A hospital-based case-control study of quality of life in older asthmatics

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A hospital-based case-control study of quality of life in older asthmatics. C.A.E. Dyer, A.J. Sinclair. ©ERS Journals Ltd 1997.

ABSTRACT: Asthma is a common but neglected problem in older people, the impact of which is relatively unstudied. The aim of this study was to objectively assess quality of life and depression in older asthmatics.

The subjects studied were 50 hospitalized known asthmatics, over 55 yrs of age (mean age 72 yrs). Of these, 40 had objective evidence of asthma, and were compared to 40 age- and sex-matched controls. Using a structured questionnaire, the Geriatric Depression Score, subjective health status (short form (SF)-36), and other comparative disability data were recorded. Spirometric results were also recorded.

Depressive symptoms were common in both groups but were not significantly different. Mean SF-36 scores were significantly worse in the asthmatics, especially for components of physical function ($p=0.04$), physical role limitation ($p=0.01$), energy ($p=0.01$), health change ($p=0.01$), and general health perception ($p=0.01$). However mental, mental role and social scores were similar in both groups.

We conclude that quality of life is impaired in hospitalized asthmatics compared to controls. Physical components appear to be most adversely affected. Depressive symptoms are common but no overall difference was found for psychological disability. Older asthmatics appear to adapt well to adverse situations.

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Asthma is now recognized as a common condition in older adults. Prevalence rates in epidemiological studies have varied from 3.6% in South Wales [1] to around 8% in Tucson, Arizona [2], although these figures may be underestimates [3]. The condition has been studied relatively little, probably because of difficulty in making a precise diagnosis due to confusion with other conditions, such as chronic bronchitis, and also underreporting of respiratory symptoms by many older patients [4].

Chronic obstructive pulmonary disease (COPD) is well known to be associated with disability and a reduced quality of life [5, 6]. However, few data exist regarding the impact of asthma on the lives of those affected, although a study of self-labelled asthmatics aged 65 yrs or more found much higher levels of functional impairment compared with controls [7]. There is good evidence that asthma is a cause of impaired life quality in younger age groups [8], but there is little information in the literature relating to this impairment, or depression, in older subjects with asthma.

Measurement of health-related quality of life is gaining popularity and can be used to demonstrate the importance that an individual places on certain aspects of their health or disease process. Five broad areas are usually assessed: physical health; mental health; social functioning; role functioning; and general well-being. This information may be potentially useful in developing more appropriate therapies and to assist in planning comprehensive strategies of care, which are important objectives in many chronic diseases.

The aim of the present study was to assess quality of life and depressive symptoms in older people with asthma, by comparison to a group of age- and sex-matched controls. Due to the difficulties of making a precise diagnosis, we aimed to characterize the respiratory condition of the individual subjects accurately in order to use only those in whom the diagnosis of asthma appeared likely.

Methods

Study subjects and collection of data

This case-control study was conducted at the University Hospital, located in the City of Birmingham, UK. By systematic review of case notes, 71 consecutive medical in-patients, aged ≥ 55 yrs who had a physician, general practitioner, and patient self-diagnosis of asthma, were identified. Patients were assessed prior to discharge (median 7 days after admission) by the same interviewer (CAED), using a structured questionnaire. Sixteen subjects were excluded because of: terminal illness (2); reduced level of consciousness (3); dysphasia (6); or a Mini-Mental State Examination (MMSE) score of ≤ 15 (5). Five patients refused to participate.

In order to further substantiate the label of asthma, patients' data were analysed only if they fulfilled at least one of the following criteria: 1) airways reversibility

(>15% improvement in forced expiratory volume in one second (FEV₁) 20 min after the administration of 5 mg salbutamol and 0.5 mg ipratropium bromide *via* a nebulizer, with a minimum increase in FEV₁ of 160 mL, as described by TWEEDALE *et al.* [9]); 2) minimal smoking history (a smoking history of <10 pack-years); 3) long-standing history (history of asthma of ≥40 yrs); 4) absence of airflow obstruction (postnebulizer FEV₁ >65% predicted, *i.e.* within 2 SD of expected values in this age range [10]).

