Monitoring of Asthma Outpatients After Adapting Treatment to Meet International Guidelines

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Objective: Poor control of asthma treated in outpatient settings has been demonstrated. The aim of this study was to perform a short intervention, readily replicable in everyday practice, to try to improve control of asthma symptoms.

Patients and Methods: Two primary health care clinics made appointments with asthma patients to administer a questionnaire and adapt their treatment to the guidelines of the Global Initiative for Asthma. Patients also received an explanation of the disease lasting not more than 5 minutes. The protocol was repeated at a second visit 4 months later.

Results: The characteristics of the 180 patients were as follows: 70% were women, 17% were smokers, 8% were illiterate, 46% had only primary education, 45% were in contact with cleaning products, and 63% had extrinsic asthma. The asthma severity was as follows: mild in 73%, moderate in 23%, and severe in 4%. Twenty-two percent had received previous explanations of the disease, 50% had a written treatment plan, 14% had a plan for exacerbations, and 54% were taking inhaled corticosteroids. The second appointment made appointments with asthma patients to administer a questionnaire and adapt their treatment to the guidelines of the Global Initiative for Asthma. Patients also received an explanation of the disease lasting not more than 5 minutes. The protocol was repeated at a second visit 4 months later.

Conclusions: This minimal clinical intervention reduced the need for visits to health care centers and improved the clinical control of the disease.

Key words: Asthma. Education. Adherence.

Introduction

European studies of asthma and respiratory health have shown that asthma is a common disease. In Barcelona, Spain, for example, 6.6% of women and 6.3% of men between 20 years and 40 years of age suffer from asthma. However, the prevalence of asthma in Spain is below the actual European average.
According to a study that included data from Barcelona, where 3% of the population is actually diagnosed with asthma, this suggests that only half the patients with asthma had actually been diagnosed with the disease.

Although it is recognized that asthma treatments can control symptoms in many patients, studies in both Europe and the United States of America show that most patients do not administer their medication in accordance with international guidelines. Global Initiative for Asthma (GINA) and report that their disease is poorly controlled. This is disappointing if we bear in mind the extensive health care resources assigned to these patients and the effort expended in training the physicians through multiple academic activities. These resources and measures do not appear to ensure acceptable control of patients’ symptoms in practice. In fact, patients are not treated according to the recommendations of consensus guidelines, and the limited knowledge that the patients have of their illness contributes to the unsatisfactory control of asthma symptoms. This unsatisfactory control not only increases the likelihood of an exacerbation but also gives rise to greater personal discomfort, greater use of outpatient and emergency services, absence from work or school, and therefore to a greater economic burden on the health system. For example, the average total cost generated by an asthmatic patient in the district of Osuna, near Barcelona, Spain, was calculated to be US $2879 per year in 1995, whereas the cost of treating a patient with severe disease was 6 times greater. The patients with poorest asthma control, representing a fourth of the population, accounted for more than half the total cost of the disease.

Several studies have shown that those patients who follow an educational plan to inform them about asthma, have a written treatment plan, monitor their disease, and attend the clinic regularly have better disease control, and these findings have been confirmed in Spain by Ignacio-García et al. For these educational plans to be effective, the physician or nurse must dedicate a certain amount of time to them at each visit, and so their application in clinical practice is difficult. Faced with the lack of studies that show the effectiveness of these sample interventions, experts recommend that studies should be undertaken.

The aim of this study was to determine how well asthma is controlled and investigate what treatments are actually taken by patients diagnosed with asthma in 2 primary health care clinics in Barcelona. We also assessed whether adapting treatment to international guidelines and undertaking a basic educational intervention to inform the patients about asthma in a single dedicated visit could improve the degree of symptom control in such patients and reduce the use of health care services.

**Patients and Methods**

**Patients**

The patient lists of 2 primary health care clinics were reviewed, and consecutive patients with asthma were scheduled to have an appointment with a pulmonologist in the corresponding center in order to update their treatment. The study was approved by the ethics committee of the Hospital Universitari Vall d’Hebron, Barcelona, Spain.

