ORIGINAL ARTICLES

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. Health care parameters were compared with those from the previous visit.

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 was kept by 110 (61%) of the patients, who showed differences with respect to the previous visit 4 months earlier in the percentage taking inhaled corticosteroids (78%, $P<.001$), the number of visits to the physician ($P<.01$), visits to the physician due to exacerbations ($P<.001$), emergency visits to the outpatient clinic ($P<.002$), and disease severity ($P<.02$).

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.*

La población de asmáticos ambulatorios y su control tras adaptar el tratamiento a las recomendaciones internacionales (ASMACAP I)

Objetivo: Los pacientes asmáticos en régimen ambulatorio muestran un deficiente control de su enfermedad. El objetivo de este estudio ha sido realizar una intervención corta, y factible de repetir en la práctica, con el fin de intentar mejorar dicho control.

Pacientes y métodos: Se citó a los pacientes asmáticos de 2 centros de asistencia primaria para encuestarles, adaptar el tratamiento según las recomendaciones de la GINA (Global Initiative for Asthma) y explicarles en 5 min en qué consistía la enfermedad. A los 4 meses se realizó una segunda visita repitiendo el protocolo. Se compararon los parámetros asistenciales de los 4 meses anteriores a cada visita.

Resultados: De las características clínicas de los 180 pacientes destaca que un 70% eran mujeres, un 17% fumaba, un 8% eran analfabetos, un 46% únicamente tenía estudios primarios, un 45% estaba en contacto con productos de limpieza y en un 63% el asma era extrínseca. Por lo que se refiere a la gravedad del asma, en un 73% ésta era leve, en un 23%, moderada y en un 4%, grave. Un 22% había recibido explicaciones sobre su enfermedad, un 50% tenía el tratamiento por escrito, un 14% tenía un plan para las exacerbaciones y el 54% recibía corticoides inhalados. Los 110 (61%) que acudieron a la segunda visita mostraron diferencias, en los 4 meses previos a cada visita, en el tratamiento con corticoides inhalados (78%, p < 0,001) en el número de visitas a su médico (p < 0,01), en las visitas por agudización a su médico (p < 0,001) y a urgencias en su ambulatorio (p < 0,002), y también en el estadio de la enfermedad (p < 0,02).

Conclusiones: Esta actuación clínica mínima ha reducido la frecuentación a los centros asistenciales y ha mejorado el grado de control clínico de los pacientes.

Palabras clave: *Asma. Educación. Adherencia.*

Introduction

European studies of asthma and respiratory health have shown that asthma is a common disease.[1,2] 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.[1] However, the prevalence of asthma in Spain is below the actual European average

according to a study that included data from Barcelona,[1] where 3% of the population is actually diagnosed with asthma.[2] 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[3] and the United States of America[4] show that most patients do not administer their medication in accordance with international guidelines (Global Initiative for Asthma [GINA])[5] 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.[6] 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 Osona, 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.[7,8]

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,[6] and these findings have been confirmed in Spain by Ignacio-García et al.[9] 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 simple interventions,[10] experts recommend that studies should be undertaken.[11]

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[5] 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 consulted, 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 profession, smoking habit, 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,[12] that 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,

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 bronchospasm 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.[13]

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 χ^2 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 antigen. 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 or other system). Only 2 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*<.03), and reactions to acetylsalicylic acid, reported by 18 (16%) of those who kept the second appointment and 2 (3%) of those who

TABLE 2
Baseline Sociodemographic, Clinical, and Health Care Characteristics of the 180 Asthmatic Patients Attended in 2 Primary Health Care Clinics*

