Quality of life in asthma and COPD: development of a disease-specific questionnaire

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Summary
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This thesis focuses on the development and validation of the Quality of Life for Respiratory Illness Questionnaire (QoL-RIQ) (Asthma Foundation 90.37). This work is a direct consequence of the study “Coping with Chronic Non-Specific Lung Disease – research in asthma and COPD, a social science perspective” (Asthma Foundation 88.54), published in 1991, in which a research agenda was presented mentioning the most important topics for future behavioural research. Quality of life of patients with asthma or chronic obstructive pulmonary disease (COPD) was considered a very important issue for future studies. Most studies on the consequences of asthma or COPD for patients’ daily lives did not yet have the broad quality of life perspective and, relatively few disease-specific instruments existed at the time. Prompted by developments in the area of quality of life in health care, and the need for a questionnaire in the Dutch language for asthma and/or COPD patients, it was decided to develop a disease-specific quality of life instrument. This instrument should include functional, psychological and social aspects of quality of life of asthma and COPD patients. As relatively little research had been done into the consequences of mild and moderately severe asthma or COPD, it was decided to address these patients first.

The thesis starts with a general introduction on quality of life in asthma and COPD (Chapter 1). An introduction on definitions, recent pathophysiological developments and prevalence of asthma and COPD is presented, followed by a short review of the psychological views on asthma and COPD. Topics of behavioural research in asthma and COPD and psychological guidance and treatment of these patients are discussed. Finally a short introduction on the concept of quality of life in general and more specifically in patients with
asthma or COPD is presented. The chapter concludes with an outline of the thesis.

No clear distinction used to be made between asthma and COPD in the Netherlands. Recently gained insight into the pathophysiological aspects of asthma, however, shows that asthma and COPD have to be looked upon as separate diseases. Asthma is a chronic inflammatory disorder of the airways, which may result in an increase in airway hyperresponsiveness to a variety of stimuli and cause recurrent episodes of wheezing, breathlessness, chest tightness and cough, associated with variable airflow limitation. In COPD the presence of airflow obstruction is the main characteristic. This obstruction is progressive; it may be partly reversible and accompanied by airway hyperreactivity. The main goal in asthma management is to achieve control of the disease. Patients themselves play an important role, and patient education has become an important part of asthma management. COPD treatment is directed at the prevention of symptoms and exacerbations, the preservation of optimal lung function and improvement in daily activities and quality of life. It goes without saying that, prevention of smoking or smoking cessation is very important, next to pharmacological treatment.

Although the term ‘quality of life’ is not unequivocally defined a consensus has been reached about the areas of life that have to be included in quality of life research. In general physical and functional status, and psychological status as well as social functioning are considered the main components of quality of life. With regard to quality of life research in clinical medicine, a distinction is made between generic instruments, assessing general characteristics and consequences of health and sickness, and disease-specific questionnaires, which take into account the specific problems and consequences of a specific disorder. At the start of the research project the consequences of asthma and COPD for daily life had already been described in several studies. However, these did not
have the broad quality of life perspective. Moreover, many instruments used in these studies were not disease-specific, due to which important aspects might have been overlooked.

In *Chapter 2* part of the results of a study on the most prominent topics and conditions for future research in asthma and COPD is presented. Medical and behavioural experts (both Dutch and foreign) in asthma or COPD care were asked in interviews and questionnaires to give their views on relevant themes for future behavioural research and on the necessary conditions for optimum results. Based on their reactions a research agenda was formulated, which encompassed a wide range of subjects. Quality of life was considered a very important topic for future behavioural research in asthma and COPD patients, in adults as well as in children. The interviewed professionals recommended methods for behavioural research into asthma and COPD and suggested preconditions for optimum care to these patients. They also came up with a number of suggestions to improve the policy on behavioural and psychosocial research.

In addition to the research agenda, several subjects emerged from the literature review that also required attention, such as the appreciation of patients with asthma or COPD, in general as well as among health care professionals and scientists; research into the psychosocial problems of specific groups of asthma or COPD patients (elderly patients, young children and their parents, non-native speakers, adolescents with asthma) education of health professionals not only regarding medical aspects of the disease, but also in the behavioural aspects of asthma and COPD.

