolona):</i></b>	<b><i>Pastillas de esteroides administradas para la EPOC (por ejemplo, Prednisolona)</i></b>	<b><i>12. Pastillas de esteroides administradas para la EPOC (por ejemplo, prednisolona):</i></b>
a Steroid tablets help strengthen muscles.	<i>a. Los esteroides ayudan a fortalecer los músculos.</i>	<i>a. Las pastillas de esteroides ayudan a fortalecer los músculos.</i>	<i>a. Las pastillas de esteroides ayudan a fortalecer los músculos.</i>
b Steroid tablets should be avoided if there is a chest infection.	<i>b. Las pastillas de esteroides deben evitarse si hay una infección en el pecho.</i>	<i>b. Las pastillas de esteroides deben evitarse si hay una infección en el pecho.</i>	<i>b. Las pastillas de esteroides deben evitarse si hay una infección respiratoria.</i>
c The risk of long-term side effects due to steroids is less with short courses than with continuous treatment.	<i>c. El riesgo de efectos secundarios a largo plazo debido a los esteroides es menor con tratamientos cortos que con tratamientos prolongados.</i>	<i>c. El riesgo de efectos secundarios a largo plazo a causa de los esteroides es menor con los tratamientos cortos que con el tratamiento continuo.</i>	<i>c. Los efectos secundarios a largo plazo de los esteroides son menores con tratamientos cortos que con tratamientos prolongados.</i>
d Indigestion is a common side effect from using steroid tablets.	<i>d. La indigestión es un efecto secundario común del uso de las pastillas de esteroides.</i>	<i>d. La indigestión es un efecto secundario común del uso de pastillas de esteroides.</i>	<i>d. La indigestión es un efecto secundario común del uso de pastillas de esteroides.</i>
e Steroid tablets can increase your appetite.	<i>e. Las pastillas de esteroides pueden aumentar el apetito.</i>	<i>e. Las pastillas de esteroides pueden aumentar el apetito.</i>	<i>e. Las pastillas de esteroides pueden aumentar el apetito.</i>
<b>13 Inhaled steroids (brown, red or orange):</b>	<b><i>13 Esteroides inhalados (marrón, rojo o naranja):</i></b>	<b><i>13 Esteroides inhalados (marrón, rojo o naranja):</i></b>	<b><i>13. Esteroides inhalados (marrón, rojo o naranja):</i></b>
a Inhaled steroids should be stopped if you are given steroid tablets.	<i>a. Usted debe suspender los esteroides inhalados si le administran esteroides en pastillas.</i>	<i>a. Los esteroides inhalados deben ser suspendidos si se administran pastillas de esteroides.</i>	<i>a. Usted debe suspender los esteroides inhalados si le recetan pastillas de esteroides.</i>
b Steroid inhalers can be used for rapid relief of breathlessness.	<i>b. Los esteroides inhalados se pueden usar para aliviar rápidamente el ahogo.</i>	<i>b. Se pueden utilizar inhaladores de esteroides para aliviar rápidamente la falta de aliento.</i>	<i>b. Los esteroides inhalados se pueden usar para aliviar rápidamente el ahogo.</i>

c Spacer devices reduce the risk of getting thrush in the mouth.	<i>e. Los dispositivos espaciadores (inhalocámaras) reducen el riesgo de contraer hongos en la boca.</i>	<i>c. Los dispositivos espaciadores reducen el riesgo de contraer candidiasis oral.</i>	<i>e. Usar inhalocámara (espaciador) reduce el riesgo de contraer hongos en la boca.</i>
d Steroid inhaler should be taken before your bronchodilator.	<i>d. Los esteroides inhalados deben aplicarse antes del broncodilatador.</i>	<i>d. Se debe usar el inhalador de esteroides antes del broncodilatador.</i>	<i>d. Se debe aplicar el esteroide inhalado antes del broncodilatador.</i>
e Inhaled steroids improve lung function in COPD.	<i>e. Los esteroides inhalados mejoran la función pulmonar en la EPOC.</i>	<i>e. Los esteroides inhalados mejoran la función pulmonar en la EPOC.</i>	<i>e. Los esteroides inhalados mejoran la función pulmonar en la EPOC.</i>

#### 4.1.4 Back Translation

The Colombian Spanish version completed in the synthesis meeting was sent to the bilingual translator to perform the translation from Spanish into English. The back-translation was received after two days.

#### 4.1.5 Review of Back Translation

The two physiotherapists who participated in the synthesis meeting reviewed the two versions in English (the original English version and the English back-translated version). In general, the back translation maintained the concepts and adaptations made during the synthesis meeting. However, three items did not reach equivalence with the questionnaire in English. The researcher submitted those items to be reviewed by experts and informants to choose the best translation options. In these items, the researcher requested them to suggest the best translation for the phrasal verbs “can develop”, “be administered”, and for the adverb “often.”

#### 4.1.6 Consultation with Informants

The informants were two clinicians and three lay people. The two clinicians were an internist and a pulmonologist with experience in the management of patients with COPD. The three lay people were bilingual Colombian people, professionals in different areas without medical knowledge. The researcher sent them the information via e-mail. Two translation alternatives were offered, with the option of suggesting another choice if either of the two offered was not appropriate. After receiving the answers, those that prevailed among them were included in the final Spanish version. Table 5 describes the translation options for each item.

Table 6. Options Chosen by Clinicians and Informants for the Items that Remained not Equivalent After Back-Translation Review

Original item	Translation options	Chosen translation
2c. Longstanding asthma can develop into COPD.	<i>a. El asma crónica puede convertirse en EPOC. b. Las personas con asma crónica pueden desarrollar EPOC.</i>	<i>Las personas con asma crónica pueden desarrollar EPOC.</i>
6a. Chest infections often cause coughing of blood.	<i>a. Las infecciones respiratorias suelen provocar tos con sangre. b. Las infecciones respiratorias con frecuencia provocan tos con sangre.</i>	<i>Las infecciones respiratorias con frecuencia provocan tos con sangre.</i>
13d. Inhaled steroid should be administered before the bronchodilator.	<i>a. Se debe aplicar el esteroide inhalado antes del broncodilatador. b. Se debe usar el esteroide inhalado antes del broncodilatador.</i>	<i>Se debe usar el esteroide inhalado antes del broncodilatador.</i>

#### 4.1.7 Finalization and Proofreading

The researcher included the translation chosen by the experts and informants into the final questionnaire in Word format. The Final Spanish version was typed in font Arial 10 points size. The Colombian Spanish version of the questionnaire was sent to Dr. Roger White, original author of the questionnaire, who granted his approval of this version. The Final Colombian Spanish version is available in Appendix J.

#### 4.2 Equivalence of the Spanish Version of the BCKQ

Table 7 shows the adaptations made to achieve content equivalence, item equivalence, and semantic equivalence of the questionnaire in the Colombian context.

##### 4.2.1 Conceptual Equivalence

To achieve conceptual equivalence, the participants in the process of translation and cultural adaptation should explore the construct of interest to look into the domains included in the original questionnaire. This was accomplished by the non-medical translator consulting the information for COPD patients available at the United States National Library of Medicine (<https://medlineplus.gov/spanish/copd.html>) and the

United States National Heart, Lung, and Blood Institute

(<https://www.nhlbi.nih.gov/health-topics/espanol/epoc>) to explore the construct of interest (COPD knowledge) and to explore the language used for patients.

During the synthesis meeting, the participants consulted the COPD clinical practice guide for patients and caregivers of the Ministry of Health and Social Protection of Colombia (available at <http://gpc.minsalud.gov.co>) to find the best translations of medical terms into patient language. During the synthesis meeting the physiotherapists clarified some concepts to the non-medical translator and the linguist that lead them to express more properly some items of the questionnaire. After that, the items were adapted in consensus to make the questionnaire more understandable.

#### 4.2.2 Item/Word Equivalence

Item equivalence exists when words estimate the same parameters, and they are equally relevant and acceptable in both cultures. During the synthesis meeting, the professionals used words that were common in the Colombian context, trying to maintain a relevant and acceptable language in Colombian culture. Some items could be translated without modification, such as the words “fatigue (tiredness)” which were literally translated as *fatiga (cansancio)*, or “inhaled bronchodilators” which were translated as *broncodilatadores inhalados*.

Other items required minimal modifications such as the word “severe” which was translated as *grave* or the word “longstanding” which was translated as *crónica*. In some items, extra words were included to give a better meaning to the translated expressions.



For example, the term “high temperature” was expressed as *alta temperatura corporal* and “oxygen levels” as *niveles de oxígeno en la sangre*.

Some items were difficult to translate and adapt. For example, the word “crushing” in item 3d, the expressions “large meals” in item 4b, and “clearing phlegm” in the items of dimension 5, as well as the verb “slow down” in item 8b. These terms were adapted to the Colombian context using common terminology used by health professionals when addressing patients or by common expressions use by patients in the Colombian context consulting the Colombian COPD clinical practice guide aforementioned.

Some items containing adverbs that imposed difficulties in their translations. In the English version of the BCKQ questionnaire there were five items that included adverbs (usually, commonly, and often). In the creation of questionnaires Brislin (1986) recommend avoid adverbs telling “where” or “when” (e.g. frequently, beyond, upper) because there are not often direct equivalent of those words in the other languages.