Age, y	
Mean (SD)	59 (19)
<20	13 (7%)
20-93	55 (30%)
40-59	37 (21%)
60-79	75 (42%)
Sex	
Women	126 (70%)
Smoking habit	
Smokers	30 (17%)
Treating physician	
Physician of any type	162 (90%)
Family physician	83 (51%)
Pulmonologist	70 (44%)
Other physicians	5 (3%)
Private physician	14 (8%)
Treatment guidelines received	39 (22%)
Explanation of asthma	22 (12%)
List of substances to avoid	89 (50%)
Written treatment plan when plan of changes is available	26 (14%)
Severity	
I (mild intermittent)	46 (26%)
II (mild persistent)	86 (49%)
III (moderate)	37 (21%)
IV (severe)	6 (3%)
Previous allergy studies	
SPT available	131 (73%)
≥1 positive SPT	82 (63%)
Other manifestations of hypersensitivity	
Rhinitis	83 (46%)
Positive SPT	48/82 (59%)
Negative SPT	12/35 (37%)
Conjunctivitis	75 (42%)
Positive SPT	36/82 (43%)
Negative SPT	13/35 (35%)
Eczema	51 (30%)
Positive SPT	27/82 (32%)
Negative SPT	8/35 (23%)
Urticaria	48 (27%)
Positive SPT	22/82 (26%)
Negative SPT	5/35 (14%)
Drug hypersensitivity	35 (19%)‡
Acetylsalicylic acid reaction	
Evident	20 (11%)
Probable	8 (4%)
Educational level	
Illiterate	14 (8%)
Primary education	83 (41%)
Secondary education	58 (32%)
Higher education	25 (14%)
Skill level	
Skilled manual	66 (37%)
Manual	69 (38%)
Intermediate	25 (14%)
Professional/university graduates	20 (11%)
Type of Work†	
Homemaker	64 (36%)
Office worker/student	58 (32%)
Cleaner	19 (10%)
Food worker	6 (3%)
Textile worker	5 (3%)
Builder	5 (3%)
Baker	4 (3%)
Others	19 (10%)

*Data are shown as the number of patients and percentage unless otherwise stated. SPT indicates skin prick test.
†Nonexclusive categories; ‡Penicillin (n=9), amoxicillin (n=2), sulfamides, metamizol, sulpiride, triamcinolone, iodine, and "cough syrup" (n=1 for each); the medication was not reported in the remaining cases.

TABLE 3
**Prior Pharmacologic Treatment, Treatment Prescribed
by the Pulmonologist, and the Treatment Taken 4 Months
After the Intervention**

Treatment	Prior to Firt Visit (n=180)	Prescribed in the First Visit (GINA) (n=180)
None	41 (23%)	0
Short-acting β-agonists	101 (56%)	123 (68%)
Inhaled corticosteroids	98 (54%)	152 (84%)
Long-acting β-agonists	71 (39%)	135 (75%)
Anticholinergics	20 (11%)	33 (18%)
Antileukotrienes	20 (11%)	45 (25%)
Theophylline	9 (5%)	4 (2%)
Antihistamines	27 (15%)	9 (5%)
Oral corticosteroids >8 days/previous month	6 (4%)	–
Hyposensitizing treatment	6 (4%)	0
Alternative treatments	2 (2%)	0

TABLE V
**Treatment Followed Before and 4 Months After
the Intervention as Reported by the 110 Patients Who Kept
the Second Appointment**

Treatment	Before the First Visit	At the Visit After 4 Months	P
None	20 (18%)	9 (8%)	.01
Short-acting β-agonists	63 (57%)	66 (60%)	.7
Inhaled corticosteroids	64 (58%)	86 (78%)	<.001
Long-acting β-agonists	44 (40%)	74 (67%)	<.001
Anticholinergics	17 (15%)	16 (15%)	1
Antileukotrienes	15 (14%)	28 (25%)	.004
Theophylline	3 (3%)	5 (5%)	.7
Oral corticosteroids >8 days/previous month	3 (3%)	15 (14%)	<.001
Hyposensitizing treatment	4 (4%)	1 (1%)	.4
Antihistamines	16 (15%)	16 (15%)	1
Natural medicine	–	2 (2%)	–

did not (*P*<.006). 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*<.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*<.03). The reasons for not keeping the second appointment, despite arranging it

