

Original article

Quality of asthma care: results from a community pharmacy based survey

Background: Optimal control is a major objective of disease management of asthma. The aim of the present study was to provide descriptive data on disease management in asthma patients, including medical resource utilization.

Methods: Asthma patients (age 18–50 years) were consecutively recruited in 348 dispensing pharmacies. They completed a questionnaire which collected data on personal characteristics, asthma management, including medical resource utilization, including asthma management. Asthma control was measured with the Asthma Control Test. Data from computerized pharmacy records of medications, dispensed before inclusion, were also collected.

Results: In 1791 eligible patients, 1559 accepted to participate in the study (mean age = 36.5, 56.1% of females). During the previous 4 weeks, the asthma control was satisfactory for only 28% of the patients, despite extensive provision of anti-inflammatory asthma control treatments (89%). Combinations of long acting beta agonists (LABA) and inhaled corticosteroids (ICS) were commonly used (59%), while fewer patients received LABA and ICS as two separate medications (15%). In addition, short-acting beta agonists, were frequently dispensed (71%). A substantial number of patients consulted their GPs on a monthly basis. Patients commonly reported daily shortness of breath (30%), daily use of rescue medication (29%) and weekly nocturnal symptoms (32%). Surprisingly, most patients considered their asthma as completely or well controlled (76%).

Conclusions: Our results clearly identify a need to improve the management of asthma. Education programmes would be beneficial to improve asthma control.

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Many studies have suggested that most asthma patients in the general population are not properly controlled (1, 2) and this appears to be a world-wide problem. Inadequate control of asthma can be improved by better prophylaxis. Adherence to asthma therapy is one of the key factors in improving asthma control. However, several studies have indicated that this adherence is not satisfactory (3).

Moreover, improvement of the quality of care in asthma requires a comprehensive knowledge of patients and the management of their asthma. Additional factors related to the perception of the disease by the patient should also be taken into account. Indeed, some studies have reported better asthma control when the patients themselves felt adequately informed on asthma and when they were involved in the management of their disease (4). Their health-related quality of life and their expectations with regard to therapy should also be taken into account in order to optimize the management of asthma. However, in such observational studies these subjective patient-related data have not always been assessed in the perspective of clinical data collected simultaneously.

Most epidemiological observational studies have so far mostly been conducted in hospitals, consulting rooms or in the general population, but seldom in community pharmacies. However, pharmacists are well placed in the healthcare system to conduct epidemiological studies investigating the management of chronic diseases such as asthma, since most patients visit pharmacies regularly to buy their prescribed treatments. The computerized records of dispensed medications, available in most pharmacies can provide interesting complementary data.

A pharmacy-based study was conducted in France to recruit asthma patients. The aim was to provide detailed descriptive data on the management of asthma.

Methods

Study design

A retrospective observational study was carried out in 348 community dispensing pharmacies in nine French cities (Lyon, Montpellier, Caen, Nancy, Besançon, Amiens, Dijon, Angers, Limoges)

between November 2003 and June 2004. As required by current French legislation, the protocol was approved by the National Committee of Informatics and Liberty.

Study population

Asthma patients were recruited consecutively in the pharmacies. Community pharmacists invited asthma patients aged 18–50 years who were regular users of the pharmacy to participate to the study. To be eligible, patients were required to have with them a prescription for an anti-asthma medication (R03, ATC classification) and to be able to understand the study questionnaire. In case of refusal, the next patient who fulfilled the inclusion criteria was invited to participate.

Data collected

Questionnaire and peak-flow meter measure. Eligible patients who accepted to participate to the study were given a self-administered questionnaire which they completed at home. Completed questionnaires were returned to the pharmacist by the patient at a subsequent visit. This questionnaire included questions on patient characteristics, asthma symptoms, asthma-related medical resource utilization (except medication). At the time of inclusion, ventilatory function was measured using a peak-flow meter (% of predicted value) at the pharmacy.