#### 4.2.3 Semantic Equivalence

Semantic equivalence involves the ability to transfer meaning from the concepts contained in the original instrument to the new questionnaire (Reichenheim & Moraes, 2007). During the synthesis meetings, some additions and adaptations were made to transfer the meaning of the concepts contained in the original questionnaire in English to the questionnaire in Spanish. The meeting participants decided to spell out the abbreviation EPOC when it appears the first time in the questionnaire. In some items, common medical expressions were maintained in the questionnaire next to common

expressions. For example, *esputo* next to the term *flema* (in dimension 5), *gérmenes* next to the term *bacterias* in item 11b and *episodios de empeoramiento* next to the word *exacerbaciones*.

The medical term *sibilancias* was not modified, given the difficulty of finding a lexical construction in Spanish. This term was maintained by adding in parentheses the phraseological unit *silbidos al respirar* contained in the guidelines for COPD of the Government of Colombia. *Falta de aire (ahogo)* was used as the translation of “breathlessness”, based on conceptual equivalences available on the official guides of the Government of Colombia aforementioned. The term *densidad* (item 7c) and *grandes cantidades de comida* (item 4d) was suggested to be presented to patients to explore its comprehensibility.

#### 4.2.4 Aspects of Form Included in the Questionnaire

The sentence structure of subject + verb + complement was maintained when possible. As mentioned before, in some items, medical terms were maintained adding the common terms used for patients. The pronoun *usted* (as translation of “you”) was maintained in cases where the items refer directly to the patient (for treatment, for example). Text readability of the questionnaire using the Fry method adapted to Spanish texts by Gilliam et al. (1980) showed that the grade needed to understand the questionnaire is 6<sup>th</sup> grade.

Table 7. Adaptations Made to Achieve Equivalence of the Bristol COPD Knowledge Questionnaire in Spanish

Original item	Adaptations made to achieve equivalence	Final translation in Spanish
2b. COPD can be caused by occupational dust exposure.	Although it did not appear in the original questionnaire, the words “ <i>ciertos tipos</i> ” was included to specify that not all dust to which people are exposed during work activities, causes COPD.	<i>2b. La EPOC puede ser causada por la exposición a ciertos tipos de polvos en el trabajo.</i>
1e. COPD is unusual in people less than 40 years old.	For the word the unusual some options emerged: <i>rara, inusual, or poco común</i> . The latter was chosen to express that the disease is uncommon in people under 40 years.	<i>1e. La EPOC es poco común en personas menores de 40 años.</i>
10c. Spacers (e.g. volumatic, nebulizer, aerochamber) should be dried with a towel after washing.	In the items that included the word <i>espaciadores</i> the term <i>inhalocámaras</i> was included as complementary to the original term spacers since the word <i>inhalocámaras</i> is more common in the Colombian medical context. In item 10c, the examples of the types of spacers were omitted (e.g. volumatic, nebulizer, aerochamber) since they are not common brands in the Colombian context.	<i>10 c. Las inhalocámaras (espaciadores) deben secarse con una toalla después de lavarlas.</i>
11e. You should seek advice if antibiotics cause severe diarrhea.	For the translation of “seek advice” two options emerged: <i>consultar al médico</i> or <i>acudir a los servicios de salud</i> . The expression <i>consultar al médico</i> was chosen since it is more characteristic of the Colombian context.	<i>11e. Usted debe consultar al médico si los antibióticos causan diarrea severa.</i>
Items in dimension 12 and item 13a and 6e.  Example: 12 a. Steroid tablets help strengthen muscles.	It was decided to use the expression <i>pastillas de esteroides</i> instead of <i>tabletas</i> (for the translation of “tablets”) since the word <i>pastillas</i> is more in line with Colombian Spanish.	<i>Ejemplo: 12 a. Las pastillas de esteroides ayudan a fortalecer los músculos.</i>
8a. Stopping smoking will reduce the risk of heart disease.  11c. Antibiotics will clear all chest infections.	It was chosen to use the indicative present tense in some items originally written in future tense (using will as a conditional in English) since they are intended to be presented as factual facts.	<i>8a. Dejar de fumar reduce el riesgo de enfermedades del corazón.</i>  <i>11c. Los antibióticos eliminan todas las infecciones respiratorias.</i>
10 d. Using a spacer device will increase the amount of drug deposited in the lungs.  13 a. Inhaled steroids should be stopped if you are given steroid tablets.	Other terms were adapted to make them less formal for the Colombian context, such as <i>que llega</i> instead of <i>depositada</i> (for the word “deposited”) or <i>recetan</i> instead of <i>administran</i> (for the translation of “given”).	<i>10d. Usar una inhalocámara aumentará la cantidad de medicamento que llega a los pulmones.</i>  <i>13a. Usted debe suspender los esteroides inhalados si le recetan pastillas de esteroides.</i>

Ítems contenidos en la dimensión 6, 11c y 12b.  Example: 6a. Chest infections often cause coughing of blood.	The translation <i>infección respiratoria</i> was chosen instead of <i>infección en el pecho</i> for the translation of “respiratory infection”, because the former was more relevant to the instrument.	Example: 6a. <i>Las infecciones respiratorias suelen provocar tos con sangre.</i>
7c. Exercise can help maintain your bone density.  8a. Stopping smoking will reduce the risk of heart disease.	Some medical terms were changed to explain the medical concepts in a language for patients. “Bone density” were translated as <i>densidad de los huesos</i> instead of <i>densidad ósea</i> and the term “heart disease” was translated as <i>enfermedades del corazón</i> instead of <i>enfermedades cardiacas</i> .	7c. <i>El ejercicio puede ayudar a mantener la densidad de los huesos.</i>  8a. <i>Dejar de fumar reduce el riesgo de enfermedades del corazón.</i>
3d. Crushing chest pain	The word "crushing" is translated as <i>aplastante</i> or <i>abrumador</i> , however, considering that in the health context the term to refer to chest pain is <i>dolor opresivo en el pecho</i> , this former phraseological unit was chosen including the word <i>presión</i> in parentheses to add meaning to the term <i>opresivo</i> .	3d. <i>Dolor opresivo (presión) en el pecho</i>
4b. Breathlessness can be worsened by eating large meals.	The expression “large meals” was difficult to adapt because it was not found a word in Spanish for the term "large" used in English to express a large meal. Therefore it was decided to use the phraseological unit <i>grandes cantidades de comida</i> , recommending to evaluate its understanding by the patients.	4b. <i>La falta de aire puede empeorar si se comen grandes cantidades de comida.</i>
5b Clearing phlegm is more difficult if you get dehydrated.	The expression <i>expulsar las flemas</i> was chosen as equivalent to “clearing phlegm”.	5b. <i>Expulsar las flemas es más difícil si usted está deshidratado.</i>

#### 4.3 Documenting Content Validity

Eleven health care professionals agreed to participate and gave the informed consent to participate in the measurement of content validity. Two health care professionals requested extra explanations about the way to fill out the Excel format. One professional did not send back the answers of the questionnaire, so the responses of ten health care professionals were included in the data analysis. The characteristics of the professionals who participated in rating the content validity appear in table 8.

Table 8. Characteristics of the Health Care Professionals Who Participated in the Content Validity Evaluation

Judge	Sex	Age	Academic Training	Field of Expertise	Years of experience	City
1	Woman	58	Physiotherapist	Pulmonary Rehab / Hospital Care	28	Cali
2	Man	57	Physician	Home Care Chronic Respiratory Care / Palliative Care	34	Bogotá
3	Woman	42	Physiotherapist	Integrated Care / Home Care	19	Bogotá
4	Man	44	Pulmonologist	Pulmonary Function Tests / COPD	10*	Bogotá
5	Man	38	Pulmonologist	Hospital Care / Ambulatory Care	7*	Bucaramanga
6	Woman	39	Physiotherapist	Pulmonary Rehab / Integrated Care	12	Yopal
7	Woman	35	Nurse	University Teaching	14	Bogotá
8	Woman	56	Physiotherapist	Pulmonary Rehab / Hospital Care	26	Bucaramanga
9	Woman	55	Respiratory Therapist	Home Care Chronic Respiratory Care / Pulmonary Rehab	28	Bogotá
10	Man	42	Pulmonologist	Ambulatory Care	12*	Bogotá

\* For the pulmonologist the years of experience reported is the years as pulmonologist.