In *Chapter 3* a review of the literature between 1980 and 1994 on quality of life in asthma and COPD is presented. Special attention was paid to definitions and operationalisations of the quality of life concept, to the instruments used to assess quality of life (including disease-specific questionnaires) and to the aims of quality
of life research. Analysis revealed that quality of life was seldom defined clearly and was operationalised in a variety of ways. Overall definitions of quality of life were mostly lacking. This was even the case in publications on the development of disease-specific quality of life questionnaires. Operational definitions were used in terms of the dimensions that were measured, but this had only been done in a minority of the studies. These studies generally included physical, psychological and social functioning, the three dimensions that, according to the literature on quality of life should minimally be assessed.

Most studies had an evaluative character. In general, possible changes in quality of life as a result of specific treatments or therapies were studied. One fourth of the studies on quality of life in asthma and COPD was classified descriptive in nature and they concluded that asthma and COPD patients experience impaired quality of life in many aspects of daily life. Only a very small proportion of the studies used quality of life data to make predictions, e.g. regarding progression of the disease, or studied the determinants of quality of life.

More than half the studies used generic quality of life instruments or, psychological or psychiatric questionnaires. These questionnaires were applied in research that took place at the beginning of the eighties, when adequate quality of life questionnaires appeared to be lacking. Disease-specific instruments became more widely used at the beginning of the nineties.

A majority of the studies documenting quality of life addressed patients with chronic obstructive lung problems, i.e. patients with chronic lung diseases, and patients with rather severe COPD (hypoxemic as well as non-hypoxemic, with or without oxygen). In studies on the development of disease-specific quality of life questionnaires, however, the majority had addressed asthmatic patients.

The development of the Quality of Life for Respiratory Illness Questionnaire (QoL-RIQ) is described in Chapter 4. Based on a study of the literature, other generic quality of life questionnaires, consultations with people providing
medical care for asthma and/or COPD patients, and consultations with foreign experts in the area of quality of life and asthma and COPD, a questionnaire was developed with a large number of items. The items were checked for completeness and clarity in asthma or COPD patients in a semi-structured interview.

In the item-reduction phase general practitioners in the Western region of The Netherlands selected patients from their asthma and COPD register. The patients (n=171) were asked to answer, on a 7-point Likert-type scale, to what degree they had had trouble from the specified symptoms and/or complaints or, to what degree they were impeded by their disorder in carrying out specified activities. For the items in the activity categories there was a possible answer "not applicable" for persons who did not pursue such an activity for reasons other than having too much trouble from breathing problems.

Items for the reduced quality of life questionnaire were selected as follows: Items with a "not-applicable" answer-category were included in the final quality of life - questionnaire if less than 30 percent of the respondents had answered "not applicable". The inter-item correlations were then assessed; if an inter-item correlation was 0.8 or higher the two items were combined. Finally a factor analysis was performed for every domain-subscale. Items that loaded on the first two or three factors of each domain-subscale were included in the final questionnaire. To assure content-validity, items were grouped into domain-subscals, based on their content. After applying this item selection procedure, a uni-dimensional quality of life questionnaire was constructed consisting of 55 items divided into seven domain-subscals: breathing problems (9 items), physical problems (9 items), emotions (9 items), situations triggering or enhancing breathing problems (7 items), general activities (4 items), daily and domestic activities (10 items), and social activities, relationships and sexuality (7 items).

Internal consistency was assessed by split-half reliabilities and Cronbach's alpha coefficients and was considered good. The QoL-RIQ - total score was not
correlated with age, nor was there a difference between asthma or COPD-patients. Thus, the questionnaire may be used for both patient groups, as well as for broad age groups. Caution has to be taken with some domain-subscale scores; especially 'daily and domestic activities' seems to reflect the problems in elderly patients rather than in younger ones. The domain-subscale 'situations triggering or enhancing breathing problems' seems to reflect more on problems in women than in men.