**Baseline Visit**

A primary health care physician called 8 patients per week by telephone to arrange an appointment with 4 of them per day on 2 different days. Once in the clinic, the patients were attended by 1 of the 2 pulmonologists who participated in the study and who were not affiliated with the study centers. These specialists followed a protocol that comprised: a) questioning the patients about their professional lifestyle, diet, consumption of alcohol and other drugs, pets in their home, allergic manifestations other than asthma (rhinitis, conjunctivitis, eczema, urticaria), and the results of skin prick tests or determination of specific serum immunoglobulin E if 1 or both tests had been performed; b) asking the patients whether they had been given an explanation of their disease, whether they had been given a written treatment plan, and whether their disease was monitored in any other way, as well as asking them about the treatment they were actually using and assessing the degree of asthma control according to their symptoms (cough, wheezing, dyspnea, and rescue medication used), frequency of visits to the primary health care physician and the emergency services, and absence from work in the previous 4 months; c) spirometric testing; d) classifying asthma severity according to GINA guidelines, which is, prior symptoms and symptoms at the time of the visit; and, finally, e) issuing a prescription to adjust the medication to the severity of the disease, as well as instructing the patients what changes to make to control worsening symptoms (increased use of rescue β-agonists and, in the case of improvement, a short course of oral corticosteroids) and explaining to the patients in 5 minutes what asthma consists of. The first visit lasted 30 minutes overall. The disease was explained with the aid of illustrated educational material contained in the Diaryflow informative booklet and peak flow diary (issued by the Catalan Foundation of Pneumology [FUCAP], Barcelona, Spain). This booklet is used regularly in our service. The information it contains is shown in Table 1.

**Follow-Up at 4 Months**

Patients were called by telephone 2 to 4 days before the appointment to remind them of the visit. This second and final visit to the pulmonologist followed the same protocol as presented above, and the clinical data from the preceding 4 months were collected.

**Definition of Asthma**

The pulmonologist accepted all referred asthmatic patients who reported symptoms of intermittent dyspnea, wheezing, and coughing as their indicators of asthma. The pulmonologist administered a breath test and performed spirometric testing and skin prick tests.

**TABLE 1**

**Content and Treatment Plan Presented in the Diaryflow Informative Booklet and Peak Flow Diary**

| 1. Explanation of asthma as an inflammatory bronchial disease, which may be accompanied by bronchoospasm and mucus secretion |
| 2. What drugs are prescribed and where they act |
| 3. List of proinflammatory substances of the bronchial mucosa |
| 4. Scheme/treatment plan and plan for changes in the event of exacerbation (bronchodilators on demand and, if necessary, oral corticosteroids) |
| 5. Administration technique for the different drug inhalers |
and/or chest tightness. Seasonal variation in symptoms and a family history of asthma or atopy helped guide diagnosis.  

Statistical Analysis

Initially, the sociodemographic and clinical characteristics of the patients included in the study were analyzed descriptively. The baseline characteristics of patients with complete follow-up and those who failed to attend the second visit were compared. Groups were compared with the Student t test in the case of quantitative variables and with the χ² test or Fisher exact test in the case of qualitative variables. The comparative analysis between the baseline visit and the follow-up visit was done with the McNemar test for paired data. The level of significance was set to .05 for all statistical tests. The statistical analysis was carried out using the SPSS program version 12.0.

Results

Baseline Visit

Of the 230 patients who answered the telephone call, 192 (83%) attended the clinic. Of those who attended, diagnosis of asthma was confirmed in 180, who comprised the patient population studied in the first visit. Table 2 presents the baseline characteristics of the patients: 70% were women, 42% were over 60 years old, 17% were regular smokers, 46% had only primary education, 8% were illiterate, and 75% were or had been manual workers. Skin prick tests had been done in 131 patients (73%), and 82 (63%) reported that the results had been positive for at least 1 allergen. A high percentage reported other allergic symptoms, the most common of which was rhinitis (46%) followed by conjunctivitis (42%). A significant or severe clinical reaction to acetylsalicylic acid had been experienced by 11% of the patients. As expected, 90% of the patients were attended by a physician of the Catalan health system—51% directly by the family physician and 44% by a pulmonologist. Eight percent were attended by a private physician through a health insurance company (other system). Only 22 patients reported following alternative medical treatment. Only 22% of the patients reported having received explanations about asthma, 50% said they had no written treatment plan, and only 14% had a plan to follow in the event of exacerbation of the disease. After excluding patients with systolic blood pressure greater than 140 mm Hg and/or diastolic blood pressure greater than 90 mm Hg, the mean (SD) systolic blood pressure in the remaining 114 patients was 119 (9) mm Hg and the mean diastolic blood pressure was 73 (6) mm Hg.