#### 4.3.1. Content Validity Indexes

The results of the content validity indexes for each item are shown in Table 9 and the content validity index for each dimension are shown in table 10. Thirty-three of the 65 items achieved universal agreement (items that were scored 1 for all the experts for clarity, coherence, and sufficiency). According to Escobar-Pérez and Cuervo-Martínez (2008) the items can be incorporated in the questionnaire if 80% of the experts have agreed with the validity of an item. Clarity and coherence for all items scored between 0.8 and 1. For relevance, two of the 65 items, obtained a score of 0.7. The researcher decided to include them into the questionnaire although the rank was below 0,8. Those items were:

- *2e. Las mujeres son menos vulnerables que los hombres a los efectos de fumar cigarrillo.*
- *5d. Las flemas causan daño si se tragan.*

Table 9. Content Validity Indexes for Each of the 65 Items of the BCKQ

<b>Dimension</b>	<b>Item</b>	<b>Clarity</b>	<b>Coherence</b>	<b>Relevance</b>
<i>1. En la EPOC</i>	1.a.	1	1	1
	1.b.	0.9	1	1
	1.c.	1	1	1
	1.d.	1	0.9	1
	1.e.	1	1	0.9
<i>2. EPOC</i>	2.a.	1	1	1
	2.b.	1	1	1
	2.c.	1	0.9	0.9
	2.d.	1	1	0.9
	2.e.	1	0.9	0.7
<i>3. Síntomas comunes en la EPOC</i>	3.a.	0.9	0.9	0.8
	3.b.	1	1	1
	3.c.	1	1	1
	3.d.	0.9	0.9	0.9
	3.e.	0.9	0.9	0.9
<i>4. La falta de aire (ahogo) en la EPOC</i>	4.a.	1	0.8	0.9
	4.b.	0.9	1	1
	4.c.	0.9	1	1
	4.d.	0.9	1	1
	4.e.	1	1	1
<i>5. Flema (esputo)</i>	5.a.	1	1	1
	5.b.	1	0.9	1
	5.c.	1	1	1
	5.d.	1	0.9	0.7
	5.e.	1	1	1
<i>6. Infecciones respiratorias y exacerbaciones</i>	6.a.	1	0.9	1
	6.b.	1	1	1
	6.c.	1	1	1
	6.d.	1	1	1
	6.e.	1	1	1
<i>7. Ejercicio en la EPOC</i>	7.a.	1	1	1
	7.b.	1	0.9	1
	7.c.	1	0.9	1
	7.d.	1	1	1
	7.e.	1	1	1

(table continues)

<b>Dimension</b>	<b>Item</b>	<b>Clarity</b>	<b>Coherence</b>	<b>Relevance</b>
<i>8. Fumar</i>	8.a.	1	1	0.9
	8.b.	1	1	1
	8.c.	1	0.9	0.9
	8.d.	1	0.9	1
	8.e.	1	0.9	0.9
<i>9. Vacunación</i>	9.a.	1	1	1
	9.b.	1	1	1
	9.c.	1	0.9	0.9
	9.d.	1	0.9	0.9
	9.e.	1	1	1
<i>10. Broncodilatadores Inhalados</i>	10.a.	1	1	1
	10.b.	1	1	1
	10.c.	1	0.9	0.9
	10.d.	1	1	1
	10.e.	1	1	1
<i>11. Tratamiento con antibióticos en la EPOC</i>	11.a.	1	1	0.8
	11.b.	1	1	1
	11.c.	1	0.9	0.9
	11.d.	1	1	1
	11.e.	1	1	1
<i>12. Pastillas de estroides administradas para la EPOC</i>	12.a.	1	0.9	0.8
	12.b.	0.9	1	1
	12.c.	0.9	1	1
	12.d.	1	1	1
	12.e.	1	1	0.9
<i>13. Esteroides Inhalados</i>	13.a.	1	1	1
	13.b.	1	1	1
	13.c.	1	1	1
	13.d.	1	0.9	1
	13.e.	1	1	1

Table 10. Content Validity Indexes for Each Dimension of the BCKQ

	<b>Clarity</b>	<b>Coherence</b>	<b>Relevance</b>	<b>Sufficiency</b>
Avg. CVI 1. <i>En la EPOC</i>	0.98	0.98	0.98	0.90
Avg. CVI 2. <i>EPOC</i>	1.00	0.96	0.90	0.90
Avg. CVI 3. <i>Síntomas en EPOC</i>	0.94	0.94	0.92	0.90
Avg. CVI 4. <i>Falta de aire (ahogo) en la EPOC</i>	0.94	0.96	0.98	0.90
Avg. CVI 5. <i>Flema</i>	1.00	0.96	0.94	1.00
Avg. CVI 6. <i>Infecciones respiratorias</i>	1.00	0.98	1.00	1.00
Avg. CVI 7. <i>Ejercicio en EPOC</i>	1.00	0.96	1.00	1.00
Avg. CVI 8. <i>Fumar</i>	1.00	0.96	0.94	0.9
Avg. CVI 9. <i>Vacunación</i>	1.00	0.96	0.96	0.9
Avg. CVI 10. <i>Broncodilatadores inhalados</i>	1.00	0.98	0.98	1.00
Avg. CVI 11. <i>Antibióticos</i>	1.00	0.98	0.94	0.90
Avg. CVI 12. <i>Pastillas de esteroides</i>	0.96	0.98	0.94	0.90
Avg. CVI 13. <i>Esteroides inhalados</i>	1.00	1.00	1.00	0.90
Avg. CVI for each criteria	0.99	0.97	0.96	0.93

Avg.: Average. CVI: Content validity index



## CHAPTER 5

### SUMMARY, DISCUSSION AND RECOMMENDATIONS

#### 5.1 Summary

This thesis describes the process of translation and cultural adaptation of the Bristol COPD Knowledge Questionnaire (BCKQ) into Colombian Spanish. The process followed internationally accepted standards including steps of preparation, forward translations, synthesis of forward translations, back translation, review of back translation, and proofreading of the final Colombian Spanish version. Experts and informants were consulted in the process to achieve equivalence of the questionnaire. The researcher also measured content validity using the help of ten health care professionals who evaluated the clarity, coherence, relevance, and sufficiency of the questionnaire.

In the process of patient education, it is important to have baseline measurements that allow the professionals to plan programs and measure the results of those interventions. The BCKQ is a questionnaire that covers many of the topics to measure COPD knowledge, including common misconceptions that are important to address in any educational activity. Also, as the BCKQ Questionnaire is widely used, having a Colombian Spanish version will allow researchers and health care professionals to compare results between different countries and cultures.

The Colombian Spanish version of the BCKQ will be an academic tool to measure knowledge of COPD in students and health care professionals that will

allow them to find gaps, improve their knowledge, and respond with the best care of the patients with COPD. The Spanish version of the BCKQ also can serve as a reference in the development and translation or generation of other instruments in the field of respiratory health.

## 5.2 Discussion

At a glance, the BCKQ in English seemed feasible to translate and to adapt. Unlike questionnaires that evaluate perceptions, attitudes, or subjective constructs, the BCKQ evaluates facts which made its adaptation straightforward. The discrepancies that arise in the translation of questionnaires are most common in instruments that evaluate feelings and emotions like depression inventories (Steele & Edwards, 2008). Although the BCKQ questionnaire contains 65 items, which could have made the translation process cumbersome, the items are short, with each item containing an average of 10.6 words. The short items minimized the challenges in the process of translation and adaptation. DuBay et al. (2021) in their study about the translation of an autism screening tool, found that the items that imposed a high challenge to translate contained an average of 17.1 words in contrast with the low-challenge items that contained 13.3 words per item. Low challenge items describe simple concepts and lack complex syntax or language structures. Brislin (1986) suggests that sentences should be simple and short and contain fewer than sixteen words.

For the translation and cultural adaptation of the BCKQ, the researcher followed the steps proposed for the guidelines available to this process, however

some variations were made to make the process run effectively and in a reasonable time frame. For the forward translation, the researcher chose to act as the medical translator. Even though she is not a certified translator, she is a bilingual person and had experience in translating texts from Spanish into English and from English to Spanish. Most importantly, she is a physiotherapist with 20 years of experience in the field of respiratory care and pulmonary rehabilitation. This saved time and money and allowed her to get a precise knowledge of the questionnaire that was useful for the synthesis meeting, back translation review, and for the process of clarification of items when the help of experts and informants were required.

Although the guidelines available for the process of translation of health instruments suggest that the medical translators must be experts in the process of translation, it is also important that they have a profound knowledge of the topic being translated. There are jargon and vocabulary specific to the material being translated that are not achieved by professional translators even if they are considered experts in health subjects. In the study by Tsai et al. (2018) even though the translators provided by an agency of professional translators were classified as experts in the health matter, they resulted to only had minimal knowledge of the health system and its terminology. In the study of Lindberg et al. (2021), one of the barriers encountered in translated materials was that some professional translations were “inaccurate or written at a reading level above the literacy level of the participants” (p. 444).

Having knowledge of the source and target language is important for the researchers that participate in the process of translation and cultural adaptation. Steele and Edwards (2008) indicate that researchers cannot simply rely on the process of translation, back translations, and committee approaches. They must take the responsibility of analyzing the problems presented during the process and use a problem-oriented approach to reach a better solution on a case-by-case basis. The authors found that when the researchers have limited knowledge of the target language it is difficult to mediate when differences in interpretations appear.

The strategy to work with few people in the synthesis meeting allowed for the discussion to be precise and the sessions to be completed without major issues. For the synthesis meetings, it is key to consider the time, attitude, and costs of the people who participate in them. Steele and Edwards (2008) found that sometimes participants have busy schedules that make difficult to participate in the sessions. They also found that participants can assume a passive role in the sessions or avoid meetings making the process time consuming.

The step of preparation that included the contact and agreement of translator B, the linguist, and the key in-country person made the process of translation and synthesis meeting organized and run smoothly. During the review of translations and adaptation, it was difficult to balance making a translation accessible for patients and trying not to over-simplify complex medical terms. The partnership between translators, the key in-country person, and the linguist, besides

the experience of each of them in their areas of knowledge, made the process run effectively.