Asthma-related medical resource utilization

Dispensed medications. Information on anti-asthma medications dispensed to patients before inclusion were available through computerized pharmacy records. For each medication class, the number of units dispensed each month in users was available. Dispensed medication consisted of asthma control treatments, asthma rescue treatments and oral corticosteroids. Control medication classes included inhaled corticosteroids (ICS), long-acting beta agonists (LABA), LABA-ICS fixed combinations (COMB LABA-ICS), oral xanthine, leukotriene receptor antagonists. Control treatments were studied both as separate medication classes and as associations (treatment regimens) Anti-asthma rescue treatments included short-acting beta agonist, anticholinergic medications and short-acting beta agonist –anticholinergic combinations.

Any changes in therapy over the 12 months preceding inclusion were also reported by the patients.

Other asthma-related medical resource utilization

Patients reported in the questionnaires the average frequency of their visits to GPs or chest specialists, and any asthma-related hospital visits during the preceding 12 months.

Level of asthma control

Asthma control was measured with the Asthma Control Test (5). Level of control was assigned from responses to five questions on episodes of shortness of breath, nocturnal symptoms, impairment of daily activities and need for rescue medication during the previous 4 weeks. The questionnaire also included an item on overall control as perceived by the patient. Each question proposed five possible response modalities (a to e), classified by decreasing level of asthma control. Asthma Control Test was first considered as a semi quantitative score ranging from 5 to 25, a higher score indicated

better asthma control. Then, categories of asthma control were defined as follows. The three last modalities (c, d and e) for each question corresponded to an inadequate level of control. When these modalities were not chosen for any question, asthma was considered properly controlled. If responses c, d or e were chosen for either one or two questions, asthma was considered moderately uncontrolled. In all other cases, asthma was considered poorly controlled.

Analyses

We present preliminary descriptive results from the questionnaires and the computerized pharmacy records. Patient and asthma characteristics, including asthma-related medical resource utilization are presented successively. Data regarding prescribed medications were presented only for patients for whom at least 6 months of pharmacy records were available. All the analyses were performed on SAS software (version 8.0).

Results

Patients were recruited at 348 dispensing pharmacies in nine cities. Overall, 1809 asthma patients were invited to participate. Ten patients were not included because of language or understanding problems. Eight additional subjects who bought the asthma medication for a relative were also excluded. Of the 1791 eligible patients, 182 (10.2%) refused to participate to the study and 50 did not bring back their questionnaire to the pharmacy.

Overall, data from 1559 patients providing completed questionnaires were available for analysis, corresponding to 87% of the patients who met inclusion criteria. For 1489 of these, pharmacy records were available, which covered the previous 6 months for 1421 patients (79.3%). The period covered by the records ranged from 6 to 18 months before inclusion (mean value = 10.5 months, SD = 2.3). Twelve months of records were available for most patients (65.6%).

Patients' characteristics and asthma

Our sample included a majority of women (Table 1), with a mean age of 36.8 years (SD = 9.8). Smokers were numerous and a majority of them smoked more than 10 cigarettes a day.

Level of asthma control

Sum score ranged from 5 to 25, with a median value at 19 (Fig. 1).

Only 28% of patients could be considered as properly controlled for their asthma. About 38% were moderately uncontrolled and more than a third of them were uncontrolled for at least three of the five questions (34%).

Nearly 40% of the patients included in the study reported episodes of shortness of breath at least 3 times a week, and about 30% of them had daily episodes. Similar

Table 1. Patient characteristics

	<i>n</i>	%
Overall	1559	100
Female gender	871	56.1
Current smoking status		
Nonsmoker	1076	69.7
1–9 cigarettes daily	217	14.1
≥10 cigarettes daily	250	16.2
Body Mass Index (kg/m ²)		
≤ 25	971	68.2
26–30	269	18.9
>30	183	12.9
Age (years)		
18–30	467	30.0
31–40	441	28.3
41–50	649	41.7
Peak-flow measures (% of predicted value)		
>80%	854	59.6
61–80%	356	24.8
31–60%	224	15.6
Detailed written plan in case of asthma exacerbation	348	24.7
Any hospital admissions	129	9.2

proportions were observed for the use of rescue medication (29%). Almost a third of the study population experienced at least weekly nocturnal symptoms (32%) and impairment in activities of daily life at least 'some of the time' was common (40%). In contrast, a majority of patients estimated their asthma totally or mostly controlled (76%).