TABLE 4
**Clinical Parameters in the 4 Months Prior to the Baseline
Visit and at the Follow-Up Visit in the 110 Patients
Who Attended the Second Visit***

	4 Months Before the Baseline Visit	4 Months Before the Follow-Up Visit (2nd Visit)	P
Scheduled visit to the physician			<.001
None	31 (28%)	75 (68%)	
1	30 (27%)	27 (25%)	
>1	49 (45%)	8 (7%)	
Visit to physician for exacerbation			<.001
None	55 (50%)	95 (86%)	
1	42 (38%)	11 (10%)	
>1	13 (12%)	4 (4%)	
Emergency visit for exacerbation to the primary health care clinic			<.001
None	51 (46%)	92 (84%)	
1	41 (37%)	11 (10%)	
>1	18 (16%)	7 (6%)	
Disease severity			.02
I (mild intermittent)	28 (26%)	35 (33%)	
II (mild persistent)	50 (47%)	46 (44%)	
III (moderate)	25 (23%)	20 (19%)	
IV (severe)	4 (4%)	4 (4%)	
Not determined	3	5	

*No significant differences observed for symptoms and rescue medication (>7 days with 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 spirometry variables before and after the invention.

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 taking before the baseline visit and the one that was 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*<.001) and fewer visits to the physician due to exacerbation were reported (*P*<.001). Likewise, fewer emergency visits to the primary health care clinic were required (*P*<.001). Moreover, disease control at the follow-up visit was significantly better as reflected by the significantly lower severity (*P*<.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

required fewer visits, whether scheduled or urgent, to their family physician, and fewer emergency visits to the primary health care clinic.

Studies on educating asthmatic patients have shown that a brief educational intervention (of an informative nature only) does not have a significant impact on outcome unless this effort is accompanied by a plan for action, monitoring of the disease by the patients themselves, or regular check-ups.[14] In contrast, interventions that require self-monitoring, whether of symptoms or peak flow, together with a plan of action for exacerbations, have been shown to be effective,[15] and therefore the guidelines recommend that such measures be offered to asthmatic patients. In any case, it should be remembered that efficacy and effectiveness are not the same. Efficacy refers to the impact of a medication in optimum conditions, whereas effectiveness applies to the effects in everyday practice. In the Catalan health system, as in other health systems, application of these interventions is hindered by the short time—5 minutes—the family physician has for explaining what asthma is, prescribing the medication, explaining treatment, instructing the patients on how to administer the medication correctly, and finally, showing them how to monitor the disease themselves, either by paying attention to symptoms or measuring peak flow. In a real-life situation, it is therefore difficult to offer appropriate care to the asthmatic patient. Consequently, control of the disease in asthmatic patients is unsatisfactory,[3,4] as reflected in the present study.

In an attempt to improve this situation, we proposed that a pulmonologist schedule an appointment in the primary health care clinic with all patients diagnosed with asthma in order to adapt treatment to international guidelines,[5] briefly inform the patient about the disease, and issue a basic written treatment plan for exacerbations. All these actions were completed in 5 minutes. The outcome of this intervention after 4 months was less use of health care services and a decrease in the severity of asthma in the patient population. This finding suggests that the patients, in addition to receiving better treatment, were better able to treat exacerbations by self-administration of more courses of oral 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 between primary health care and pulmonologists. The expert is responsible for adapting treatment to the guidelines and briefly informing the patient about the disease.[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),[17] and may be beneficial for the health care system. In addition to improving the control of symptoms, these measures may reduce the overall cost of this disease to the health care services.[18] We should remember, though, that 39% of the patients did not keep the second appointment, and we can only assess the effectiveness of the intervention in those who actually attended the follow-up visit. In any case, we were able to ascertain that many of the patients did not come to the second visit because they had not complied with the prescribed treatment, 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.[2] Thus an additional 3% of the overall population must correspond to subjects with asthma that has yet to be diagnosed to make up the well-known figure of 6% for the prevalence of asthma.[1] Indeed, 70% of the present sample were women, whereas women make up 52.9% of the asthmatic population in Spain.[19] Similarly, a high percentage of these patients cared for in an outpatient setting for asthma are over 60 years old (42%), and such patients may seek medical attention more frequently because they have retired or because a greater percentage of them have been diagnosed with asthma after visits to the family physician for other reasons. In our population, 17% were smokers, a figure that while high is lower than the 31% of smokers who comprised the population of asthmatic patients who attended hospital emergency rooms (data submitted for publication). It should be pointed out, however, that the mean (SD) age of the population attending the hospital emergency rooms was 46 (20) years, lower than that of the present study population (59 [20] years).