The use of experts was a key part in the process of cultural adaptation. Physicians did not participate in the synthesis meetings. Later, the researcher reached out to two pulmonologists with expertise in smoking cessation to request their suggestions about two items related to smoking that were problematic to adapt in the synthesis meeting. Also, other physicians acted as informants to find the best translation for three items after back translation review. Although for this kind of studies researchers must allocate “sufficient time, effort and budget” (Lindberg et al., 2021, p. 441) to translate and adapt materials, the participation of physicians in the synthesis meetings would have been costly and possibly would have imposed schedules issues. The strategy of present selected portions of the translated documents to native Spanish speaking health care professionals, has been used in other studies to ensure the clarity of translated materials (Lindberg et al., 2021; Tsai et al., 2018).

The participants in the synthesis meeting used some strategies to achieve equivalence of the questionnaire. Cultural differences made that some of the terms in the original questionnaire could not be used in the Colombian Spanish version. To overcome this, a common equivalent term in Spanish was selected using as reference documents from the Ministry of Health and Social Protection available in Colombian Spanish. It was the case in the translation of words like “breathlessness” and “crushing.” Also, although the guidelines for the process of

translation indicate that medical terms should be avoided in questionnaires, that was not possible in the translation of the BCKQ. The strategy in this case was to use the medical terms next to a common term. For example, for the medical term “wheezing”, the translation chosen was *sibilancias (pitos o silbidos al respirar)*. Other examples are *dolor opresivo (presión) en el pecho* for the translation of “crushing chest pain” or *inflamación (hinchazón) de los tobillos* for the translation of “swelling of ankles.” Adding those words offers the option of clarification for the reader and in the same way it serves as a mean to educate the reader about the meaning of these concepts. Offering additional descriptions have been used in other studies to help patients/participants to interpret items accurately (DuBay et al., 2021).

Some items created difficulties in the translation and adaption because adverbs and subjunctive verb forms used in the English version of the BCKQ questionnaire. According to Brislin (1986) in designing a new questionnaire, the authors should notice that some words are impossible to translate into other languages. For example, subjunctive verbs like "could," "should," or "would" rarely have an equivalent term in other languages. These difficulties will limit having versions of a questionnaire in different languages and will prevent a questionnaire be used in different cultures and making comparisons between populations.

The field of measurement of psychometric properties has become increasingly sophisticated (Patalay et al., 2018) and it is a common practice assess

the validity and reliability of a questionnaire before implementing it in clinical practice. However, sometimes the measurement of readability and suitability of questionnaires are skipped in the process of adaptation and validation of questionnaires. There are instruments that have been used in clinical settings but for which the level of readability has not been evaluated.

Patalay et al. (2018) assessed the readability of the Strengths and Difficulties Questionnaire (SDQ) used to measure mental health in children and adolescents. The authors found that the instructions and some of the subscales of the questionnaire have average readability ranging up to 13.9 years. Based on these results the researchers considered the questionnaire unsuitable for children 6- and 8-year-olds and difficult to understand for 11-year-olds despite psychometric validation studies at these ages.

During this study, the researcher did not measure the whole psychometric properties required to implement the BCKQ questionnaire for clinical use due to time constraints. Nonetheless, it was possible to measure the readability of the questionnaire obtaining 6<sup>th</sup> grade as the level of study necessary to understand the questionnaire. In Colombia, COPD is more prevalent in people with low educational level (Caballero et al., 2008) and the level of grades coursed by Colombian people older than 35 years is in average 8.8 (Departamento Nacional de Estadística, 2020). The result of the readability of the Spanish version of the BCKQ suggests that the reading level is suitable for Colombian people living with COPD.

The measurement of content validity was used to assess the representativeness and the content relevance of the items of the questionnaire. The guidelines for the process of adaptation suggests that the questionnaires should be subjected to evaluation of clarity by patients including cognitive interviews, before being tested by clinicians. However, for this project, the researcher first presented the questionnaire to clinicians to verify that the instrument captured the most important aspects of the knowledge of COPD.

The results of the content validity by health professionals, showed that the items in the questionnaire are clear and coherent. Also, the five items included in each dimension were scored as sufficient. Only two items were rated as not relevant using the criteria of content validity index as  $< 0.78$ . There are some discrepancies in the limit that should be considered to exclude an item from a questionnaire. Some authors (Almanasreh et al., 2019; Lynn, 1986; Yusoff, 2019) indicate that items ranking 0.78 or below should be excluded, other authors indicate that items ranking 0.50 or below need to be excluded (Almanasreh et al., 2019; Waltz et al., 2010). For this study, the researcher did not remove those two items from the questionnaire with the plan to present them to patients at a future time. The researcher will decide to keep, further revise or eliminate the items after results of relevance by the patients.

### 5.3 Recommendations

The results of this study are a first step in the process of obtain a valid and reliable questionnaire to measure knowledge in COPD in Spanish. This



questionnaire was not tested in patients to measure clarity and comprehensibility of the items, so this is a next step to follow in this process. The results of the content validity will allow the research to test the relevance of the two items that were ranked as not relevant for the health care professionals and decide if they must be kept in the questionnaire.

Evaluation of other psychometric properties of this questionnaire (i.e., construct validity, concurrent validity, predictive validity, internal consistency, reliability, and repeatability) should be completed before adopting the questionnaire for clinical use.

The researcher considers that measuring the level of readability should be included in the process of developing questionnaires as well as in the process of adaptation of questionnaires that evaluate health conditions. Researchers should facilitate the comprehension of questionnaires with the goal to make them clear and culturally appropriate for people with low levels of literacy. In the generation of new questionnaires researchers should consider the use of short simple sentences and avoid the use of adverbs.

The Colombian Spanish version of the BCKQ can transcend the borders of Colombia, so other professionals in Spanish-speaking countries in Hispanic America can use the questionnaire as a reference to measure knowledge in COPD. However, as linguistic differences exist in the Spanish language spoken in Spain and Latin America, a separated cross-cultural adaptation is needed for using the questionnaire in other Spanish-speaking countries.

The measurement of knowledge is a first step in the evaluation of self-management in people living with COPD. But the translation and adaptation of instruments that measure other constructs like attitudes, skills, or self-efficacy, are needed in Colombian Spanish. Those instruments will be useful for clinicians to measure all the aspects necessary to implement programs that help people with COPD to best manage their disease. Additionally, the objective measure of knowledge, skills, and self-efficacy can guide public policy education programs for people living with chronic respiratory conditions.

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## APPENDIX A

## INFORMED CONSENT FOR TRANSLATOR AND LINGUIST

## (ENGLISH VERSION)

Through this document, you are being invited to participate in a project called: Translation into Spanish and cultural adaptation of the Bristol questionnaire to assess knowledge in people with COPD. This study is carried out by Vilma Gómez, a physiotherapist, student of Master of Community Health at the University of Northern Iowa in the United States.

The study involves translation, back translation, and cultural adaptation of the Bristol COPD knowledge questionnaire. For the study, you agree to participate in two meetings to obtain the synthesis and cultural adaptation of the translated versions. At meetings, you will have contact with other professionals to discuss and analyze the best options for the translation of the questionnaire. The duration of each meeting is expected to be approximately one hour and a half. Therefore, your total time meeting commitment will be approximately 3 hours. It is possible your participation be required in other meetings if a consensus for the translated document cannot be reached in the first two meetings. For the online meetings you will also need access to Microsoft Excel software in a computer, to the zoom club meetings application and to have access to the internet to carry on the virtual meetings.

The study risks are minimal, although you may feel some discomfort answering questions about your opinions, however, it is important that you express your opinions based on all the best knowledge and experience about translation and linguistic options for the questionnaire.

There will be compensation for your time. You will receive 30 dollars for the translation or back-translation of the questionnaire and 15 dollars per hour meeting. The minutes will be rounded to the next 30 minutes after the first hour and the payment will be calculated prorated according to the time spent in the meetings. This survey is confidential. Because the meetings will be carried out by the internet, we cannot guarantee that the data will not be intercepted by others, although this seems unlikely. The meetings will be recorded in order to summarize the synthesis process. The results of these synthesis will be shared in articles and presentations and only members of the research team will have access to the data. The recordings will not be shared with anyone and they will be destroyed once the results of the study are published.

If you have questions about the study, please contact the lead researcher, Vilma Gómez, at xxxxxxxx. If you have questions about the rights of research participants, contact the UNI IRB Administrator at [anita.gordon@uni.edu](mailto:anita.gordon@uni.edu). If you are interested in

participating in the study, please send a confirmation message to my email: xxxxxx informing of your decision:

Agreement to participate:

I, \_\_\_\_\_, DO agree to participate in the meetings to obtain the synthesis of the Spanish version of the Bristol COPD knowledge questionnaire.

-OR-

I, \_\_\_\_\_, do NOT agree to participate in the meetings to obtain the synthesis of the Spanish version of the Bristol COPD knowledge questionnaire.

## APPENDIX B

## INFORMED CONSENT FOR TRANSLATOR AND LINGUIST

## (SPANISH VERSION)

A través de este documento, lo estoy invitando a participar en un proyecto llamado: Traducción al español y adaptación cultural del cuestionario de Bristol para evaluar el conocimiento en personas con EPOC. Este estudio lo lleva a cabo Vilma Gómez, fisioterapeuta, estudiante de la Maestría en Salud Comunitaria de la Universidad del Norte de Iowa en los Estados Unidos.

