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Journal of Clinical Epidemiology 66 (2013) 1166−1174

Journal of Clinical Epidemiology

The Severe Respiratory Insufficiency Questionnaire scored best in the assessment of health-related quality of life in chronic obstructive pulmonary disease

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Accepted 16 April 2013; Published online 5 July 2013

Abstract

Objective: There are limited data on health-related quality of life (HRQL) in chronic obstructive pulmonary disease (COPD) patients with chronic hypercapnic respiratory failure during an admission requiring ventilatory support. The aim was to assess and compare the reliability and validity of the Clinical COPD Questionnaire (CCQ), Chronic Respiratory Questionnaire (CRQ), Maugeri Respiratory Failure-28 (MRF-28) Questionnaire, and Severe Respiratory Insufficiency (SRI) Questionnaire in patients with very severe COPD.

Study Design and Setting: One hundred eighty hospitalized patients filled out the CCQ, CRQ, MRF-28, SRI, Groningen Activity Restriction Scale (GARS), Hospital Anxiety and Depression Scale (HADS), and the Medical Research Council Dyspnea Scale (MRC). Reliability was examined by assessing distribution of total scores, floor and ceiling effects, and internal consistency (using Cronbach α coefficient). Construct validity between questionnaires and also the other measurements were tested with Spearman ρ.

Results: All four questionnaires were feasible in this setting and had reasonable characteristics for distribution of total scores, floor and ceiling effects, internal consistency, and construct validity. On balance, the SRI scored best. Additionally, the SRI had a remarkable high explained variance by HADS, GARS, and MRC (73%).

Conclusion: The SRI performed slightly better than the CCQ, CRQ, and MRF-28, which renders it the preferred questionnaire for scoring HRQL in patients with very severe COPD.

Keywords: Chronic respiratory failure; COPD; Health domain; Health status; Noninvasive positive pressure ventilation; Questionnaire

1. Introduction

Health-related quality of life (HRQL) assessment in patients with chronic obstructive pulmonary disease (COPD) has become more common over the last two decades, and its importance in clinical trials has been recognized by many health care institutions [1]. Quite a few disease-specific questionnaires in the field of COPD have been developed, some of which have been shown to be valid, reliable, and responsive in several stages of severity of this disease; for example, the Chronic Respiratory Questionnaire (CRQ) [2] and Clinical COPD Questionnaire (CCQ) [3]. Others were designed for a more specific subset of COPD patients. Both the Maugeri Respiratory Failure-28 (MRF-28) Questionnaire [4] and the Severe Respiratory Insufficiency (SRI) Questionnaire [5] were originally developed for a mixed group of patients with respiratory failure (not necessarily COPD) receiving chronic noninvasive positive pressure ventilation (NPPV). In addition, they have also shown to be valid and reliable specifically in COPD patients with stable chronic hypercapnic

Conflict of interest: T.v.d.M. developed the Clinical COPD Questionnaire and holds the copyright. All other authors have no conflicts of interest to disclose.

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http://dx.doi.org/10.1016/j.jclinepi.2013.04.013

What is new?

Key finding

- The Clinical COPD Questionnaire, Chronic Respiratory Questionnaire, Maugeri Respiratory Failure-28 Questionnaire, and Severe Respiratory Insufficiency (SRI) Questionnaire showed to be reliable and valid questionnaires in chronic obstructive pulmonary disease (COPD) patients with chronic hypercapnic respiratory failure requiring ventilatory support.

What this adds to what was known?

- On balance, the SRI scored best, making it the preferred questionnaire for measurement of health-related quality of life in patients with very severe COPD.

What is the implication and what should change now?

- We suggest that future studies on the effects of chronic noninvasive ventilation in COPD use the SRI in addition to a more general disease-specific questionnaire.

respiratory failure (CHRF) [6]. One trial on chronic NPPV in COPD with CHRF [7] showed that the SRI was more related to anxiety and depression, whereas the MRF-28 added the cognitive domain compared with the CRQ and therefore suggested using both the SRI and the MRF-28 as they assess different aspects of HRQL in these patients.

The lack of agreement on which HRQL questionnaire to use has contributed to the fact that evidence for the use of chronic NPPV in patients with stable COPD is still contradictory [8−10]. Among others, the pooling of results on HRQL is hampered in this way.

Not only is chronic NPPV in stable COPD of interest but also the role of chronic NPPV in COPD after an episode of acute respiratory failure requiring ventilatory support in hospital [11]. In Europe, a few studies on chronic NPPV after acute exacerbation are currently in process, and therefore, it is of importance to find the appropriate questionnaires for this precise area. As there are limited data on HRQL in this specific group, the aim of the present study is to assess and compare the reliability and validity of the CCQ, CRQ, MRF-28, and SRI in COPD patients with CHRF during an admission requiring ventilatory support.

2. Methods

2.1. Patients

Between 2008 and August 2011, 180 patients from 45 Dutch hospitals were included. These data are part of a larger randomized controlled trial studying the effects of chronic NPPV. Patients met the following inclusion criteria: Chronic Obstructive Pulmonary Disease Global Initiative for Chronic Obstructive Lung Disease (GOLD) stage III or IV, invasive or noninvasive ventilation during acute respiratory failure and minimally 48 hours without ventilatory support (maximally until discharge), and persistent hypercapnia ($PaCO_2 > 6.0$ kPa) during daytime at rest without ventilatory support. Exclusion criteria were younger than 18 years or 80 years and older, obstructive sleep apnea (apnea−hypopnea index >15/hr), neuromuscular disease, or significant heart failure. The study was approved by the local ethics committee, and all patients gave written consent.

2.2. HRQL questionnaires

Patients completed the following questionnaires concerning HRQL: the CCQ [3], CRQ [12], MRF-28 [4], and SRI [5]. The CCQ is a self-administered 10-item questionnaire that can be divided into three domains: symptom, functional state, and mental state. Scores range from 0 to 6, with high scores indicating extremely poor health status. The CRQ (self-reported) contains 20 items and measures physical and emotional functions, divided into four domains: dyspnea, fatigue, emotion, and mastery. Scores range from 1 (worse) to 7 (best). The MRF-28 contains 28 items that are divided into three domains: daily activity, cognitive function, and invalidity. The scores range from 0 (best) to 100 (worse). The SRI contains seven domains covering 49 items: respiratory complaints, physical functioning, attendant symptoms and sleep, social relationships, anxiety, psychological well-being, and social functioning. Scoring ranges between 0 and 100, with high scores representing better HRQL.

2.3. Other measurements

The following parameters were measured as possible determinants of HRQL. Arterial blood gasses >48 hours after ending acute ventilatory support were obtained from blood from the radial artery with the patient breathing room air. Lung function measurements included routine spirometry using a pneumotachograph. The Groningen Activity Restriction Scale (GARS) assesses activity and disability of daily living [13] and consists of 18 items. The Hospital Anxiety and Depression Scale (HADS) [14] was used to determine levels of depression and anxiety. It consists of 14 questions from which seven are on detection of anxiety and seven on depression (two subscales). Dyspnea was measured using the Medical Research Council Dyspnea Scale (MRC) [15].

2.4. Statistical analysis

2.4.1. Reliability

Distribution of total scores and internal consistency as a measure of reliability were calculated for each questionnaire.