

# Reliability and validity of a Lithuanian version of Leicester cough questionnaire

## Abstract

**Background:** Cough is the most common presenting symptom in primary practice.<sup>1</sup> Chronic, exhausted cough has a significant impact on the quality of life.<sup>2</sup> Cough questionnaire was developed to evaluate the quality of life for patients with chronic cough. Unfortunately, such kind of health status measurement do not exist in Lithuania yet.

**Methods:** The translation of Leicester Cough Questionnaire (LCQ) was made using all methods that are required, following a forward-backward translation procedure. The Questionnaire and Visual Analogue Scale (VAS) was completed by 53 patients with chronic cough (duration of cough >8weeks).

The Questionnaire was divided into three domains: physical, psychological and social. To validate LCQ we tested three different aspects, i.e. the concurrent validity, the internal consistency and the repeatability.

**Results:** A strong correlation was established among the domains of the questionnaire and a statistically significant correlation established between the questionnaire and VAS. Cronbach's alpha coefficients for the internal consistency were from 0,787 to 0,927. The intraclass correlation coefficient (ICC) of the test – retest reliability was 0,89 ( $p < 0,0001$ ).

**Conclusion:** The Lithuanian version of Leicester Cough Questionnaire is ready, compatible with original and understandable for patients. Leicester Cough Questionnaire appears to be valid, reliable and highly responsive.

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## Background

Cough is one of the most common causes of presentation to general practice. Cough that has been persisted longer than three weeks is subacute (three to eight weeks) or chronic (more than eight weeks) About 15 percentages of non smoking people complain about the chronic cough.<sup>1</sup>

Chronic cough is the most common complain during the visit to a pulmonologist. Cough is described as a protective reflex that removes excessive secretions and inhaled foreign bodies from the respiratory tract. The anatomy of respiratory tract which is plentiful of cough receptors is the reason, that the most frequently causes of chronic cough are upper airway disorders, asthma and gastroesophageal reflux. There is some controversy if these conditions are aggravants or causes of cough. What is more, many people have a cough reflex sensitivity and their cough cannot be explained.<sup>2,3</sup>

Patients with chronic cough suffer physical and psychological morbidity. Long lasting chronic cough can affect the quality of life interfering with physical symptoms as chest pain, syncope, incontinence, sore throat and headaches. What is more, people are more depressed, feel anxiety or social embarrassment of their cough. It can disturb not only work and activity but also family members and friends.<sup>2-6</sup>

To effectively evaluate the impact of chronic cough on quality of life, it is important to have valid measurement tools. A number of measurement tools including questionnaires, cough diaries, visual analogue scales, electronic recordings, and human counts are available to assess the impact of quality of life for people with chronic

cough. However there exists no questionnaires to evaluate quality of life for patients with chronic cough in Lithuania. So we have made a validation of LCQ by using all required methods that have been used to validate the LCQ in other languages.<sup>7-10</sup>

## Methods

**Questionnaire:** The Leicester Cough Questionnaire is designed to assess the quality of life for patients with chronic cough.<sup>10</sup> It has 19 questions and it is divided into 3 domains: physical, psychological and social. In all questions you can get from 0 to 7 points. Higher result show better quality of life.

**Translation procedure:** The translation of LCQ was made using all methods that are required.<sup>7-10</sup> The translation followed forward-backward translation procedure, with two independent translations to lithuanian language. One of the translations was done by the professional translator and another by the doctor who has basic knowledge of medical translations from english. Both translations of the questionnaire were discussed by the professional translators, doctors and specialists of lithuanian language. The translations were matched paying particular attention to the correct translation of phraseological expressions. That is how the first version of questionnaire was made.

The trial version of questionnaire was tested in 20 patients with chronic cough in case to find out about the problems in comprehension and comprehension of the questionnaire. All patients pointed that the questions are understandable so the final version of lithuanian version of Leicester cough questionnaire was made.

**Patients:** The Questionnaire and Visual Analogue Scale (VAS) was completed by 53 patients with chronic cough (duration >8weeks). Spirometry and BHR (Bronchial Hyperreactivity) were normal by the day patients referred to the clinic.

**Validation:** The Questionnaire was divided into three domains: physical, psychological and social. To validate LCQ we tested three different aspects, i.e. the concurrent validity, the internal consistency and the repeatability.

**Concurrent validity:** Concurrent validity was tested by comparing correlations among all the domains of the questionnaire and by calculating the correlation between the questionnaire and specific cough VAS. A correlation coefficient <0,5 is accepted as weak, ≥0,5 as moderate and >0,7 as strong correlation.

**Internal consistency:** The internal consistency was calculated by Cronbach's alpha coefficients for three domains. This coefficient specifies the extent to which questions are related. Internal consistency is generally acceptable if Cronbach's alpha is >0,7.

**The repeatability:** The repeatability (or test-retest reliability) reveals the stability of scores over the time. The repeatability was determined by comparing the scores of the first visit to the clinic with the scores of the visit after three weeks who reported their cough unchanged. To calculate the repeatability of questionnaire the Intraclass Correlation Coefficient (ICC) was used. Responsiveness of a questionnaire demonstrates changes over time. We determined the responsiveness by comparing results of the first visit and the visit after 6 months.