El estudio implica la traducción, la retro-traducción y la adaptación cultural del cuestionario Bristol de conocimientos de EPOC. Para el estudio, usted acepta participar en dos reuniones para obtener la síntesis y la adaptación cultural de las versiones traducidas. En las reuniones, tendrá contacto con otros profesionales (traductores y fisioterapeutas) para discutir y analizar las mejores opciones para la traducción del cuestionario. Se espera que la duración de cada reunión sea aproximadamente una hora y media. Por lo tanto, el tiempo total de su participación en las reuniones será de 3 horas aproximadamente. Es posible que se requieran realizar más reuniones si en las dos primeras reuniones, no se obtiene un consenso para la traducción del documento. Usted también necesitará acceso al software Microsoft Excel en una computadora, a la aplicación para reuniones virtuales zoom y tener acceso a Internet para llevar a cabo las reuniones virtuales.

Los riesgos del estudio son mínimos, aunque durante las reuniones usted puede sentir cierta incomodidad al responder preguntas sobre sus opiniones, sin embargo, es importante que exprese sus opiniones en función de todos los mejores conocimientos y experiencia profesional que tenga sobre traducción y opciones lingüísticas para el cuestionario.

Habrá una compensación por su tiempo. Usted recibirá 30 dólares por la traducción o retro-traducción del cuestionario y 15 dólares por hora de reunión. Los minutos después de la primera hora serán redondeados a los siguientes 30 minutos y el pago será calculado de acuerdo al total de tiempo de la reunión. Su participación en este estudio es confidencial. Debido a que las reuniones se llevarán a cabo por Internet, no podemos garantizar que los datos no sean interceptados por otros, aunque esto parece poco probable. Las reuniones se grabarán para resumir el proceso de síntesis. Los resultados de esta síntesis se compartirán en artículos y presentaciones y solamente los miembros de equipo de investigación tendrán acceso a la información. Las grabaciones no se compartirán con nadie y se destruirán una vez que se publiquen los resultados del estudio.

Si tiene preguntas sobre el estudio, comuníquese con la investigadora principal,

Vilma Gómez, a xxxxxxxx Si tiene preguntas sobre los derechos de los participantes en la investigación, comuníquese con el Administrador de UNI IRB al correo electrónico: xxxxxxxx Si está interesado en participar en el estudio, envíe un mensaje de confirmación a mi correo electrónico: xxxxxxxx informando su decisión:

Acuerdo para participar:

Yo, \_\_\_\_\_, ACEPTO participar en las reuniones para obtener la síntesis de la versión en español del cuestionario Bristol de conocimiento de la EPOC de

-O-

Yo, \_\_\_\_\_, NO acepto participar en las reuniones para obtener la síntesis de la versión en español del cuestionario Bristol de conocimiento de la EPOC.

## APPENDIX C

## COVER LETTER FOR HEALTH CARE PROFESSIONALS

(ENGLISH VERSION)

Good morning Dr. \_\_\_\_\_

*My name is Vilma Gómez, I am a physical therapist, and I am currently studying for a master's degree in Community Health at the University of Northern Iowa in the United States. I am reaching out to you because I am carrying out a research project that consists of the Spanish translation and cultural adaptation of the Bristol COPD Knowledge Questionnaire. During the project, there are several phases including the content validity of the questionnaire.*

*For this validation phase, I require that health professionals with knowledge and experience in the care of patients with COPD qualify the questionnaire by issuing an expert judgment. In order for you to know what the study consists of, I have made a 15-minute video in which I explain how the evaluation will be done and how to use the questionnaire's qualification format.*

*If you are interested in watching the video to find out about the project, I appreciate you sending your response to my email: xxxxx. Along with the video link, I will send you the informed consent form with all the details of your participation in the study. Remember that you can decide whether or not to participate in the study once you have watched the video and read the informed consent.*

*You will not receive financial compensation for your participation, but if you wish, your name will appear in the acknowledgments of the articles that will be published as a result of this research.*

*Sincerely,  
Vilma Gomez Physiotherapist - Pulmonary Rehabilitation Specialist  
WhatsApp: xxxx  
email: xxxxx*



## APPENDIX D

## COVER LETTER FOR HEALTH CARE PROFESSIONALS

(SPANISH VERSION)

Buenos días Dr. \_\_\_\_\_

*Mi nombre es Vilma Gómez, soy fisioterapeuta y actualmente estoy estudiando una Maestría en Salud Comunitaria en la Universidad del Norte de Iowa en los Estados Unidos. Me pongo en contacto con usted porque estoy llevando a cabo un proyecto de investigación que consiste en la traducción al español y adaptación cultural del cuestionario Bristol para evaluar conocimientos en EPOC. Durante el proyecto hay varias fases incluida la validación de contenido del cuestionario.*

*Para esta fase de validación requiero que profesionales de la salud con conocimiento y experiencia en el cuidado de pacientes con EPOC califiquen el cuestionario emitiendo un juicio de experto. Para que usted conozca en que consiste el estudio yo he realizado un video de 15 minutos en el cual explico cómo se va a hacer la evaluación y como usar el formato de calificación del cuestionario.*

*Si está interesado en ver el video para enterarse del proyecto, agradezco enviar su respuesta a mi correo electrónico: xxxxxxxx. Junto con el link del video, le enviaré el formulario de consentimiento informado con todos los detalles de su participación en el estudio. Recuerde que usted puede decidir si participa o no en el estudio una vez haya visto el video y haya leído el consentimiento informado.*

*Usted no recibirá compensación económica por su participación, pero si lo desea, su nombre aparecerá en los reconocimientos de los artículos que se publicarán como resultado de esta investigación.*

*Atentamente,*

***Vilma Gómez***

*Fisioterapeuta - Esp. Rehabilitación Pulmonar*

*WhatsApp: xxxxxxxx*

*correo electrónico: xxxxxxxx*

## APPENDIX E

## INFORMED CONSENT FOR HEALTH CARE PROFESSIONALS

## (ENGLISH VERSION)

Through this document you are being invited to participate in a research project called: Translation into Spanish and cultural adaptation of the Bristol questionnaire to assess knowledge in people with COPD. This study is carried out by Vilma Gómez, a physiotherapist, student of master's degree in Community Health at the University of Northern Iowa in the United States.

The study involves the measurement of content validity of the questionnaire through a survey of professionals who are experts in the field of health education for patients with COPD. Knowing your professional background in the field of respiratory health, I request your participation to obtain an EXPERT JUDGMENT for the validation of the questionnaire. The total of experts that will participate in this study is 10.

The participation in this study is voluntary and requires you to rate 13 dimensions distributed in 65 questions. You will evaluate clarity, coherence, and relevance of the 65 items of the questionnaire, using a scale of four points for each question. You will evaluate the sufficiency of each domain (13 in total), also using the four-point scale for each question.

To participate in the study, I will send you a video explaining the objective of the questionnaire and how to use the evaluation template (in Excel format). This process takes around 15 minutes. You will also need access to Microsoft Excel software in a computer to rank the questions.

If you agree to participate, I will send you the evaluation instrument (in Excel format) so that you can proceed independently to carry out the evaluation. This will take approximately 45 minutes. If you have any questions during the evaluation you can contact me via email: xxxxxxxx or via WhatsApp: xxxxxxxx.

You might refuse to participate or may discontinue participation in this study at any time.

To know the characteristics of the clinicians who will participate in this study I will collect your name, demographic information (age, sex, city of residence), profession, educational level, and time of experience in the field of education for people with respiratory diseases. Although I would like to acknowledge your contribution when my study is published and/or presented, your individual results will never be shared with anyone. Grouped results will be shared in articles and presentations.

The risks of the study are minimal, although you may feel some uncertainty when answering questions about some questions on the questionnaire. Please, feel free to answer the question using your best criteria and don't hesitate in contact me if you have any questions. Because the information of this study is on the internet, we cannot guarantee that the data will not be intercepted by others, although this seems unlikely. After I receive your survey, I will separate the survey sections and store the demographic information in a different file than the survey responses, and only combine the data during analysis. You will not receive compensation for your time, and there are no direct benefits to you, however, the study will help people who work with respiratory patients to have a valid tool that allows them to measure knowledge in educational programs at different levels of care.

If you have questions about the study, contact the main researcher, Vilma Gómez via email: xxxxxxxx or WhatsApp: xxxxxxxx. If you have questions about your rights of research participant, please contact the administrator of the Institutional Review Board at the University of Northern Iowa by Email: anita.gordon@uni.edu.

If you want to participate in the study, please send a confirmation message to my email: gomezpv@uni.edu informing of your decision:

Agreement to participate:

I, \_\_\_\_\_, DO agree to participate as an EXPERT in evaluating the content of the Spanish version of the Bristol Questionnaire for COPD knowledge.

-OR-

I, \_\_\_\_\_, do NOT agree to participate as an EXPERT in evaluating the content of the Spanish version of the Bristol Questionnaire for COPD knowledge.

Acknowledgment of participation: Please add your authorization or non-authorization to include your name in the acknowledgments of the articles to be published as follows:

I \_\_\_\_\_ DO authorize that my name appears in the acknowledgments of the articles to be published derived from this research process.

-OR-

I \_\_\_\_\_ do NOT authorize that my name appears in the acknowledgments of the articles to be published derived from this research process.

