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ORIGINAL RESEARCH

A Comparison of the Assessment of Quality of Life with CAT, CCQ, and SGRQ in COPD Patients Participating in Pulmonary Rehabilitation

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Abstract

Background: The aim of this study was to compare the COPD specific health-related quality of life (HR-QoL) instruments, the St George's Respiratory Questionnaire (SGRQ), COPD Assessment Test (CAT), and COPD Clinical Questionnaire (CCQ), in terms of feasibility and correlations in COPD patients participating in pulmonary rehabilitation (PR). **Methods/materials:** Ninety consecutive patients with mainly severe COPD who participated in a 7-week PR programme were assessed with CAT, CCQ, SGRQ. In addition to evaluating the scores obtained by the questionnaires we also assessed the need of help and the time needed to complete the questionnaires. **Results:** Patients had mean FEV₁ = 38.7% of predicted value and poor quality of life (mean SGRQ total score 51.1, CAT 1.81, and CCQ 26.5 units). There were good correlations between the overall scores for the three HR-QoL instruments: CAT versus CCQ, $r = 0.77$; CAT versus SGRQ, $r = 0.73$; and CCQ versus SGRQ, $r = 0.75$ ($p < 0.001$ for all correlations).

The average time to complete the questionnaires was 578 seconds for SGRQ, 107 seconds for CAT, and 134 seconds for CCQ. The need for assistance while answering the questionnaire was 86.5% for SGRQ, 53.9% for CAT, and 36.0% for CCQ. **Conclusions:** we observed a good correlation between the SGRQ, CCQ and CAT in this group of patients with severe COPD undergoing pulmonary rehabilitation. We found that CAT and CCQ have the advantage of being easier and faster to complete than the SGRQ. The need for help with the completion of the questionnaires was especially seen in patients with low education level.

Introduction

In chronic obstructive pulmonary disease (COPD), measures of health-related quality of life (HRQL) are increasingly used as descriptive instruments or as outcome measures (1). The St George's Respiratory Questionnaire (SGRQ) is a reliable, valid, and responsive instrument designed to measure self-reported HRQL in COPD patients (2), and it is one of the most widely used. It contains 50 items with 76 weighted responses. Each item has an empirically derived weight, which means that a key is necessary to calculate a score. This makes the use of SGRQ slightly more complicated and in addition studies have shown that many COPD patients are unable to complete the SGRQ without help (3,4).

Keywords: COPD, Rehabilitation, Quality of life

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In an attempt to avoid these drawbacks, the COPD assessment Test (CAT) and the COPD Clinical Questionnaire (CCQ) have been developed. They contain only 8 and 10 questions, respectively, and a key is not necessary to calculate a score (5,6). CCQ has mainly been tested in mild-to-moderate COPD, and correlation with SGRQ has only been investigated in two small studies (6,7). Recently, two large multinational cross-sectional studies with COPD patients mainly recruited from primary care showed a strong correlation between CAT and SGRQ (5,8).

The primary aim of the present study was to investigate the correlations between SGRQ and CCQ, respectively CAT, in patients from secondary care with severe to very severe COPD. In addition we also wanted to examine the feasibility of completing SGRQ, CAT, and CCQ in terms of time needed to fulfil the questionnaires and the need of help.

Methods

Study population

Ninety consecutive COPD patients who started a 7-week outpatient pulmonary rehabilitation programme constituted our study group. Eligibility criteria included: stable COPD with forced expiratory volume in one second (FEV₁) <80% of predicted value and FEV₁/forced vital capacity (FVC) <70% and motivated for pulmonary rehabilitation. Exclusion criteria were: unstable ischemic heart disease, aortic valve stenosis, musculo-skeletal diseases, which were severely limiting exercise capacity, and cognitive problems e.g., dementia and psychiatric disorder, which impaired the ability to participate in the programme and completing the questionnaires. Patients unable to speak or read Danish were also excluded.

Outcomes

CAT: The CAT consists of 8 items with scores ranging from 0 to 5 (0 = no impairment). An overall score is calculated by adding the score from each item and then divided by 8. The minimal clinical important difference (MCID) for the CAT has not yet been established.

CCQ: The CCQ consists of 10 items with an overall score and 3 domains: symptoms, functional state, and mental state. All scores range from 0 to 6 (0 = no impairment).

SGRQ: The SGRQ is a disease-specific questionnaire, which comprises of three domains (dyspnoea, impact, and activity). Each score ranges from 0 to 100 (0 = no impairment). SGRQ was filled out according to the manual (<http://www.healthstatus.sgul.ac.uk/sgrq-downloads/sgrq-downloads/>).

Incremental shuttle walk test (ISWT): The ISWT was conducted using the protocol described by Singh et al. (9). Patients were required to walk around a 10-m course marked by cones placed 9 m apart, thus allowing 0.5 m for turning at each end. Walking speed was regulated by pre-recorded signals on a compact disc. The test started at an initial speed of 0.5 m/s, and the speed was increased

each minute by 0.17 m/s. Verbal encouragement was confined to "increase your speed now" immediately following the triple bleep indicating the increase in walking speed. At the first failure to maintain speed, at each level, the instruction "you're not going fast enough, try and make up the speed this time" was provided.

