



Subjects with well-controlled asthma have similar health-related quality of life as subjects without asthma



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ABSTRACT

Background: The burden of asthma and rhinitis on health-related quality of life (HRQL) among adults has been assessed mainly in studies of patients seeking health-care, while population-based studies are relatively scarce. The objective of this study was to investigate HRQL among subjects with asthma and rhinitis derived from a random population sample and to identify factors related to impairment of HRQL. **Methods:** A randomly selected cohort was invited to participate in a postal questionnaire survey. Of those who responded, a stratified sample of 1016 subjects was invited to clinical examinations and interviews, and 737 subjects in ages 21–86 years participated. Of these, 646 completed HRQL questions. HRQL was assessed with the generic SF-36 Health Survey.

Results: The physical score was lower among subjects with asthma vs. subjects without asthma ($p < 0.001$). No significant difference was found in the mental score. Subjects with well-controlled asthma had higher physical score compared to subjects with partly and un-controlled asthma ($p = 0.002$). Actually, subjects with well-controlled asthma had similar physical HRQL as subjects without asthma. Asthmatics who were current smokers had lower physical score compared to those who were non-smokers ($p = 0.021$). No significant differences in physical or mental scores were found between subjects with and without rhinitis. Subjects with both asthma and rhinitis had lower physical score compared to subjects without these conditions ($p < 0.001$), but subjects with asthma alone had even worse physical score.

Conclusions: The physical score was significantly lower in asthmatics compared to subjects without asthma. Importantly, non-smoking and well-controlled asthmatics have similar HRQL compared to subjects without asthma. Thus, subjects with asthma should be supported to achieve and maintain good asthma control and if they smoke, be offered smoking cessation as means to improve their HRQL.

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1. Introduction

The prevalence of asthma and rhinitis among adults has increased considerably over the second half of the 20th century in many countries including Sweden [1–5]. These diseases are manifestations of the atopic syndrome and there is increasing evidence of an association between asthma and rhinitis based on epidemiological, immunological, and clinical studies [6–9]. Rhinitis is a

strong risk factor for the onset of asthma in adults [10], and rhinitis has been shown to be present among up to 80% of asthmatics, and 20–50% of patients suffering from rhinitis are also bothered with asthma [6,11,12].

Health-related quality of life (HRQL) has become an increasingly important aspect in outcome evaluation in health care and comprises an important outcome measure based on individual perceptions of how a disease affects subjects in everyday life [13]. Two types of instruments, generic and disease-specific, are used to assess HRQL. Generic instruments are measures of health status in general [14], while disease-specific instruments are targeted to a specific disease. Asthma and rhinitis have shown to substantially

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impact patients' HRQL negatively [5,14,15]. Rhinitis symptoms in patients with asthma can be associated with worsening asthma symptoms, and rhinitis symptoms can have detrimental effects on physical, psychological, and social aspects of patients' life [16,17]. Lack of asthma control has been associated with impaired HRQL [18–20]. Different personality characteristics and gender can also influence perceived HRQL in patients living with asthma and rhinitis [21]. However, the burden of asthma and rhinitis on HRQL has been assessed mainly in studies of patients seeking health-care, while population-based studies are relatively scarce.

The main objective of this study was to investigate HRQL among subjects with asthma and rhinitis, derived from a random population sample. A secondary aim was to identify factors related to impairment of HRQL among subjects with asthma and rhinitis. Our hypothesis is that both asthma and rhinitis are associated with impaired HRQL, and that HRQL would be even more impaired if the subjects are affected by both diseases.

2. Material and methods

2.1. Study population

The study was performed within the Obstructive Lung Disease in Northern Sweden (OLIN) studies (www.nll.se/olin). A randomly selected cohort of 7997 subjects aged 20–69 years was recruited in 2006 [22]. A follow-up of another randomly selected cohort consisting of 7004 subjects recruited in 1996 was also performed in 2006, now aged 30–84 years. Thus, in total, 12,055 subjects (80% of those invited) participated in a postal questionnaire survey. Of the responders, a stratified sample of 1016 subjects was randomly selected after stratification for the sex and age distribution of the general population in Norrbotten. These subjects were in 2008–09 invited to clinical examinations and structured interviews, and 737 subjects participated, now in ages 21–86 years [23]. Of these, 646 completed questions about HRQL.