## APPENDIX F

## INFORMED CONSENT FOR HEALTH CARE PROFESSIONALS

## (SPANISH VERSION)

Por medio de este documento usted está siendo invitado a participar en un proyecto denominado: Traducción al español y adaptación cultural del cuestionario Bristol para evaluar conocimientos en personas con EPOC. Este estudio es realizado por Vilma Gómez, fisioterapeuta, estudiante de Maestría en Salud Comunitaria en la Universidad del Norte de Iowa en Estados Unidos.

El estudio implica la validación de contenido del cuestionario por medio de una encuesta a profesionales expertos en el tema de educación en salud a pacientes con EPOC. Conociendo su trayectoria profesional en el campo de la salud respiratoria le solicito su participación para obtener JUICIO DE EXPERTO para la validación del cuestionario. El total de expertos que participaran en el estudio es de 10.

Este estudio es voluntario y requiere que usted califique 13 dimensiones distribuidas en 65 ítems. Usted evaluará la claridad, coherencia y relevancia de los 65 ítems del cuestionario, utilizando una escala de cuatro puntos para cada ítem. Evaluará la suficiencia de cada dominio (13 en total) utilizando también la escala de cuatro puntos.

Para participar en el estudio le enviaré un video explicando el objetivo del cuestionario y como usar la plantilla de evaluación en Excel. La duración del video es de 15 minutos. También necesitará acceso al software Microsoft Excel en un computador para calificar las preguntas.

Posteriormente yo le enviaría el enlace que contiene el instrumento de evaluación (en formato Excel) para que usted proceda de manera independiente a realizar la evaluación. Esto le tomará aproximadamente 45 minutos. Si surge alguna duda durante la evaluación puede contactarme a mi correo electrónico: XXXXXX

Para conocer las características de los profesionales que participarán en este estudio, recopilaré su nombre, información demográfica (edad, sexo, ciudad de residencia), profesión, nivel educativo y tiempo de experiencia en el campo de la educación para personas con enfermedades respiratorias. Aunque me gustaría agradecer su contribución cuando se publique y / o presente mi estudio, sus resultados individuales ni sus datos de identificación nunca se compartirán con nadie. Los resultados agrupados se compartirán en artículos y presentaciones.

Los riesgos del estudio son mínimos, aunque puede sentir cierta incertidumbre al responder preguntas sobre algunos ítems del cuestionario. No dude en responder la

pregunta utilizando su mejor criterio y no dude en ponerse en contacto conmigo si tiene alguna pregunta. Debido a que la encuesta será enviada por Internet, no podemos garantizar que los datos no sean interceptados por otros, aunque es poco probable que esto ocurra. Después de recibir su encuesta, separaré las secciones de la encuesta y almacenaré la información demográfica en un archivo diferente al de las respuestas de la encuesta, y solo combinaré los datos durante el análisis. Solamente los miembros del equipo de investigación tendrán acceso a los datos. No habrá compensación por su tiempo, y no hay beneficios directos para usted, sin embargo, el estudio ayudará a las personas que trabajan con enfermos respiratorios a tener una herramienta válida que les permita medir conocimientos en programas educativos en diferentes niveles de atención.

Usted puede negarse a participar o suspender su participación en este estudio en cualquier momento.

Si tiene preguntas sobre el estudio, comuníquese con la investigadora principal, Vilma Gómez al correo electrónico xxxxxx o al WhatsApp: xxxxxx. Si tiene preguntas sobre sus derechos como participante en la investigación, comuníquese con el administrador del Institutional Review Board de la Universidad del Norte de Iowa al correo electrónico: anita.gordon@uni.edu.

Si desea participar en el estudio envíeme un mensaje de confirmación a mi correo electrónico: gomezpv@uni.edu informándome de su decisión:

1. Acuerdo para participar:

Yo, \_\_\_\_\_, ACEPTO participar como EXPERTO en la evaluación del contenido de la versión en español del Cuestionario de Bristol para el conocimiento de la EPOC.

-O-

Yo, \_\_\_\_\_, NO estoy de acuerdo en participar como EXPERTO en la evaluación del contenido de la versión en español del Cuestionario de Bristol para el conocimiento de la EPOC.

2. Reconocimiento de participación: Agregue su autorización o no autorización para incluir su nombre en los reconocimientos de los artículos que se publicarán de la siguiente manera:

Yo, \_\_\_\_\_ autorizo que mi nombre aparezca en los agradecimientos de los artículos que se publicarán derivados de este proceso de investigación.

-O-

Yo, \_\_\_\_\_ NO autorizo que mi nombre aparezca en los agradecimientos de los artículos que se publicarán derivados de este proceso de investigación.

## APPENDIX G

## CRITERIA TO ELABORATE THE EXCEL TEMPLATE (ENGLISH VERSION)

Evaluation of clarity, coherence, relevance, and sufficiency. Categories and indicators extracted from Escobar-Pérez & Cuervo-Martínez (2008). The template was designed including the 65 items of the questionnaire and for each item the next categories were included:

CATEGORY	INDICATOR
CLARITY	4. The item is clear, has adequate semantics and syntax.
	3. A very specific modification of some of the terms of the item is required.
	2. The item requires quite a lot of modifications or a very large modification in the use of the words according to their meaning or the ordering of them.
	1. The item is not clear.
COHERENCE	4. The item is completely related to the dimension.
	3. The item has a moderate relationship to the dimension.
	2. The item has a tangential relationship to the dimension.
	1. The item has no logical relationship to the dimension.
RELEVANCE	4. The item is very relevant and must be included.
	3. The item is relatively important.
	2. The item has some relevance, but another item may be including what it expresses.
	1. The item can be removed without affecting the dimension.
SUFFICIENCY	4. The items are sufficient to measure the dimension.
	3. Some items must be increased in order to fully evaluate the dimension.
	2. The items measure some aspect of the dimension but do not correspond to the total dimension.
	1. The items are not enough to measure the dimension.

## APPENDIX H

## CRITERIA TO ELABORATE THE EXCEL TEMPLATE (SPANISH VERSION)

Evaluación de claridad, coherencia, relevancia y suficiencia. Categorías e indicadores extraídos de Escobar-Pérez & Cuervo-Martínez (2008). La plantilla se diseñó incluyendo los 65 ítems del cuestionario y para cada ítem se incluyeron las siguientes categorías:

<b>CATEGORÍA</b>	<b>INDICADOR</b>
CLARIDAD	4. El ítem es claro, tiene semántica y sintaxis adecuada
	3. Se requiere una modificación muy específica de algunos de los términos del ítem
	2. El ítem requiere bastantes modificaciones o una modificación muy grande en el uso de las palabras de acuerdo con su significado o por la ordenación de las mismas
	1. El ítem no es claro
COHERENCIA	4. El ítem se encuentra completamente relacionado con la dimensión que está midiendo
	3. El ítem tiene una relación moderada con la dimensión que está midiendo
	2. El ítem tiene una relación tangencial con la dimensión que está midiendo
	1. El ítem no tiene relación lógica con la dimensión que está midiendo
RELEVANCIA	1. El ítem es muy relevante y debe ser incluido
	2. El ítem es relativamente importante
	3. El ítem tiene poca relevancia pero otro ítem puede estar incluyendo lo que mide
	4. El ítem puede ser eliminado sin que se vea afectada la medición de la dimensión
SUFICIENCIA	1. Los ítems son suficientes para medir la dimensión
	2. Se deben incrementar algunos ítems para poder evaluar la dimensión completamente
	3. Los ítems miden algún aspecto de la dimensión pero no corresponden con la dimensión total
	4. Los ítems no son suficientes para medir la dimensión



APPENDIX I  
ENGLISH VERSION OF THE BRISTOL COPD  
KNOWLEDGE QUESTIONNAIRE

**NHS** BRISTOL COPD KNOWLEDGE  
QUESTIONNAIRE (BCKQ)<sup>©</sup>

Name: .....

Date: .....

This questionnaire is designed to find out what you know about your lung problem. It should be completed without help from anyone else. This usually takes between 10 and 20 minutes. Your answers will help us to find out what

information you need to help you to understand and manage your lung condition.

Mark the circle which you think is the correct answer.

