Accuracy of a first diagnosis of asthma in primary health care

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Background. In a postal questionnaire study, the prevalence of asthma in southern Sweden has been found to be 5.5%. However, the register prevalence of asthma obtained from the medical records in the same municipality and age groups was found to be only 2.1%.

Objectives. The aims of the study were to investigate whether the low register prevalence of asthma was caused by an underdiagnosis of asthma in primary health care and to validate a first diagnosis of asthma set by GPs in primary health care.

Methods. During a period of 3 months in 1997, all patients seeking care in the primary health care units of the municipality of Lund (population 171 877) with upper or lower airway infections, prolonged cough, allergic rhinitis, fatigue or a first positive diagnosis of asthma were recorded (n = 3025).

Results. In the whole group of 3025 patients, 99 patients were found to have received a diagnosis of asthma for the first time during the study period. The diagnosis was verified in 52 of those 68 patients who attended a follow-up and examination by a respiratory physician. Among the remaining 2926 patients, 221 patients were selected randomly to constitute a control group. In this group, three patients were found to have asthma. Thus, the specificity of an asthma diagnosis set in primary health care was 0.99 [95% confidence interval (CI) 0.99–1.00] and the sensitivity was 0.59 (95% CI 0.31–0.81).

Conclusions. The GPs in this study were good at excluding those who did not have asthma (specificity 99%) but less good in correctly diagnosing those who actually had current asthma (sensitivity 59%), which suggests an underdiagnosis of asthma.

Keywords. Asthma, diagnosis, primary health care.

Introduction

Asthma has been proposed to be an underdiagnosed disease. A previous postal questionnaire study performed in southern Sweden supported the hypothesis that asthma is an underdiagnosed disease since the prevalence of self-reported asthma was 5.5% compared with a register prevalence in the medical records of merely 2.1%. Recently, Marklund et al. reported that every third adult asthmatic subject who visited two GPs during a 2-year period was given the wrong diagnosis.

The aims of the present study were to validate a first diagnosis of asthma set by GPs in primary health care and to investigate whether the low register prevalence of asthma was caused by an underdiagnosis of asthma in primary health care.

Methods

Study area and study centres
The study was performed in the southernmost part of Sweden in the health care district of Lund. The catchment area comprised 171 877 inhabitants with 14 primary health care units where ~100 GPs were employed. All centres used computerized medical records which allowed a search for symptoms stated by the patients when they booked an appointment and the diagnosis set by the GP after the consultation.
Study population and study groups
The study population comprised all patients, aged 18 or more, seeking care in any of the 14 primary health care units during a period of 3 months in 1997 (n = 28,969). From this population, one asthma and one control group were selected.

The asthma group was comprised of those patients who were given a first diagnosis of asthma by the physician during the study period (n = 99). The diagnosis was set according to the physician’s own individual definition of asthma.

The control group was made up of all patients presenting symptoms which could suggest asthma (upper or lower airway infections, prolonged cough, allergic rhinitis, fatigue including exercise fatigue and/or dyspnoea) when receiving an appointment with the GP. Patients with a known diagnosis of asthma were excluded from the control group. In this group, 221 patients were selected randomly to constitute the randomized control group. A flow chart of the study is shown in Figure 1.

Methods of validation (the asthma group)
All patients with a first diagnosis of asthma were invited to a free-of-charge comprehensive investigation at the Department of Respiratory Medicine. To set the diagnosis of asthma, at least one of the following five criteria had to be fulfilled.

(i) A typical history of asthma (attacks of breathlessness, wheezing alone and accompanied by breathlessness and wheezing most days of the week)
(ii) An increase of FEV1 >15% from baseline after the administration of a β2-agonist (1.0 mg of terbutalin [Bricanyl® Turbuhaler®]).
(iii) Variation of at least 20% in peak expiratory flow (PEF) rates during a 2-week period.
(iv) An increase of FEV1 >15% from baseline value after 2 weeks of an oral steroid test (30 mg of prednisolone per day).
(v) A positive methacholine challenge test.5

Methods of validation (the randomized control group)
A structured telephone interview was carried out by an experienced asthma nurse to re-evaluate the medical history of the 221 patients in the control group. In those subjects where asthma could easily be excluded, no further examination was performed. All other subjects were invited to the same examination as the asthma group.

Statistics
Differences between groups were calculated by means of the chi-square test. Values of $P < 0.05$ were considered significant.

When calculating sensitivity and specificity of asthma diagnosis set in primary health care, due allowance was made for those not participating in the clinical follow-up. Thus the proportions of true and false positive and negative in this group were estimated to be the same.
as in the group participating in the clinical follow-up. Calculations of sensitivity and specificity were performed on these estimated figures.

Results

Participation
Sixty-eight of the 99 patients with a first diagnosis of asthma (68.7%) and 167 of the 221 patients in the randomized control group (75.6%) took part in the study (Fig. 1).

Demographic data
The median age in the asthma group was 40 years. In the randomized control group, the median age was 42 years.

Total outcome
In the asthma group, the diagnosis was verified in 52 cases (76.5%). Of the 16 patients where a diagnosis of asthma was not verified, nine patients were found to have acute bronchitis or bronchitis, and three were found to have chronic obstructive pulmonary disease (COPD). In seven cases, no lung disease was diagnosed.

By the clinical evaluation by telephone of the control group, 113 patients were excluded as not having asthma. Three patients stated that they had a previous diagnosis of asthma and four patients stated that they had COPD. These diagnoses were not recorded at the primary health care units. In the remaining 47 patients who took part in the clinical examination, three (6.4%) patients were diagnosed as having asthma.

Thus, of the whole randomized control group, six patients (3.6%) had asthma and four patients (2.4%) had COPD. The results are summarized in Figure 1B.

Sensitivity, specificity and predictive value
The proportion of those who had asthma and were correctly diagnosed in primary health care was 0.59 [95% confidence interval (CI) 0.31–0.81] (sensitivity) and the proportion of those who did not have asthma and were correctly diagnosed was 0.99 (95% CI 0.99–1.00) (specificity).

The positive predictive value of an asthma diagnosis set in primary health care was 76.5% and the negative predictive value was 98.2% (Table 1).

Discussion
In this study, the diagnosis of asthma was verified in 76.5% of the patients who participated in the clinical follow-up investigation, suggesting an overdiagnosis of asthma in 23.5% of the study population. Expressed in
terms of specificity and sensitivity, the sensitivity of an asthma diagnosis was 0.59 and the specificity was 0.99. These data are supported by the study performed by Marklund et al. 4 who also found an overdiagnosis of asthma in primary health care. Several reasons for an overdiagnosis of asthma in primary health care can be suggested. It is likely that a specialist’s criteria are more stringent, thus fewer patients with a diagnosis of asthma are to be expected. The large number of GPs involved in the study having varying degrees of accuracy of diagnosing asthma might also have contributed to a less accurate diagnosis. Since the follow-up visits took place up to 3 months after the initial visit, patients may have forgotten important facts concerning their respiratory history.

In our previous postal questionnaire study performed in the same area as the present study, we found a self-reported asthma prevalence of 5.5% compared with a register prevalence in the medical records of only 2.1%. 3 Therefore, although there was an overdiagnosis of asthma in primary health care, it can be suggested that some patients with asthma are still undiagnosed. This is supported by the fact that ~2% of the subjects in the randomized control group had asthma.

The primary health care physicians in the municipality of Lund are taking part in regular educational programmes in which the topics of asthma and asthma treatment are also included. In spite of that, it is concluded that even though the GPs in the study were very good in excluding those who did not have asthma, they were presumably less good in correctly diagnosing those who actually had current asthma.

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References