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Validation of the Polish Version of the Chronic Cough Quality of Life Questionnaire (Leicester Cough Questionnaire)

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A – research concept and design; **B** – collection and/or assembly of data; **C** – data analysis and interpretation; **D** – writing the article; **E** – critical revision of the article; **F** – final approval of article

Abstract

Background. The Leicester Cough Questionnaire (LCQ) is one of the few specific quality-of-life questionnaires (QOLQ) dedicated to measuring the impact of chronic cough on patients' health/condition.
Objectives. The aim of the study was to validate the Polish version of the LCQ.
Material and Methods. The LCQ was translated forward and backward. The Polish version of the LCQ was tested on 35 patients suffering from chronic cough (23 women, median age 60 years, non- or ex-smokers, median cough duration of 23 weeks). Its validity was tested by comparison to a visual analogue scale (VAS) of cough intensity and other health questionnaires (hospital anxiety and depression scale – HADS, Euro-Quality of Life Questionnaire – EQ5D, St. George's Respiratory Questionnaire – SGRQ). The internal reliability of the Polish version of the LCQ was determined using the Cronbach alpha coefficient and its repeatability by the intraclass consistency coefficient.
Results. The translation of the LCQ into Polish was accepted by the author of the original LCQ. The Cronbach's alpha coefficient for total LCQ was 0.89, and reached 0.82, 0.86 and 0.78 for the physical, psychological and social domain, respectively. There were significant negative correlations between cough severity measured by VAS, the results of the EQ5D and SGRQ and the Polish version of the LCQ. The intraclass correlation coefficient of the test-retest reliability was significant (0.99).
Conclusions. The Polish version of the LCQ has been validated and is a reliable tool to measure the impact of chronic cough on quality of life of patients with chronic cough (**Adv Clin Exp Med 2016, 25, 4, 649–653**).

Key words: chronic cough, cough intensity, quality of life questionnaire.

Chronic cough is a common complaint which affects not only the physical, but also the psychological and social aspects of the patient's life [1–3]. Impairment of quality of life (QOL) due to chronic cough is comparable with that caused by severe COPD [4, 5]. The efficacy of chronic cough treatment may sometimes be unsatisfactory [6].

Both the British Thoracic Society and the European Respiratory Society recommend to assess the impact of chronic cough on the patient's condition with cough-specific quality-of-life questionnaires [1, 3]. There are few such questionnaires. The Leicester Cough Questionnaire (LCQ), created in the UK [7], is the most frequently used quality of life questionnaire (QOLQ) in Europe [8, 9].

There has been no Polish version of the quality of life questionnaire designed for patients with chronic cough so far. Therefore, the aim of the study was to create and validate the Polish version of the LCQ.

Material and Methods

The LCQ consists of 19 questions and is divided into 3 domains: physical (8 questions), psychological (7 questions) and social (4 questions). Each answer is scored on a 1–7 Likert scale and each domain is scored separately as an average of all questions. The total score is the sum of the three domain score, thus the range of the total score is 3 to 21 points [7].

Initially, a conceptual framework was developed for each item. Then the LCQ was translated into Polish by a physician who speaks English fluently (MD) and then backwards into English by another bilingual physician (MMW). No significant differences between the forward and backward translation were observed. The backward translation was approved by the author of the original version (Surinder S. Birring). The comprehension and simplicity of the Polish version of the LCQ was tested on a group of 20 healthy volunteers (median age 34 years, range 22–54 years, 14 women).

Then the Polish version of the LCQ was tested on 35 patients (median age 60 years, range 22–74 years, 23 women) suffering from chronic (lasting > 8 weeks) cough, who were recruited from an adult respiratory out patient clinic. None of the patients was a current smoker. Median duration of cough was 23 weeks (range 10 weeks–18 months).

The protocol was approved by the Institutional Review Board of the Medical University of Warsaw and all patients signed an informed consent form.

The results of the LCQ were compared with a visual analogue scale (VAS) measuring cough intensity and with three questionnaires measuring the impact of complaints on quality of life. These were:

– Euro-Quality of Life Questionnaire (EQ5D),
– St. George's Respiratory Questionnaire (SGRQ),
– Hospital Anxiety and Depression Scale (HADS).