2.2. The clinical examination

The structured interview included questions about respiratory symptoms and diseases which have been validated [10]. Severity of asthma was classified as well-controlled, partly controlled and uncontrolled asthma according to the Global Initiative for Asthma (GINA) classification of levels of asthma control, e-Table 1 [24]. Height and weight was measured and weight/height² (body mass index, BMI) was calculated. Blood samples were collected and allergic sensitization was assessed by analyses of specific IgE antibodies in serum; birch, timothy, mugwort, cat, dog, horse, D. pteronyssinus, D. farinae, and alternaria. A positive result was defined as an IgE level ≥ 0.35 IU/ml to any of the specific allergens. Smoking habits were classified into three categories: current smokers, ex-smokers and never-smokers. Ex-smokers had smoked for at least one year but not during the last 12 months. In the analyses, ex-smokers and never-smokers were merged into one group, non-smokers.

2.3. HRQL instrument

HRQL was assessed with the generic SF-36 Health Survey measuring eight domains of health: physical function (PF), role functioning – physical causes (RP), bodily pain (BP), general health (GH), vitality (VT), social function (SF), role-emotional (RE) and mental health (MH). The SF-36 scale can be transformed into two summary measures: the Physical Component Summary (PCS) based on the first four domains and the Mental Component Score (MCS) based on the last four domains. The Swedish version of the

SF-36 is well documented and has shown good psychometric qualities in different groups [25–27], and has been validated in a Swedish normative population [27]. The instrument is valid and reliable in terms of clinical, criteria-and constructs validity. Each component summary is ranging from 0 to 100 (0 = worst possible health status and 100 = best imaginable health status).

2.4. Definitions

Current asthma: Was defined as answering yes to the questions: Have you been diagnosed as having asthma by a doctor? and Have you been using asthma medications regularly or as needed during the last 12 months? or Have you had wheezing or whistling in your chest at any time during the past 12 months? or Have you ever had attacks of shortness of breath or breathlessness during the past 12 months?

Current rhinitis: Was defined as answering yes to the questions: Do you have allergic nasal symptoms or rhinitis? and Problems with sneezing, runny nose or blocked nose, without having a cold during the past 12 months? or Have you been using medications due to rhinitis/allergic nasal problems or blocked nose, non-allergic, during the past 12 months?

2.5. Statistical analysis

Statistical analyses were performed with the IBM Statistical Package for the Social Sciences (SPSS) Statistics 20. As the distribution of the HRQL-scores was skewed and not normally distributed, the non-parametric Mann-Whitney *U* test was used to test differences in HRQL between groups. Subjects with and without asthma and rhinitis, respectively, were evaluated. In addition, four mutually exclusive groups were created; asthma only, rhinitis only, both asthma and rhinitis, and subjects without any of these conditions. Linear regression was used between non-transformed HRQL-scores and diagnoses and the associations were estimated based on 1000 non-parametric bootstrap samples. A multiple regression model was utilized for adjusting the HRQL-scores for variables that could be associated with both asthma/rhinitis and HRQL, sex, age, smoking habits and BMI.

3. Results

3.1. Characteristics of the study population

Basic characteristics of the study population are shown in Table 1. In total, 96 subjects (13.0%) were defined as having current asthma, whereas 184 subjects (25.0%) had current rhinitis. Most of the study population was non-smokers or ex-smokers and 14.5%

Table 1
Characteristics of the study population.

	Males (n = 364)	Females (n = 373)	All (n = 737)
Age, mean (range)	53.0 (21–85)	53.8 (21–86)	53.4 (21–86)
Asthma, n (%)	45 (12.4)	51 (13.7)	96 (13.0)
Rhinitis, n (%)	90 (24.7)	94 (25.2)	184 (25.0)
Smoking habits			
Never-smoker, n (%)	193 (53.0)	186 (49.9)	379 (51.4)
Ex-smoker, n (%)	127 (34.9)	120 (32.2)	247 (33.5)
Current smoker, n (%)	42 (11.5)	65 (17.4)	107 (14.5)
Positive Any-IgE, n (%)	100 (27.5)	93 (24.9)	193 (26.2)
PCS ^a (mean)	50.0	47.8	48.8
MCS ^b (mean)	52.3	50.6	51.4
BMI	27.2	27.4	27.3

^a Physical component summary.

^b Mental component summary.

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