This procedure excluded 10 patients, who were characterized by heavy cigarette consumption (median 31 pack-years), recent onset of symptoms (mean 7 yrs duration), and very low FEV₁ (mean 0.9 L, 39% pred), and who almost certainly had emphysema rather than asthma. This left 40 asthmatics who were age- and sex-matched with 40 hospital controls without a diagnosis of asthma. Control subjects were recruited after the asthmatics had been enrolled by systematic case-note review. All control subjects were interviewed and matched if they were born within 6 months of the birth date of an asthmatic of the same sex: 62 were identified from ward records, of whom 18 were excluded (reduced level of consciousness (6), dysphasia (5) and MMSE score <15 (7)) and four refused to participate. All patients gave written informed consent, and the study was approved by the local Research Ethics Committee.

Assessment scales

The MMSE of FOLSTEIN *et al.* [11] was used to assess cognition, a modified Barthel Index (BI) [12] was used to record basic functional status, and the St George's Respiratory Questionnaire (SGRQ) [13] was used to record symptoms only. This latter test has a maximal score of 100, denoting worst symptoms. The 30-item Geriatric Depression Score (GDS), which was used to detect depression, has been validated for use in hospitalized patients aged ≥55 yrs, with a score of ≥11 being highly suggestive of depression [14]. Quality of life was assessed by use of the short form (SF)-36 health survey questionnaire [15], which is divided into nine different components, each with a maximum score of 100, denoting "best" quality of life. It has also been validated in older hospitalized patients [16], and has been used in studies of patients with chronic airflow obstruction [17]. Self-completion was encouraged wherever possible; the interviewer (CAED) remained with the patient to advise on the completion of the questionnaire, but took care not to give advice that might bias the answers given. Spirometry was performed on all subjects (Compact 2, Vitalograph, UK), and was repeated in asthmatics to assess reversibility, as described above. After tuition, the best of three attempts was recorded, provided there was less than 5% variability in FEV₁. Seven asthmatics and eight controls were unable to give a satisfactory reading.

Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences. Paired sample t-tests were used to

compare data relating to function, depressive symptoms and quality of life, since results were approximately normally distributed. Mean paired difference and 95% confidence intervals were also calculated for SF-36 components. A calculation demonstrated that with 40 pairs of subjects there was over 80% power to detect a difference between means of 15 points in any of the SF-36 components, with a standard deviation of 30. A p-value less than 0.05 was considered significant.

Results

Characteristics of population

The mean age in both groups was 72±8 (median 73 yrs, range 55–85 yrs) and 29 (72%) were female (table 1). Smoking history was similar in both groups. The characteristics of the asthma group are presented in figure 1. Despite exclusion of those whose diagnosis of

Table 1. – Characteristics of study population

	Asthma group (n=40)	Control group (n=40)
Mean age yrs	72	72
Current smokers n	7	4
Ex-smokers n	19	23
Lifetime nonsmokers n	14	13
Living alone n	18	16
FEV ₁ L#		
prenebulizer	1.09 (0.52)	1.49 (0.69)
postnebulizer	1.28 (0.55)	NA
FVC L#		
prenebulizer	1.79 (0.74)	2.29 (0.8)
postnebulizer	2.13 (0.59)	NA
FEV ₁ /FVC %		
prenebulizer	60 (18)	69 (27)
postnebulizer	62 (30)	NA

#: values are presented as mean, and SD in parenthesis. FEV₁: forced expiratory volume in one second; FVC: forced vital capacity; NA: not applicable.

Fig. 1. – Chart of characteristics of asthma subjects. IHD: ischaemic heart disease; COPD: chronic obstructive pulmonary disease (history of chronic bronchitis or emphysema); REV: ≥15% increase in FEV₁ postnebulizer; FEV₁ >65%: postnebulizer FEV₁ >65% of predicted value; >40 yr diagnosis: asthma first diagnosed ≥40 yrs ago. FEV₁: forced expiratory volume in one second.

asthma was highly debatable, seven patients had co-existing chronic bronchitis, although only three had a diagnosis of "emphysema" (two of whom also had chronic bronchitis), which could not be confirmed. In asthmatics, mean FEV₁ prenebulizer was 1.09 L (53% pred) and postnebulizer was 1.28 L (62% pred), compared with 1.49 L (70% pred) in the controls (without nebulization). Asthma was the main reason for admission in 27 cases, and comorbidity data are presented in table 2. Oral corticosteroids were prescribed to 21 asthmatics at the time of study.