<b>1 In COPD:</b>	True	False	Don't Know
<i>a</i> In COPD the word "chronic" means it is severe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> COPD can only be confirmed by breathing tests.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> In COPD there is usually gradual worsening over time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> In COPD oxygen levels in the blood are always low.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> COPD is unusual in people less than 40 years old.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>2 COPD:</b>	True	False	Don't Know
<i>a</i> More than 80% of COPD cases are caused by cigarette smoking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> COPD can be caused by occupational dust exposure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> Longstanding asthma can develop into COPD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> COPD is commonly an inherited disease.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> Women are less vulnerable to the effects of cigarette smoking than men.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3 The following symptoms are COMMON in COPD:</b>	True	False	Don't Know
<i>a</i> Swelling of ankles	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> Fatigue (tiredness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> Wheezing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> Crushing chest pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> Rapid weight loss	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>4 Breathlessness in COPD:</b>	True	False	Don't Know
<i>a</i> Severe breathlessness prevents travel by air.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> Breathlessness can be worsened by eating large meals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> Breathlessness means that your oxygen levels are low.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> Breathlessness is a normal response to exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> Breathlessness is primarily caused by a narrowing of the bronchial tubes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>5 Phlegm (sputum):</b>		<b>True</b>	<b>False</b>	<b>Don't Know</b>
<i>a</i>	Coughing phlegm is a common symptom in COPD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Clearing phlegm is more difficult if you get dehydrated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Bronchodilator inhalers can help clear phlegm.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Phlegm causes harm if swallowed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Clearing phlegm can be assisted by breathing exercises.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>6 Chest infections / exacerbations:</b>		<b>True</b>	<b>False</b>	<b>Don't Know</b>
<i>a</i>	Chest infections often cause coughing of blood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	With chest infections phlegm usually becomes coloured (yellow or green).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Exacerbations (episodes of worsening) can occur in the absence of a chest infection.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Chest infections are always accompanied by a high temperature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Steroid tablets should be taken whenever there is an exacerbation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>7 Exercise in COPD:</b>		<b>True</b>	<b>False</b>	<b>Don't Know</b>
<i>a</i>	Walking is better exercise than breathing exercises to improve fitness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Exercise should be avoided as it strains the lungs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Exercise can help maintain your bone density.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Exercise helps relieve depression.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Exercise should be stopped if it makes you breathless.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>8 Smoking:</b>		<b>True</b>	<b>False</b>	<b>Don't Know</b>
<i>a</i>	Stopping smoking will reduce the risk of heart disease.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Stopping smoking will slow down further lung damage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Stopping smoking is pointless as the damage is done.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Stopping smoking usually results in improved lung function.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Nicotine replacement therapy is only available on prescription.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>9 Vaccination:</b>		<b>True</b>	<b>False</b>	<b>Don't Know</b>
<i>a</i>	A flu jab is recommended every year.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	You can get flu from having a flu jab.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	You can only have a flu jab if you are 65 or over.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	A pneumonia jab protects against all forms of pneumonia.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	You can have a pneumonia jab and a flu jab on the same day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>10</b>	<b>Inhaled bronchodilators:</b>	<b>True</b>	<b>False</b>	<b>Don't Know</b>
<b>a</b>	All bronchodilators act quickly (within 10 minutes).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b</b>	Both short and long acting bronchodilators can be taken on the same day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c</b>	Spacers (e.g. volumatic, nebulizer, aerochamber) should be dried with a towel after washing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d</b>	Using a spacer device will increase the amount of drug deposited in the lungs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e</b>	Tremor may be a side effect of bronchodilators.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>11</b>	<b>Antibiotic treatment in COPD:</b>	<b>True</b>	<b>False</b>	<b>Don't Know</b>
<b>a</b>	To be effective, the course should last at least 10 days.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b</b>	Excessive use of antibiotics can cause resistant bacteria (germs).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c</b>	Antibiotics will clear all chest infections.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d</b>	Antibiotic treatment is necessary for an exacerbation (worsening) however mild.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e</b>	You should seek advice if antibiotics cause severe diarrhoea.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>12</b>	<b>Steroid tablets given for COPD (eg Prednisolone):</b>	<b>True</b>	<b>False</b>	<b>Don't Know</b>
<b>a</b>	Steroid tablets help strengthen muscles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b</b>	Steroid tablets should be avoided if there is a chest infection.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c</b>	The risk of long-term side effects due to steroids is less with short courses than with continuous treatment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d</b>	Indigestion is a common side effect from using steroid tablets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e</b>	Steroid tablets can increase your appetite.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>13</b>	<b>Inhaled steroids (brown, red or orange):</b>	<b>True</b>	<b>False</b>	<b>Don't Know</b>
<b>a</b>	Inhaled steroids should be stopped if you are given steroid tablets.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>b</b>	Steroid inhalers can be used for rapid relief of breathlessness.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>c</b>	Spacer devices reduce the risk of getting thrush in the mouth.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>d</b>	Steroid inhaler should be taken before your bronchodilator.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>e</b>	Inhaled steroids improve lung function in COPD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Further supplies can be obtained from:  
Department of Medicine (BCKQ)  
Frenchay hospital,  
Bristol BS16 1LE

Ref.: White R, Walker P, Roberts S, Kalisky S, White P,  
Chronic Respiratory Disease. 2006;3:123-131

Designed by the Medical Illustration Department, Frenchay Hospital, Bristol

## APPENDIX J

## SPANISH VERSION OF THE BRISTOL COPD

## KNOWLEDGE QUESTIONNAIRE

## CUESTIONARIO BRISTOL DE CONOCIMIENTOS DE LA EPOC

Nombre:

Fecha:

Este cuestionario está diseñado para averiguar lo que usted sabe sobre su condición pulmonar. Debe ser completado sin ayuda de nadie más. Responder el cuestionario le tomará entre 10 y 20 minutos. Sus respuestas nos ayudarán a averiguar qué información necesita para ayudarle a entender y controlar su condición pulmonar. Marque el círculo que considera que es la respuesta correcta.

<b>1 En la EPOC (Enfermedad Pulmonar Obstructiva Crónica):</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i> En la EPOC, la palabra "crónica" significa que la enfermedad es grave.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> La EPOC solo se puede confirmar por medio de una prueba de respiración.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> En la EPOC, generalmente hay un empeoramiento gradual con el tiempo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> En la EPOC, los niveles de oxígeno en la sangre siempre son bajos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> La EPOC es poco común en personas menores de 40 años.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>2 EPOC:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i> Más del 80% de los casos de EPOC son causados por fumar cigarrillo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> La EPOC puede ser causada por la exposición a ciertos tipos de polvos en el trabajo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> Las personas con asma crónica pueden desarrollar EPOC.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> La EPOC es generalmente una enfermedad hereditaria.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> Las mujeres son menos vulnerables que los hombres a los efectos de fumar cigarrillo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>3 Los siguientes síntomas son COMUNES en la EPOC:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i> Inflamación (hinchazón) de los tobillos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> Fatiga (cansancio).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> Sibilancias (pitos o silbidos al respirar).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> Dolor opresivo (presión) en el pecho.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> Pérdida rápida de peso.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>4 La falta de aire (ahogo) en la EPOC:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i> La falta de aire grave impide viajar en avión.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i> La falta de aire puede empeorar si se comen grandes cantidades de comida.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i> La falta de aire indica que sus niveles de oxígeno en la sangre son bajos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i> La falta de aire es una respuesta normal al ejercicio.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i> La falta de aire es causada principalmente por un estrechamiento de los bronquios.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>5</b>	<b>Flema (esputo):</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	La tos con flema es un síntoma común en la EPOC.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Expulsar las flemas es más difícil si usted está deshidratado.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Los inhaladores broncodilatadores pueden ayudar a expulsar las flemas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Las flemas causan daño si se tragan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Algunos ejercicios respiratorios pueden ayudar a expulsar las flemas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>6</b>	<b>Infecciones respiratorias y exacerbaciones:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Las infecciones respiratorias con frecuencia provocan tos con sangre.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	En las infecciones respiratorias, las flemas generalmente cambian de color (amarillo o verde).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Las exacerbaciones (episodios de empeoramiento) pueden ocurrir incluso cuando no hay una infección respiratoria.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Las infecciones respiratorias siempre van acompañadas de temperatura corporal alta.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Cada vez que haya una exacerbación se deben tomar pastillas de esteroides.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>7</b>	<b>Ejercicio en la EPOC:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Caminar es mejor que los ejercicios respiratorios para mejorar la condición física.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Se debe evitar el ejercicio, ya que esfuerza los pulmones.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	El ejercicio puede ayudar a mantener la densidad de los huesos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	El ejercicio ayuda a aliviar la depresión.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	El ejercicio debe detenerse si siente que le falta el aire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>8</b>	<b>Fumar:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Dejar de fumar reduce el riesgo de enfermedades del corazón.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Dejar de fumar disminuye el riesgo de un mayor daño pulmonar.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Dejar de fumar es inútil porque el daño ya está hecho.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Dejar de fumar generalmente resulta en una mejor función pulmonar.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	La terapia de reemplazo de nicotina sólo se puede conseguir con fórmula médica.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>9</b>	<b>Vacunación:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Se recomienda vacunarse contra la gripa (influenza) cada año.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Usted puede contraer la gripa por aplicarse la vacuna antigripal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Usted sólo puede recibir la vacuna antigripal si tiene 65 años o más.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Una vacuna contra la neumonía protege contra todas las formas de neumonía.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Usted puede vacunarse contra la neumonía y contra la gripa el mismo día.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>10</b>	<b>Broncodilatadores inhalados:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Todos los broncodilatadores actúan rápidamente (dentro de los primeros 10 minutos).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Los broncodilatadores de acción corta y de acción prolongada se pueden tomar el mismo día.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Las inhalocámaras (espaciadores) deben secarse con una toalla después de lavarlas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Usar una inhalocámara aumentará la cantidad de medicamento que llega a los pulmones.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	El temblor puede ser un efecto secundario de los broncodilatadores.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>11</b>	<b>Tratamiento con antibióticos en la EPOC:</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Para que sea efectivo, el tratamiento con antibióticos debe durar al menos 10 días.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	El uso excesivo de antibióticos puede causar bacterias (gérmenes) resistentes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Los antibióticos eliminan todas las infecciones respiratorias.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Es necesario un tratamiento con antibióticos en caso de una exacerbación (empeoramiento), aunque sea leve.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Usted debe consultar al médico si los antibióticos causan diarrea severa.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>12</b>	<b>Pastillas de esteroides administradas para la EPOC (por ejemplo, prednisolona):</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Las pastillas de esteroides ayudan a fortalecer los músculos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Las pastillas de esteroides deben evitarse si hay una infección respiratoria.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Los efectos secundarios a largo plazo de los esteroides son menores con tratamientos cortos que con tratamientos prolongados.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	La indigestión es un efecto secundario común del uso de pastillas de esteroides.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Las pastillas de esteroides pueden aumentar el apetito.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>13</b>	<b>Esteroides inhalados (marrón, rojo o naranja):</b>	<b>Verdadero</b>	<b>Falso</b>	<b>No sé</b>
<i>a</i>	Usted debe suspender los esteroides inhalados si le recetan pastillas de esteroides.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>b</i>	Los esteroides inhalados se pueden usar para aliviar rápidamente el ahogo.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>c</i>	Usar inhalocámara (espaciador) reduce el riesgo de contraer hongos en la boca.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>d</i>	Se debe usar el esteroide inhalado antes del broncodilatador.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>e</i>	Los esteroides inhalados mejoran la función pulmonar en la EPOC.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX K