Chapter 5 describes the results of a study on the validity of the QoL-RIQ; its internal consistency and suitability for patients in different treatment settings, its test-retest reliability, construct validity and responsiveness to change. The relative contribution of subjective and objective illness severity measures and of specific personality characteristics to quality of life was also investigated in an explorative way. This might give insight into the mediating role of psychological characteristics of patients (e.g., coping resources, self-efficacy, and anxiety) between objective and subjective disease severity and patients' quality of life in respiratory illness.

The validation study was carried out in three samples of asthma and COPD-patients with varying degrees of illness severity and treatment intensity. 136 Asthma and COPD patients were treated in General Practice (sample 1), 86 patients came from an outpatient lung clinic (sample 2), and 63 patients were participating on an inpatient pulmonary rehabilitation programme (sample 3).

To assess its reliability, internal consistencies were calculated for the subscales and total scale. Its test-retest reliability was tested in 35 stable patients in sample I. In addition the intra-class correlation coefficient was assessed for each subscale as well as for the QoL-RIQ total scale. The internal consistencies were high to very high. The stability of the responses for the total scale was also considered good. For most subscales the stability was acceptable to good, only the emotions subscale showed some random measurement error.
Considering the discriminative properties of the QoL-RIQ it was shown that the questionnaire was able to highlight significant differences between patients in different treatment settings. Patients in the inpatient pulmonary rehabilitation programme had the highest scores, reflecting a more impaired quality of life, compared to outpatients and patients treated in a GP-setting. Looking at overall quality of life as well as part of the subscales, outpatients (sample 2) showed significantly more problems than patients in the GP-setting. This was true for asthma as well as for COPD-patients. These differences remained significant after correction for age. Within each treatment sample COPD-patients tended to have more problems in daily life.

To examine the construct validity of the questionnaire, Spearman Rank correlations of the QoL-RIQ subscale and total scores of generic questionnaires for quality of life (SIP, MOS-20) were calculated, as well as with the scores of some overall questions on health related quality of life. The correlation of the ‘emotions’ subscale of the QoL-RIQ with the anxiety and depression subscale of the SCL -90 item version was studied, as well as the correlation between the subscale ‘breathing problems’ of the QoL-RIQ and the subjective severity of attacks/dyspnoea. Finally the correlation between the QoL-RIQ-total score and lung function (FEV_{1}\%pred, FVC) and symptoms (MRCQ-dyspnoea score, frequency of attacks/dyspnoea, subjective severity of attacks/dyspnoea) was assessed. The correlations between the subscales of the QoL-RIQ and subscales of the generic quality of life questionnaires, overall questions on satisfaction with aspects of life as well as with the anxiety and depression subscales, questions on frequency and severity of attacks and the MRCQ-score were moderate to strong and provided evidence of the construct validity. As was to be expected from the literature, the correlation with lung function parameters was only fair to low, showing that spirometry and experienced quality of life represent different aspects of disease-severity.

The sensitivity to change of the QoL-RIQ was tested in the inpatient pulmonary
rehabilitation population. Except for the QoL-RIQ subscale ‘situations triggering or enhancing breathing problems’, scores on all subscales and the QoL-RIQ total score decreased significantly. This reflects a decrease in experienced problems in daily life (and thus an enhanced quality of life) after the 3-month inpatient pulmonary rehabilitation programme. The responsiveness to change was demonstrated in terms of effect-sizes as well as in terms of clinical relevance of the changed scores.

Concerning the validity of the QoL-RIQ it was concluded that the psychometric characteristics were good. Considering its high internal consistency and responsiveness to change the QoL-RIQ may be used for clinical trials as well as for individual screening and monitoring of patients in routine medical care. The questionnaire is suitable for asthma as well as COPD-patients with varying degrees of disease severity.

To get an impression of the relative contribution of demographic characteristics, objective and subjective illness severity and personality characteristics to quality of life, multiple regression analyses were performed with the QoL-RIQ total score as dependent variable. The independent variables were chosen on the basis of their intercorrelations with the QoL-RIQ-total score. As this was different for asthma and COPD patients, the regression analyses were performed separately for the two diagnostic groups. For asthma patients, it was concluded that about two-thirds of the variance in quality of life is explained by three variables: subjective severity of attacks, depression and disease-specific self-efficacy. Coping and anxiety played no significant role, nor did background characteristics and objective illness severity after inclusion of the above mentioned variables.