Table 2. – Major co-morbidity data from asthmatic subjects and controls

Co-morbid diagnosis	Asthma group (n=40)	Control group (n=40)
Arthritis	17 (42)	20 (50)
Stroke	0	6 (15)
Chronic bronchitis	7 (18)	4 (10)
Ischaemic heart disease	16 (40)	19 (48)
Parkinson's disease	1	1
Diabetes mellitus	2	3
Pulmonary embolus	0	4 (10)
Leg ulcers	1	1

Values are presented as absolute number, and percentage in parenthesis.

Table 3. – Results of SGRQ, MMSE, Barthel Index and GDS

	Asthma group (n=40)	Control group (n=40)	p-value
SGRQ (symptoms)	53.8 (25.8)	22 (24.7)	0.001
MMSE score	26.2 (2.6)	25.4 (4.2)	0.3
BI score	18.1 (3.0)	17.9 (2.1)	0.68
GDS score	8.1 (5.3)	10.4 (7.1)	0.12
GDS >11 n [#]	19 (48)	11 (28)	0.32

Scores are presented as mean, and sd in parenthesis. #: absolute number, and percentage in parenthesis. SGRQ: St George's Respiratory Questionnaire; MMSE: Mini-Mental State Examination; BI: Barthel Index; GDS: Geriatric Depression Score.

Symptoms, mental and functional status

Asthmatics were highly symptomatic according to the symptoms section of the SGRQ, which assesses symptoms over the previous 12 months, with a mean score of 53.8, compared with 22.0 in control subjects ($p<0.001$). Shortness of breath on most days a week was experienced by 21 asthmatics, and 14 complained of wheeze most days. Mean MMSE and Barthel Indices were similar in both groups (table 3).

Depressive symptoms

As might be expected in an elderly hospitalized population, high levels of depression were found in both groups (table 3). Nineteen asthmatics (48%) and 11 (28%) controls scored 11 or more using the GDS, although this was not statistically significant. A past history of depression requiring medication was reported by 11 asthmatics and 12 controls. In the eight asthmatics with coexisting chronic bronchitis and/or emphysema the mean GDS was 8, compared to 8.3 in the other asthmatics, *i.e.* depression appeared no more prevalent in this small subgroup.

Quality of life

Several domains of the SF-36 indicated significantly impaired quality of life in the asthma group compared with controls, particularly in physical role limitation, energy, change in health, and general health (table 4). The majority of patients reported that their health had worsened in the last 12 months, but this was significantly more marked in asthmatics, nine of whom viewed their overall health status in the worst category. However, the mental, mental role and social components were not markedly different between the groups, and pain was actually greater in the control group.

Correlations

SF-36 was not correlated with FEV₁, except for a statistically significant but poor association with the physical component ($r=0.37$; $p=0.04$). Similarly, SGRQ

Table 4. – Scores for all components of the SF-36 questionnaire

SF-36 components	Asthma group	Control group	Difference	95% CI	p-value
Physical	33.8 (27)	45.8 (26.6)	12.0	0.4–23.5	0.04
Physical role	36.0 (40)	57.9 (41)	22.0	4.4–39.4	0.01
Mental role	70.1 (43.1)	79.5 (33.8)	9.4	-26.5–7.7	0.27
Social	49.0 (31)	57.3 (32)	8.3	-5.5–22.1	0.20
Mental	72.2 (22.8)	71.3 (23.2)	8.9	-12.3–10.6	0.87
Energy	36.0 (24.6)	49.4 (25.7)	13.4	3.3–23.5	0.01
Pain	66.1 (31.8)	50.1 (33.3)	16.0	1.6–30.2	0.03
Change in health	25.7 (23.6)	39.0 (25)	13.3	3.0–23.7	0.01
General health perception	41.2 (26)	54.9 (26.3)	13.7	2.0–25.4	0.02

Values are presented as mean, and sd in parenthesis. SF: short form; 95% CI: 95% confidence interval.

and FEV₁ postnebulizer were weakly correlated ($r=-0.39$; $p=0.02$) but the scatterplot was poor. As expected, SF-36 and GDS were highly correlated ($r=-0.57$; $p<0.0001$), reflecting the overlap of questions in the two scales which has been described previously [18].