The EQ5D questionnaire is a standardized instrument dedicated to measuring general health-related quality of life. It consists of two parts: an EQ5D descriptive system and an EQ5D visual analogue scale (EQ5D-VAS) [10]. The SGRQ is a respiratory specific tool designed to measure the impact on overall health and daily life in patients with obstructive airway diseases [11]. The HADS is an instrument used to determine the levels of anxiety and depression among patients treated in a hospital [12]. The Polish versions of these three questionnaires are validated and used in research concerning Polish patients.

Statistical Analysis

The data is presented as median and ranges. $P < 0.05$ was considered statistically significant. The analysis of the reliability of the Polish version LCQ was performed by Cronbach's alpha coefficient and its validity was assessed by comparison with cough severity and with other questionnaires by the Spearman coefficient.

Repeatability was measured by comparing the LCQ in 10 randomly chosen patients in an interval of 3–6 days. Intraclass correlation coefficient was analyzed using MedCalc statistical software package (MedCalc Software Ostend, Belgium).

Responsiveness was determined by comparing the LCQ before and after treatment in all patients who declared an attenuation of cough intensity measured by a decrease in VAS of at least 50% of the initial VAS result. Thus it was measured in 10 subjects. The improvement score was defined as the difference between the LCQ score before and after 3–6 months of cough management.

Results

All the LCQ items were a straight translation of the original version. In the control group, the Polish version of the LCQ was found comprehensible and easy to answer. The median time necessary to answer all the questions was 3 min (range 2–5 min).

The detailed results of the Polish LCQ version are shown in Table 1. The Cronbach's alpha coef-

Table 1. Results of the Polish version of the LCQ

	Median	Min	Max	Mean	SD
LCQ total	13.4	6.6	20.6	13.9	3.7
LCQ physical	4.5	2.5	6.7	4.5	1.2
LCQ psychological	5.0	2.0	7.0	4.7	1.4
LCQ social	4.25	2.0	7.0	4.6	1.5

LCQ – Leicester Cough Questionnaire.

ficient for the LCQ as a whole was 0.89, and for the physical, psychological and social domain, it achieved 0.82, 0.86 and 0.78, respectively. The correlations of total and all domains of the LCQ were significant and high (results are shown in Table 2).

The reliability of the Polish version of the LCQ was measured by comparing the result of the total LCQ score and all the three domains separately with cough severity measured by VAS and other QOLQs. There were significant negative correlations between cough severity measured by VAS and the Polish LCQ version. Significant negative correlations were also noted between LCQ, EQ5D and SGRQ. Correlations between LCQ (both total or for the individual domains) and HADS were non-significant. These results are shown in Table 3.

The repeatability of LCQ was measured by the intraclass correlation coefficient for all the domains and total LCQ – the results are shown in Table 4.

Responsiveness was tested by the improvement score, which was 2.95 for the LCQ as a whole and 1.31, 0.91 and 1.5 for the physical, psychological and social domains, respectively.

Table 2. The correlation of total LCQ and each LCQ domain

	LCQ physical	**LCQ psychological**	**LCQ social**
LCQ total	r = 0.87 p = 0.000000	r = 0.90 p = 0.000000	r = 0.92 p = 0.000000
LCQ physical		r = 0.64 p = 0.00004	r = 0.76 p = 0.00000
LCQ psychological	r = 0.64 p = 0.00004		r = 0.78 p = 0.00000
LCQ social	r = 0.76 p = 0.00000	r = 0.78 p = 0.00000	

r – Spearman's coefficient; LCQ – Leicester Cough Questionnaire.