Time to fill out the questionnaire and need of help from the respiratory nurse: All 3 questionnaires had to be completed on the same occasion and under standardised conditions, before the initiation of the first PR session, when the patients had rested. The order was: CAT followed by CCQ and finally SGRQ. Patients were told that they could ask any questions on how to complete the questionnaire. Any need of help was registered as "yes" or "no." Using a stopwatch, the time to fill out the questionnaires was registered for each patient.

Statistics

Data were analysed with the statistical package (SPSS) version 13.0 SPSS Inc., Chicago, USA. The chi-squared, two sample *t*-tests and Mann-Whitney U-tests were used as appropriate to compare differences between groups. Linear regression analysis, using Spearman correlation coefficients, were applied to correlate each HRQoL instruments. A two-sided *p*-value of <0.05 was considered significant.

Results

Patients had severe airflow limitation (85.6% had FEV₁ less than 50% of predicted value) and dyspnoea while walking (84.5% had at least MRC score 4) (Table 1). Time to complete the questionnaires and need of assistance are shown in Table 2. There were good correlations between the overall scores for the 3 instruments (Table 3 and Figure 1).

Table 1. Patients' characteristics for patients who started pulmonary rehabilitation

	All (n = 90)
Age, years	69.5 (8.7)
Gender, % males	35.6
FEV ₁ , % predicted value	38.7 (12.9)
Body mass index, kg/m ²	26.9 (5.8)
Current smokers, %	20.2
Package years (minimum – maximum)	40.1 (0–150)
ISWT, meter (minimum – maximum)	170 (20–440)
Years of education (minimum – maximum)	8.8 (5–19)
Medical Research Council (MRC) dyspnoea score (minimum-maximum)	4.4 (2–5)
Oxygen saturation at rest, %	94.5 (2.2)
Oxygen saturation after incremental test, %	89.8 (5.2)
D vitamin, nM	59.3 (29.9)

Continuous variables are presented as mean (SD) unless otherwise indicated.

Table 2. Time to complete the questionnaire, need of help from the respiratory nurse, and overall scores at baseline

	Time, seconds (minimum–maximum)	Help, %	Score (minimum–maximum)
CAT	107 (43–210)	53.9	1.81 (0.2–3.4)
CCQ	134 (29–307)	34.5	26.5 (6–51)
SGRQ	578 (300–960)	86.9	51.1 (19.0–79.0)

Mean value and (range).

Table 3. Pearson correlations between overall scores from CAT, CCQ, and SGRQ

	r	P-value
CAT versus CCQ	0.76	<0.001
CAT versus SGRQ	0.73	<0.001
CCQ versus SGRQ	0.75	<0.001

Patients who needed help with the questionnaires had lower education level. There was also a tendency toward lower MRC score, better lung function, poorer ISWT, and higher age in those who needed help while completing the questionnaire (Table 4).

Discussion

Feasibility

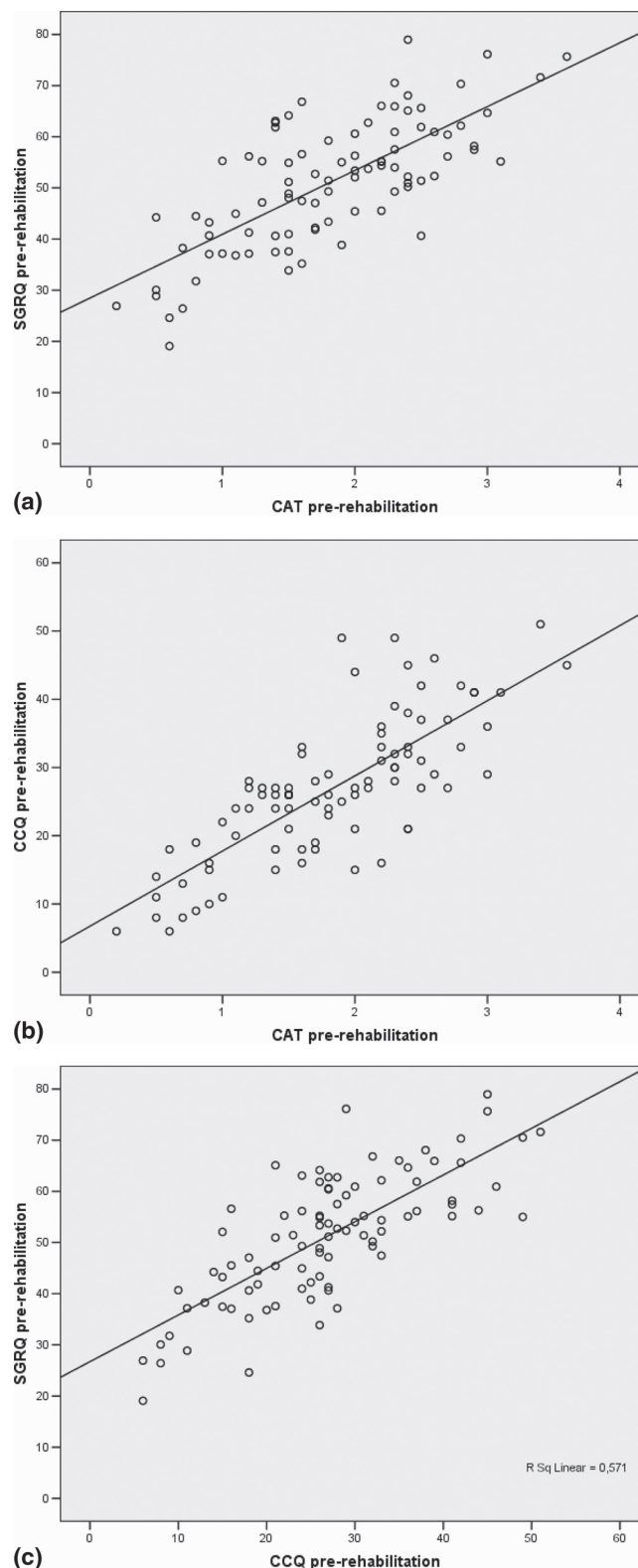
Most of our patients were able to complete CAT and CCQ within 1.5 minutes, while they spent in average about 9 minutes to complete SGRQ. This is in accordance with the website of SGRQ, where it is stated that it takes 8–15 minutes to fill out the questionnaire (<http://www.healthstatus.sgul.ac.uk/>). In general, a lot of patients needed assistance from the staff to complete the questionnaires – especially the SGRQ.