Discussion

This is one of the first studies examining depression and quality of life in older asthmatics. It demonstrated that quality of life is impaired in older hospitalized asthmatics compared with age- and sex-matched controls. The physical components of the SF-36 were the most adversely affected, while psychological and social components were not significantly different. Depressive symptoms, although common in both groups, were more frequently present in asthmatics, but this trend did not reach statistical significance.

The present study relied on hospitalized patients, albeit just prior-to-discharge. Quality of life components revealed low scores in both groups, but clearly asthmatics had significantly worse results in several key areas; we believe it is the relative differences between the various components that are important rather than the absolute values. The diagnosis of asthma in older people is complex and the differential diagnosis is wide [19]. We therefore resisted the approach of some researchers to rely purely on a self-label of asthma or on patients taking antiasthma medication [5]. Moreover, 10 patients were excluded who had no other features to suggest asthma; these patients all had a history of heavy smoking, poor lung function, and a relatively short history of symptoms. They were similar to those excluded by BURROWS *et al.* [2] in their study of elderly asthmatics. Epidemiological studies of asthma in older people show that there is a considerable co-morbid diagnosis of chronic bronchitis, ranging from 12–48% [2, 20]. Although the proportion in the present study was at the lower end, it is likely that some of the problems reported by these subjects were attributable, in part, to other lung or cardiac conditions. However, to have excluded these patients and studied only "pure" asthmatics would, we believe, have diminished the applicability of the study to the broad asthma population.

This study raises interesting questions about the role of psychosocial factors in respiratory disease. Conflicting information exists about the relationship between depression and asthma. JANSON *et al.* [21] reported an association between psychological status and respiratory symptoms but not asthma itself, and JONES *et al.* [22] found that abnormal personality profiles could not be explained by asthma *per se*. Severe and brittle asthma in younger patients did appear to be associated with psychiatric morbidity [23], whilst others have stressed that it is the severity of the condition that is important and that the combination of asthma and depression can be fatal [24]. Psychological impairment is undoubtedly a major problem in patients with COPD: prevalence rates of depression as high as 60% have been reported even in an out-patient population [25]. Psychosocial scores of the Sickness Impact Profile have been shown to be significantly worse in a study of 203 severe COPD subjects compared with controls [26].

The prevalence of depression in the present hospitalized population using a screening questionnaire was high, but we could not demonstrate a statistical difference compared with controls. The population under study make it difficult to draw any firm conclusions. However, despite the severity of symptoms described by asthmatics, there was no significant increase in social isolation or emotional problems as measured by the SF-36. This is a generic, rather than a disease specific measure, but it has been shown to have good internal reliability and validity in asthma [27], and has a broad band approach to health status measurement that has been recommended by some authorities [28, 29]. There may be several explanations for our finding of lower rates of psychological morbidity in older asthmatics. Psychosocial factors may be more frequently found in COPD because their symptoms and pulmonary function are generally worse than asthmatics. However, it is well-recognized that there is a poor association between spirometric values and quality of life [30], which is reconfirmed in the present study. The potentially greater variability of symptoms, and larger response to bronchodilators and steroids in asthmatics may make them more confident, and less liable to reduce their social contact. These are issues that need to be examined in more detail in future studies.

In conclusion, older asthmatic in-patients have an impaired quality of life, particularly with respect to the physical components. Depressive symptoms are common, but an absolute increase compared with controls was not demonstrated. Psychological and social components of the SF-36 appear not to be significantly worse than in control subjects. It should be emphasized that these findings relate to hospitalized patients and we are currently conducting a further study examining subjects dwelling in the community.

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