The clinical characteristics at the baseline visit are described in Table 2. The second appointment was kept by 110 patients (61%). There were no significant differences between these patients and the 70 (39%) who did not keep the second appointment, except for drug allergy, which was more common in the group who kept the appointment (n=27, 25%) than in the other group (n=8, 11%) (P<0.03), and reactions to acetylsalicylic acid, reported by 18 (16%) of those who kept the second appointment and 2 (3%) of those who...
did not (P<0.001). Those who kept the second appointment were less frequently attended by a private physician (n=4, 4%) than those who did not (n=10, 14%) (P<0.02). The only difference in the treatment they were taking at the first visit was in intake of anticholinergic drugs, taken more frequently by those who attended the second visit (n=17, 15%) than by those who did not attend (n=4, 3%) (P<0.03). The reasons for not keeping the second appointment, despite arranging it during the first visit and calling by telephone a few days before the appointed day were as follows: 5 patients had not complied with treatment due to worries about the side effects of inhaled corticosteroids, 3 patients suffered laryngeal side effects from corticosteroid use, 22 patients had not complied with the prescribed treatment, 25 patients confirmed but did not attend, and 15 did not attend for unknown reasons.

Table 3 shows the treatment that the 180 patients were prescribed by the pulmonologist at the first visit according to GINA criteria. Table 4 shows the data on the degree of symptom control in the 4 months prior to the baseline visit and in the 4 months between this visit and the follow-up visit (second visit). It was found that, in this period, fewer visits had been scheduled (P<0.001) and fewer visits to the physician due to exacerbation were reported (P<0.001). Likewise, fewer emergency visits to the primary health care clinic were required (P<0.001). Moreover, disease control at the follow-up visit was significantly better as reflected by the significantly lower severity (P<0.02). Between the 4-month periods before each of the visits, there were no differences with regard to having 7 consecutive days with symptoms or use of rescue medication for more than 7 days. As shown in Table 5, 4 months after the intervention, patients continued to follow a treatment that was significantly different from their previous one and this new treatment was better adapted to GINA guidelines.

Discussion

One part of this study describes the clinical characteristics and treatments of a group of asthmatic patients diagnosed and attended in two primary health care clinics. The study also showed that adapting treatment to the recommendations of international guidelines, together with a brief explanation of the disease, led to fewer exacerbations and less use of health care services by the patients. These patients

### TABLE 3

Prior Pharmacologic Treatment, Treatment Prescribed by the Pulmonologist, and the Treatment Taken 4 Months After the Intervention

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Before the 1st Visit (n=180)</th>
<th>Prescribed at the 1st Visit (GINA) (n=180)</th>
<th>After the Intervention (2nd Visit) (n=152)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>41 (23%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Short-acting β-agonists</td>
<td>101 (56%)</td>
<td>123 (68%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Long-acting β-agonists</td>
<td>71 (39%)</td>
<td>131 (75%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Anticholinergics</td>
<td>20 (11%)</td>
<td>33 (33%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Antileukotrienes</td>
<td>20 (11%)</td>
<td>43 (25%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Theophylline</td>
<td>9 (5%)</td>
<td>17 (9%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Oral corticosteroids</td>
<td>16 (15%)</td>
<td>19 (11%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>β2-agonists &gt;8 days/previous month</td>
<td>6 (4%)</td>
<td>10 (6%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Hyposensitizing treatment</td>
<td>6 (4%)</td>
<td>10 (6%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Alternative treatments</td>
<td>2 (2%)</td>
<td>2 (2%)&lt;sup&gt;β&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<sup>β</sup>Significant differences observed for symptoms and rescue medication (>7 days of symptoms or rescue medication added for more than 7 days), as well as visits to the hospital emergency room for exacerbations, absence from work, and impairment in quality of life before and after the intervention.
unsatisfactory,3,4 as reflected in the present study.

control of the disease in asthmatic patients is
dealing with a high number of exacerbations, a finding which suggests that the intervention was not very effective in these patients.