For COPD patients the picture was somewhat different. Multiple regression analysis showed that only two independent variables played a significant and important role in the quality of life score of COPD-patients: subjective severity of dyspnoea and anxiety. Subjective severity of dyspnoea explained almost half
of variance in the QoL-RIQ score, and anxiety added another 25 percent.

In the General Discussion (Chapter 6) the construction and validation of the QoL-RIQ is summarised and discussed. Methodological considerations are made concerning the development of the questionnaire; item generation, item style and item selection. In addition the psychometric properties of the questionnaire, its reliability (internal consistency and test-retest reliability) and validity (construct validity and sensitivity to change) are discussed.

In an up-dated review of quality of life questionnaires for adult asthma or COPD patients, the developed instrument is placed in context. In addition its pros and cons are discussed. When considering the QoL-RIQ in relation to the other disease-specific quality of life questionnaires, the following was concluded with regard to its item style and content and grouping of items: The Qol-RIQ fits, with 55-items, more in the group of longer instruments (55-76 items) than of shorter ones (20-33 items). The use of a seven point Likert-type answer category is quite common; six out of ten research-groups use five to seven point Likert-type scales in their questionnaires. The content of the QoL-RIQ reflects a broad range of topics relevant in quality of life research. The dimensions could just as well have been put together in broader domains (e.g. breathing problems, and physical problems combined in ‘physical-symptoms’; general activities and daily and domestic activities combined in ‘physical-activities’). It could, however, have reduced the specificity of the information gathered with each of the seven domains.

The QoL-RIQ is one of the few instruments developed for asthma as well as COPD patients. Although initially specifically developed for patients from GP-settings, research shows the instrument can also be used in patients who are more severely ill. Its psychometric characteristics are good, although until now, its responsiveness to change has only been studied in inpatient rehabilitation
programmes. The QoL-RIQ is a valid instrument in the Dutch language that can be used for patients with varying illness severity.

The chapter ends with recommendations for future research concerning quality of life in asthma and COPD, and more specifically concerning the QoL-RIQ.

**Recommendations for future research concerning the QoL-RIQ**

- The sensitivity to change of the QoL-RIQ should be assessed in patients with mild to moderate illness severity, for asthma as well as for COPD.
- The sensitivity to change of the QoL-RIQ should be studied in intervention studies other than pulmonary rehabilitation, i.e. medication trials.
- Reference data should be defined for patient-groups with distinct illness severity, for asthma and COPD. Patients should be selected and classified based on international guidelines for the definition of illness severity.
- Apart from the developed short version for monitoring in general practice, a general short version might be developed for screening purposes.
- The lay-out of the 55-item version of the QoL-RIQ should be adapted to create a version that is easily applicable in a clinical practice setting.
- Finally, it would be interesting to study the QoL-RIQ by factor analysis for underlying constructs. The purpose would not be to change the content of the questionnaire but to have a closer look at the grouping of the items in subscales versus in constructs.

**Recommendations for quality of life research in asthma and COPD, in general.**

- A study of the determinants of quality of life. The concept of quality of life has to be included in theoretical models concerning personality
characteristics, coping, illness perceptions including self-efficacy, adaptive tasks, social support, etc. More knowledge about the influence of these variables on quality of life will help to develop well-based theories about quality of life. It might also steer interventions to improve patients' quality of life.

- Existing questionnaires may be compared to assess their relative relevance. This might generate guidelines as to which questionnaire is most optimal for specific populations, specific purposes and specific diseases. This process has already been started.

- Recommendations mentioned for the QoL-RIQ also apply to other quality of life questionnaires for patients with asthma and COPD; development of 'reference data' for patient groups with different degrees of illness severity, based on international guidelines; existing questionnaires may be adapted for specific situations, i.e. clinical patient care, specific interventions or trials, including the development of short-forms; study of the grouping of items, domains versus constructs.

- Last, but not least it should not be forgotten that even well-translated versions of existing questionnaires have to be validated.