Of note is that 8% of the population were illiterate and that many of the patients (46%) had only completed primary eduction. Such patients will have greater difficulty reading, understanding, and following the instructions of their physician. Also of note is the high prevalence of jobs that require contact with cleaning products: homemakers comprised 35% of the overall population and cleaners represented 10%. Attention has been drawn to recent findings that have identified such products as a trigger of asthma attacks.[20]

Of the 131 patients who had undergone skin tests to detect possible atopy, 63% reported that at least 1 of the tests had been positive; that is, these patients had extrinsic asthma. Apart from finding that many of the asthmatic patients (70%) had undergone these tests, the figure of 63% for extrinsic asthma is high for this population if we bear in mind that 40% of a broad sample of the Spanish population between 22 years and 44 years who had undergone a methacholine test were

positive.[21] 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 reaction. If we stratify the 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 higher 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 acetylsalicylic acid 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.[22]

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 β-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 β-agonists are used as long-term treatment because, according to some reports, such use was associated with an increase in severe exacerbations.[23,34] However, this association was not corroborated by a recent study.[25] Furthermore, according to a recent study by Boushey et al[26] 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 continually received inhaled corticosteroids, as recommended in the guidelines, and those who only used such drugs in the event of deterioration of symptoms. Continual use of such drugs has therefore been brought into question.[27] It is also noteworthy in our study that many patients (25%) were prescribed antileukotrienes by the pulmonologist. Such 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[28] (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.