Taking into account how frequently SGRQ is used in the daily clinical practice and in research, it is surprising that only a few studies on the feasibility have been published (3,4,10). In fact, only one study has examined the feasibility of the newer instruments, CAT and CCQ. Among 296 patients with mild-to-moderate COPD, 17 (5.7%) were unable to complete all items of CCQ (11).

Ståhl *et al.* studied feasibility of completing SGRQ and 4 other HRQoL instruments in 174 moderate COPD patients. About 10% of the patients stated that it was difficult or very difficult to complete SGRQ. Surprisingly, twice as many found EQ-5, a questionnaire with only 5 items, “difficult” or “very difficult”. In accordance with our results, this study showed that older patients had more difficulties completing the questionnaires (10).

In line with our results, Harper *et al.* found that only 30% of 156 moderate-to-severe COPD patients were able to complete all items in SGRQ without assistance (3).

Low educational level is a well-known risk factor for a broad array of adverse COPD health outcomes (12–14), and here we demonstrate that it also was associated with difficulties completing HRQoL instruments.

**Figure 1.**

Surprisingly, severity of COPD had no influence on the feasibility of completing the questionnaires.

Validity

To determine if the shorter and easier instruments (CAT and CCQ) could replace SGRQ in measures of health

Table 4. Characteristics of patients who needed help to complete the HRQoL questionnaires

	SGRQ*			CAT*			CCQ*		
	+help, n = 77	–help, n = 12	p-value	+help, n = 48	–help, n = 41	p-value	+help, n = 32	–help, n = 57	p-value
Age, years	70.0	65.6	0.10	71.7	66.8	0.008	71.7	68.2	0.069
Males, %	39.0	16.7	0.20	27.1	46.3	0.06	37.5	35.1	0.82
FEV ₁ , %	38.9	37.2	0.68	42.6	34.0	0.002	42.7	36.3	0.025
MRC, score (1–5)	4.32	4.58	0.28	4.13	4.63	0.002	4.09	4.51	0.014
School years	8.6	10.4	0.026	8.2	9.5	0.027	7.9	9.3	0.017
ISWT, meter	165	200	0.13	160	180	0.22	152	180	0.09

All variables in Table 1 have been tested, but only variables significantly associated with needed help are shown in this table. *One patient is missing.

status, it is important to test whether they are reliable, valid, and responsive in relevant COPD populations. Previous studies have shown that both CAT (5,8) and CCQ (6,7,11,15) are reliable.

In the present study we compare the validity of CCQ, CAT, and SGRQ in COPD patients with severe to very severe airflow limitation. Both CAT and CCQ showed good validity with SGRQ and with each other. A good correlation between CCQ and SGRQ was also seen in a small study of mostly moderate COPD patients ($r = 0.71$) (6) and in a larger study of moderate COPD patients ($r = 0.84$) (7). Similar good correlation between SGRQ-c (40 items) and CAT was found in 229 COPD patients with an average FEV₁ of 52% of the predicted value ($r = 0.80$) (5), and a large cross-sectional study of 1817 COPD patients with an average FEV₁ of 56.7% of the predicted value and 114 patients with GOLD stage IV ($r = 0.80$) (8).

In conclusion, we observed a good correlation between the SGRQ, CCQ and CAT in this group of patients with severe COPD undergoing pulmonary rehabilitation. We found that CAT and CCQ have the advantage of being easier and faster to complete than the SGRQ. The need for help with the completion of the questionnaires was especially seen in patients with low education level.

Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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