## REPORT OF PROCESS OF TRANSLATION – TRANSLATOR B

1. Recursos

- Software de traducción asistida por ordenador.
  - Omega T, herramienta TAO gratuita pensada para traductores profesionales (<https://omegat.org/>).
- Textos equivalentes de fuentes gubernamentales estadounidenses:
  - <https://medlineplus.gov/copd.html> / <https://medlineplus.gov/spanish/copd.html>
  - <https://www.nhlbi.nih.gov/health-topics/espanol/epoc/> / <https://www.nhlbi.nih.gov/health-topics/copd>
- Diccionario terminológico desarrollado por traductores profesionales : <https://www.proz.com/search/>

2. Técnicas de traducción (Según Hurtado, 2001\*)

*Transposición: Cambio de categoría gramatical.*

1.c	In COPD there is usually gradual worsening over time.	La EPOC suele empeorar gradualmente con el tiempo.
4.b	Breathlessness can be worsened by eating large meals.	La falta de aliento puede empeorar si se come mucho.

*Modulación: Cambio de punto de vista.*

5.e	Clearing phlegm can be assisted by breathing exercises.	Los ejercicios de respiración pueden ayudar a eliminar la flema.
10.e	Tremor may be a side effect of bronchodilators.	Los broncodilatadores pueden causar temblores.

*Equivalencia: Se utiliza un termino o expresión reconocida equivalente.*

2	COPD:	EPOC:
5.c	Bronchodilator inhalers can help clear phlegm.	Los inhaladores broncodilatadores pueden ayudar a eliminar la flema.
8.e	Nicotine replacement therapy is only available on prescription.	La terapia de reemplazo de nicotina sólo está disponible con prescripción médica.
9.a	A flu jab is recommended every year.	Se recomienda una vacuna contra la gripe cada año.
12	Steroid tablets given for COPD (eg Prednisolone):	Pastillas de esteroides administradas para la EPOC (por ejemplo, Prednisolona):

13	Inhaled steroids (brown, red or orange):	Esteroides inhalados (marrón, rojo o naranja):
----	------------------------------------------	------------------------------------------------

### 3. Términos que no pueden ser traducidos del inglés al español y fueron adaptados.

Los términos *Wheezing* y *Breathlessness* (ítems 3.c y 4 respectivamente) fueron problemáticos para su traducción puesto que sus equivalentes acuñados en el español tienen un mayor nivel de especialidad que en el inglés.

Si bien el instrumento evalúa el conocimiento del individuo y utiliza ciertos términos específicos de la enfermedad, un nivel de especialidad más alto al del instrumento original podría causar problemas de comprensión y por lo tanto problemas de funcionalidad del instrumento.

Por lo tanto, se decidió en el caso de *Wheezing* usar el término acuñado junto con una pequeña explicación (Sibilancias o un silbido al respirar) y en el caso de *Breathlessness* se utilizó una expresión más común (falta de aliento) en lugar del término especializado (disnea) que conserva el sentido pero mantiene el nivel de especialidad del instrumento original.

Para ambos se tuvo en cuenta el lenguaje utilizado en los textos informativos mencionados anteriormente.

### 4. Ítems que fueron difíciles de traducir.

Ítem	Inglés	Español	Comentarios
3.d	<u>Crushing</u> chest pain	Dolor aplastante en el pecho	La dificultad estuvo centrada principalmente en la palabra <i>crushing</i> y sus connotaciones de intensidad y tipo de dolor (abrumador y sensación de presión) y como expresarlas en español.
7.b	Exercise should be avoided as it <u>strains</u> the lungs.	El ejercicio debe evitarse ya que sobrecarga los pulmones	El término <i>strain</i> fue difícil pues se debía mantener las ideas de esfuerzo y estrés que implica en este ítem en particular, pero manteniendo al mismo tiempo la naturalidad del lenguaje en el español.

### 5. Comentarios generales

La traducción se realizó pensando en una audiencia hispanohablante residente en EE.UU. y que por lo tanto tiene una influencia del inglés en su español. Por ello se trató de mantener, cuando fuese posible, palabras que fuesen similares en ambos idiomas siempre y cuando no se cambiase el sentido. Sin embargo, luego de la aclaración acerca de la audiencia se hizo una revisión y se hicieron cambios menores en algunos términos para adaptarse mejor a los hablantes del español colombianos, como por ejemplo el cambio de la palabra



“tabletas” a “pastillas” (*tablets*) entre otros. Asimismo, se redujo la voz pasiva, la cual es más común en el inglés pero menos utilizada en el español.

La principales dificultades se presentaron en los síntomas puesto que la experiencia sensorial de algunos de estos era difícil de expresar en ambos idiomas, a diferencia de algunos términos más específicos de la enfermedad, los síntomas son menos específicos y especializados y por lo tanto tienen mayor influencia cultural lo que hizo más difícil su traducción.

\* HURTADO, A. Traducción y Traductología, Cátedra, Madrid, 2002. pp.269-271

## APPENDIX L

## REPORT OF LINGUISTIC ADJUSTMENTS AND ADAPTATIONS

## MADE DURING THE SYNTHESIS MEETING

En reuniones realizadas durante los días 14 y 15 de julio de 2020, se reunieron cuatro expertos para realizar una primera versión de adaptación cultural del instrumento *Bristol COPD Knowledge Questionnaire*. Los ajustes lingüísticos más relevantes realizados se describen a modo de resumen a continuación:

Tipo de ajuste	Ajuste específico	Algunos ítems donde se evidencia el ajuste
Equivalencia de ítem	Se optó por utilizar el concepto “inhalocámaras” para reemplazar el original de “espaciadores”, dado que es más común en el contexto médico colombiano.	10c y otros.
	Se tuvo en cuenta la expresión “fumar cigarrillo” dado que es más propia del contexto colombiano.	2a.
	Se mantuvo la expresión “consultar al médico” en vez de “acudir a los servicios de salud” dado que es más propia del contexto colombiano.	11e.
	Se decidió la expresión “pastillas de esteroides” para referirse a las tabletas ( <i>tablets</i> ), dado que se ajusta más al contexto colombiano.	12 y otros.
	Se optó por el tiempo indicativo presente en algunos ítems que originalmente estaban escritos en futuro (inglés), dado que se pretenden evaluar como hechos fácticos.	11c.
	Se adecuaron otros términos para que resultaran más coloquiales para el contexto colombiano, como “que llega” en vez de “depositada” o “administran” por “recetan”.	10d, 13a.
	Ante la opción de elegir “infección respiratoria” o “infección en el pecho” se optó por la primera por ser más pertinente para el instrumento.	6 y otros.
	Algunos términos quedaron pendientes por confirmarse, (ya sea con otros expertos o con pacientes) dado que no se obtuvo consenso para ajustarlos culturalmente. Tal es el caso de “enlentecer” que se sustituyó por “disminuir” o “densidad ósea”, que se mantuvo a la espera de cómo se asume por los pacientes.	7c, 8b.
Equivalencia semántica	Se optó por la construcción léxica “falta de aire (ahogo)” para referirse a la expresión “ <i>breathlessness</i> ”, valiéndose de equivalencias conceptuales basadas en las guías oficiales del Gobierno de Colombia.	4 y otros.

	Se optó por mantener la terminología médica en el caso de “sibilancia” (wheezing), dada la dificultad de encontrar una construcción léxica en el español. No obstante, se mantuvo, gracias a equivalencias conceptuales basadas en las guías oficiales del Gobierno de Colombia, una unidad fraseológica: “pitos o silbidos al respirar”.	3c.
	Se mantuvieron algunos términos como “esputo” o “gérmenes resistentes”, no muy empleados en español con el ánimo de brindar más posibilidades de comprensión al lector.	5 y 11b.
Forma	Se incluyeron dentro de paréntesis en varios ítems aquellas palabras que funcionan como sinónimos en terminología médica al término elegido coloquialmente o viceversa, tal es el caso por ejemplo de falta de aire (incluyendo “ahogo” entre paréntesis para dar más claridad) o exacerbaciones (incluyendo la palabra “complicaciones” que es más coloquial).	4, 6c.
	Se sintetizaron ítems dado que la construcción oracional era muy larga y podía dificultar la lectura.	12c.
	Se mantuvo el uso del usted en casos de referirse directamente al paciente en el ítem (para el tratamiento, por ejemplo).	9b y otros.
	Se optó por mantener enunciados con estructura oracional de sujeto + verbo + complemento cuando fue posible.	8b y otros.