Table 3. Concurrent validity of the Polish version of LCQ

	VAS	**EQ5D VAS**	**EQ5D**	**HADS**	**SGRQ**
LCQ total	r = –0.39 p = 0.02	r = 0.51 p = 0.003	r = –0.59 p = 0.0001	ns.	r = –0.49 p = 0.002
LCQ physical	r = –0.37 p = 0.03	r = 0.52 p = 0.002	r = –0.61 p = 0.0001	ns.	r = –0.68 p = 0.000008
LCQ psychological	ns.	ns.	r = –0.40 p = 0.02	ns.	ns.
LCQ social	r = –0.37 p = 0.03	r = 0.58 p = 0.0006	r = –0.59 p = 0.0002	ns.	r = 0.49 p = 0.002

r – Spearman's coefficient; ns. – non significant; LCQ – Leicester Cough Questionnaire; VAS – cough intensity visual analogue scale; EQ5D – Euro-Quality of Life Questionnaire; EQ5D VAS – visual-analogue scale in EQ5D questionnaire; HADS – hospital anxiety and depression scale; SGRQ – St. George's Respiratory Questionnaire.

Table 4. Results of test-retest reliability analysis

	Intraclass correlation coefficient	**95% CI**
LCQ total	0.99	0.97–0.99
LCQ physical	0.98	0.92–0.99
LCQ psychological	0.94	0.78–0.98
LCQ social	0.99	0.96–0.99

LCQ – Leicester Cough Questionnaire.

Discussion

Our results confirmed that the Polish version of LCQ is a valid and reliable tool to monitor the influence of chronic cough on QOL. Its reliability, measured by internal consistency using the Cronbach's alpha coefficient, was similar to the original version of the LCQ and its other translations (Table 5) [7, 13, 14]. The validity of the Polish LCQ was tested by comparing it to other health-related questionnaires. There were significant correlations of the Polish version of LCQ with SGRQ, EQ-5D and VAS. On the other hand, we did not find any correlation with the HADS, despite the fact that such a correlation was documented for the Dutch version of the LCQ [13]. The repeatability, measured by intraclass consistency coefficient, was significant (0.99). The intraclass coefficient in the original LCQ was 0.96. The responsiveness was comparable to other validated LCQ versions [7, 13, 14].

Measurement of cough severity is difficult, as it is a subjective ailment which depends on the cough intensity, the patients' perception of cough severity and the impact of the cough on quality of life [8, 15]. Cough intensity may be objectively measured by cough frequency monitors, while cough severity may be measured by using tools such as VAS, descriptive scores and diaries or cough specific QOLQs [2, 8, 9, 16]. The results of subjective cough questionnaires only moderately correspond to the results of objective methods such as cough monitoring techniques [17]. Subjective and objective methods may rather complement than substitute each other. The ERS guidelines suggest using cough specific QOLQs in the assessment of chronic cough and in clinical trials [2].

There are three cough specific QOLQs which have been validated so far: Leicester Cough Questionnaire (validated in English), Cough Quality of Life Questionnaire (in English) and Chronic Cough Impact Questionnaire (in Italian) [7, 18, 19]. The LCQ is the shortest and consists of 19 items. The minimal important difference (MID) for the original LCQ is 1.3 [20]. It has been validated in Dutch, Portuguese, Korean and Chinese [13, 14, 21, 22]. Moreover, the validity of LCQ was also proved in patients with bronchiectasis or COPD [23, 24]. There has been no cough-specific QOLQ in Polish so far. Our results show that the Polish version of the LCQ may be used to assess the impact of chronic cough on QOL. This makes possible its application in Polish patients and not only widens the opportunities for research in chronic cough but may also improve the assessment of treatment efficacy in patients with this relatively common ailment.

The Polish version of the LCQ is a comprehensive and reliable method to assess QOL in patients with chronic cough. It corresponds well with QOL measured by both general and respiratory disease-specific quality of life questionnaires.

Table 5. Comparison of internal reliability of different versions of LCQ

	Cronbach's alpha coefficient			
	English LCQ	**Dutch version**	**Korean version**	**Polish version**
LCQ total	0.92	0.93	0.91	0.89
LCQ physical	0.79	0.77	0.84	0.82
LCQ psychological	0.89	0.84	0.86	0.86
LCQ social	0.85	0.83	0.87	0.78

LCQ – Leicester Cough Questionnaire.

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