**Statistical analysis:** SPSS version 20 was used for data analysis. Concurrent validity was determined by comparing LCQ with Visual Analogue Scale (VAS). We calculated the correlation between all domains and total questionnaire. The Pearson correlation coefficient was used. Cronbach's alpha coefficient was used for the internal consistency. Analysis of the test-retest reliability was done by calculating the Intraclass Correlation Coefficient (ICC) for the three domains and for the total score. Responsiveness was analysed by calculating the 95% confidence interval for the average improvements in the three domain scores and the total score of the LCQ.<sup>7-16</sup>

## Results

The final version of Lithuanian version of Leicester cough questionnaire was made after two forward-backward translations and discussion of correct translation of phraseological expressions.

The Questionnaire was completed by 53 patients. Respiratory function was normal by the day patients refer to the clinic. The main characteristics of the patients are shown in Table 1.

A strong correlation was established among the domains of the questionnaire: the strongest between psychological and social ( $r=0,891$ ,  $p<0,01$ ), the weakest between physical and social ( $r=0,732$ ,  $p<0,01$ ). The statistically significant correlation established between the questionnaire and VAS ( $r=-0,396$ ,  $p<0,01$ ). The weak correlation established between the domains of the questionnaire and VAS: physical ( $r=-0,329$ ,  $p<0,01$ ), psychological ( $r=-0,406$ ,  $p<0,01$ ) and social ( $r=-0,365$ ,  $p<0,01$ ). It demonstrates the logical identity of the questionnaire.

Cronbach's alpha coefficients for physical, psychological, social domains and for total questionnaire were 0,787, 0,863, 0,835 and 0,927.

The intraclass correlation coefficient (ICC) of the repeatability (test – retest reliability) was 0,89 ( $p<0,0001$ ). The results are compared with the original LCQ and Dutch version of LCQ in Table 2.

The results after 6 months reported a significant improvement in each of the domains of the LCQ. The results are shown in Table 3.

**Table 1** Characteristics of the patients

Patient characteristics		
N		53
Gender	Males (n/pct.)	12 /22,64
	Females (n/pct.)	41 /77,36
Age		47,75±14,89
Duration of cough		32,245±45,87
BHR (positive n/pct.)		26 /49,06%
Smoking (n/pct.)		14 /26,4
Pack – years		15
VAS (mm)		50,06±24,36

**Table 2** The repeatability of the questionnaire

Domain	Repeatability			CI 95pct. p<0,0001
	LCQ Merkytė	Birring (original)	Zwolle (Dutch version)	
Physical	0,86	0,93	0,86	0,76-0,92
Social	0,88	0,90	0,93	0,88-0,96
Psychological	0,90	0,88	0,93	0,87-0,96
Total	0,89	0,96	0,93	0,87-0,96

**Table 3** The responsiveness of the questionnaire

Domain	Responsiveness	
	Improvement score after 6 months	CI 95pct.
Physical	1,24	1,01-1,48
Social	1,78	1,54-1,93
Psychological	1,96	1,70- 2,14
Total	4,98	4,06- 5,87

## Discussion

Cough Quality-of-Life questionnaire is an important measurement tool to assess the impact of chronic cough on quality of life. For subjective assessment, Leicester Cough Questionnaire is perfect to use practically in the clinic. It can be used to assess different aspects of life and let the physician know which domain: physical, social or psychological need more attention. Now Leicester Cough Questionnaire appears to be valid and ready to use in Lithuanian language. It takes less than five minutes to complete the questionnaire and most of the patients pointed that the questions are easily understandable. The questionnaire also was responsive to change and repeatable. So it is useful outcome measure to assess the response of treatment.

Several studies showed a good or moderate correlation between LCQ and the others Quality-of-Life questionnaires (ACOS–Adverse Cough Outcome Survey; CQLC–Cough-Specific Quality-of-Life Questionnaire). There exist no validated outcome measures of chronic cough in Lithuania. So it was difficult to assess the connection between the LCQ and the others measurement tools for chronic cough or quality of life. We tested a correlation between all the domains of the questionnaire and the correlation between the LCQ and cough VAS. We established a strong correlation among the domains of the questionnaire, but a weak correlation between the LCQ and cough VAS. The other studies demonstrated that correlation with cough specific VAS varied widely from study to study, but showed robust results.<sup>13–15</sup>

Good results of internal consistency showed that questions of the LCQ are related to each other. Cronbach's alpha value less than 1 show that the questions do not completely overlap. Previous studies showed quite similar results of Cronbach's alpha. All the result of this study are generally accepted as good, because Cronbach's alpha is more than 0,7.<sup>8–10</sup>

Dutch study demonstrated a good result of repeatability or test-retest reliability. After three week during the call, patients were tested repeatedly in order to assess repeatability or test-retest reliability. The result were compared with the original validity of the LCQ and the validity of the LCQ of Dutch version. All the result were quite similar to each other.<sup>9,10</sup>

According to the other authors, it is important to find out about the improvement and to test the patients one more time after some time. Not all the patients were successfully reached, so not all the patients that were tested before were involved. The results of the LCQ after half of the year showed a significant improvement so the questionnaire is suitable to assess the effectiveness of treatment.<sup>8–10</sup>

In summary, our study showed that the LCQ is validated and ready to use in clinical practice. This is the first measurement tool to evaluate the quality of life in patients with chronic cough in Lithuania.

## Conclusion

The Lithuanian version of Cough Quality-of-Life Questionnaire is ready, compatible with original and understandable for patients. The

Cough Quality-of-Life Questionnaire appears to be valid, reliable and highly responsive.

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## Conflict of interest

The author declares no conflict of interest.

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