In the discussion of the clinical characteristics of the study patients, it should be remembered that the population corresponded to asthmatic patients who attended our primary health care clinics. This population accounts for only half the entire asthmatic population, that is, those diagnosed with the disease.5

This finding suggests that the patients, in addition to receiving better treatment, were better able to treat exacerbations by self-administration of more corticosteroids compared to the period prior to the intervention (P<.001). As a result, the patients required fewer scheduled and emergency visits to their family physician (P<.001) and fewer emergency visits to the primary health care clinic (P<.001). Given that patients with an exacerbation usually receive corticosteroids when they attend one of the emergency services, the recommendation to use a short course of such drugs if the exacerbation is not improved by adding short-acting β-agonists is effective at decreasing the burden on health services and can avoid the need for equal or even higher corticosteroid doses.

The one-off intervention of an expert can help improve control of bronchial asthma and encourage the flow of patients to primary-care care and pulmonologists. The expert is responsible for adapting treatment to the guidelines and briefly informing the patient about the disease.6,16 Such an intervention is indeed recommended by the Spanish Society of Pulmonology and Thoracic Surgery (SEPAR) and the Spanish Society of Family and Community Medicine (semFYC),8 and may be beneficial for the health care system.
positive. It is also interesting that the patients showed a number of other manifestations of allergy: 46% reported rhinitis, 42% conjunctivitis, 27% urticaria, 23% eczema, and almost 20% some type of drug hypersensitivity. A population according to whether at least one skin test was positive, the percentages of other manifestations of atopy are 50% for rhinitis, 43% for conjunctivitis, 32% for eczema, 26% for urticaria. These percentages are somewhat lower than those with negative test results, that is, those with intrinsic asthma. It is also noteworthy that 11% of the patients reported that they were certain they had experienced an adverse reaction to acetaminophen and 4% reported a probable reaction to this drug. In fact, it is known that up to 28% of asthmatic patients are hypersensitive to nonsteroidal antiinflammatory drugs if they undergo a challenge test with these drugs.

In the analysis of the treatments actually used by the patients (Table 3), we found that these patients were not receiving the recommended treatment even though guidelines are available. The question in the protocol was phrased to ask about the “medication that you are actually taking,” and so we were unable to determine whether this lack of compliance with the guidelines was because the medication was not prescribed or because the therapeutic compliance of the patients themselves was inadequate. The intervention of the pulmonologist served to adapt the medication to that recommended by the guidelines. We should point out that this adaptation will of course increase the use of inhaled corticosteroids and long-acting $\beta_2$-agonists, often through the use of combinations already on the market. This poses the question of what will happen in the coming years when long-acting $\beta_2$-agonists are used as long-term treatment because, according to some reports, such use was associated with an increase in severe exacerbations. However, this association was not corroborated by a recent study. Furthermore, according to a recent study by Boushey et al. in patients with persistent mild asthma (found in 49% of the patients in our study), differences in disease control over the course of a year were not found between those who concomitantly received inhaled corticosteroids, as recommended in the guidelines, and those who only used such drugs in the event of deterioration of symptoms. Continuous use of such drugs has therefore been brought into question. It is also noteworthy in our study that many patients (25%) were taking a number of other medications simultaneously, including antihistamines, decongestants, and expectorants. These prescriptions may be influenced on the one hand by the high incidence of associated rhinitis (46%) and on the other by the fact that these drugs are prescribed as an alternative in patients who are incapable of administering inhaled treatment properly.

The present study describes the degree of control of asthma and its treatment in “real-life” asthmatic patients who attended primary health care clinics. The severity of the disease decreased and the use of the health services was lower after adapting treatment to GINA guidelines, establishing a treatment plan for exacerbations, and giving the patients a short explanation of the disease. Given that this study presents level III evidence (uncontrolled study of a group before and after an intervention), further randomized, controlled studies should be done in patients, perhaps with 2 short successive interventions, to confirm these findings and, in particular, to corroborate the improvement in the degree of severity of disease in these patients.

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REFERENCES