Acknowledgments

REFERENCES

1. Grupo Español del Estudio del Asma. Estudio Europeo del Asma. Prevalencia de síntomas relacionados con el asma en cinco áreas españolas. Med Clin (Barc). 1995;104:487-92.
2. European Community Respiratory Health Survey. Variations in the prevalence of respiratory symptoms, self-reported asthma, and use of asthma medication in the European Community Respiratory Health Survey (ECRHS). Eur Respir J. 1996;9:687-95.
3. Rabe KF, Vermeire PA, Soriano JB, Maier WC. Clinical management of asthma in 1999: the Asthma Insights and Reality in Europe (AIRE) study. Eur Respir J. 2000;16:802-7.
4. Adams RS, Fuhlbrigge A, Guilbert T, Lozano P, Martínez F. Inadequate use of asthma medication in the United States: results of the asthma in America national population survey. J Allergy Clin Immunol. 2002;10:58-64.
5. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. NHLBI/WHO Workshop Report. NIH publication 1995; no. 02-3659. Update of Executive Committee in 2002. Available from: www.ginasthma.com. p. 115.
6. Gibson PC. Monitoring the patient with asthma: an evidence-based approach. J Allergy Clin Immunol. 2000;106:17-26.
7. Serra-Batlles J, Plaza V, Morejón E, Comella A, Brugues J. Costs of asthma according to the degree of severity. Eur Respir J. 1998; 12:1322-6.
8. Antonicelli L, Bucca C, Neri M, de Benedetto F, Sabbatani P, Bonifazi F, et al. Asthma severity and medical resource utilisation. Eur Respir J. 2004;23:723-9.
9. Ignacio-García JM, González-Santos P. Asthma self-management education program by home monitoring of peak expiratory flow. Am J Respir Crit Care Med. 1995;151:353-9.
10. López Viña A. Actividades para fomentar el cumplimiento terapéutico en el asma. Arch Bronconeumol. 2005;41:334-40.
11. Bender B, Milgrom H, Apter A. Adherence intervention research; what have we learned and what do we do next? J Allergy Clin Immunol. 2003;112:489-94.
12. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. NHLBI/WHO Workshop Report. Available from: www.ginasthma.com. p. 75.
13. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. NHLBI/WHO Workshop Report. NIH publication 1995; no. 02-3659. Update of Executive Committee in 2002. Available from: www.ginasthma.com. p. 68.
14. Gibson PG, Coughlan J, Wilson AJ, Hensley MJ, Abramson M, Walters EH. Limited (information only) asthma education on health outcomes of adults with asthma. In: Cochrane Library, Issue 1, 2001.
15. Gibson PG, Coughlan J, Wilson AJ, Abramson M, Bauman A, Hensley MJ, et al. Self-management education and regular practitioner review for adults with asthma. In: Cochrane Library, Issue 2, 2002.
16. Plaza Moral V. Médico de familia y neumólogo: ¿coordinación o confrontación? Propuesta de un esquema de relación entre atención primaria y neumología. Arch Bronconeumol. 2004;40:15-7.
17. SEPAR y semFYC. Recomendaciones para la atención del paciente con asma. Arch Bronconeumol. 1998;34:394-9.
18. Borderías Clau L, Zabaleta Murguionda M, Riesco Miranda JA, Pellicer Ciscard C, Hernández Hernández JR, Carrillo Díaz T, et al. Coste y manejo de una crisis asmática en el ámbito hospitalario

de nuestro medio (estudio COAX en servicios hospitalarios). Arch Bronconeumol. 2005;41:313-21.

19. Basagana X, Sunyer J, Zock JP, Kogevinas M, Urrutia I, Maldonado JA, et al. Incidence of asthma and its determinants among adults in Spain. Am J Respir Crit Care Med. 2001;164: 1133-7.

20. Zock JP, Kogevinas M, Sunyer J, Jarvis D, Toren K, Anto JM. Asthma characteristics in cleaning workers, workers in other risk jobs and office workers. Eur Respir J. 2002;20:679-85.

21. Soriano JB, Tobias A, Kogevinas M, Sunyer J, Sáez M, MartínezMoratalla J, et al. Atopy and nonspecific bronchial responsiveness. A population-based assessment. Spanish Group of the European Community Respiratory Health Survey. Am J Respir Crit Care Med. 1996;154:1636-40.

22. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. NHLBI/WHO Workshop Report. NIH publication 1995; no. 02-3659. Update of Executive Committee in 2002. Available from: www.ginasthma.com. p. 40.

23. WHO Pharmaceutical Newsletter. 2003;2:4. Available from: http://www.fola.gov/bbs/topics/ANSWERS/2003/ANSO1192.html

24. Anonymous. Risc d´episodis greus d´asma per salmeterol. Butlletí Groc. 2003;6:9-11.

25. Anderson HR, Ayres JG, Sturdy PM, Bland JM, Butland BK, Peckitt C, et al. Bronchodilator treatment and deaths from asthma: case-control study. BMJ. 2005;330:117.

26. Boushey HA, Sorkness CA, King TS, Sullivan SD, Fahy JV, Lazarus SC, et al. Daily versus as-needed corticosteroids for mild persistent asthma. N Engl J Med. 2005;352:1519-28.

27. Fabri L. Does mild persistent asthma require regular treatment? N Engl J Med. 2005;352:1589-90.

28. Muir Gray JA. Atención sanitaria basada en la evidencia. Madrid: Churchill-Livingstone; 1997. p. 67.