Asthma-related medical visits and hospital admissions

Nearly 40% of patients visited their GPs four times a year. A substantial proportion of them visited their GP

monthly (Fig. 2). In contrast, chest specialists were less frequently consulted. About 10% of patients experienced asthma-related hospital admissions (Table 1), although repeated admissions were rare (2.9%).

Asthma-related medical resource utilization

Dispensed medication. Most patients were dispensed asthma control treatments that included ICS and/or COMB LABA-ICS (89.4%). Dispensation of COMB LABA-ICS was prevalent, while fewer patients received LABA and ICS as two separate medications (Table 2). Of interest, in the patients who received LABA and ICS separately, the dispensation level was significantly higher for LABA than for ICS. In patients for whom 12 months of records were available, the average number of LABA units dispensed was 9.7 (SD = 7.5) compared with 7.3 (SD=5.3) for ICS ($P < 0.0001$).

About 8% of patients were dispensed ICS as control monotherapy. None of the 'other regimens' were used by more than 5% of the patients. Thirty-three patients (2.3%) were dispensed LABA as monotherapy. Anti-asthma rescue treatments, predominantly short-acting beta agonists, were frequently dispensed (Table 2).

A minority of patients recorded dose reduction or treatment discontinuation during the 12 months preceding inclusion.

Discussion

This is one of the few observational studies to investigate the disease management of asthma patients conducted in community pharmacies. Our results illustrate the

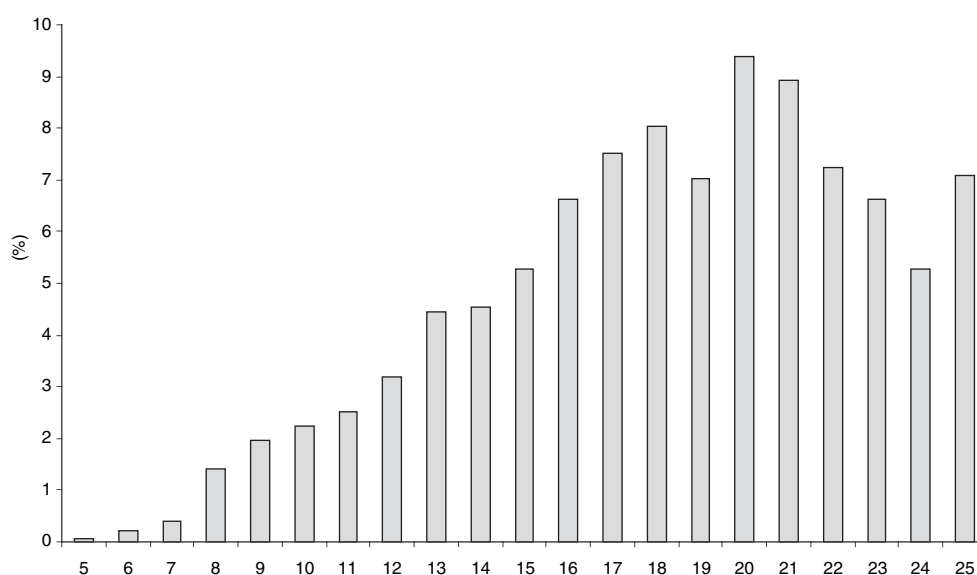


Figure 1. Sum score of Asthma control test ($n = 01479$). A Higher score indicates better asthma control.

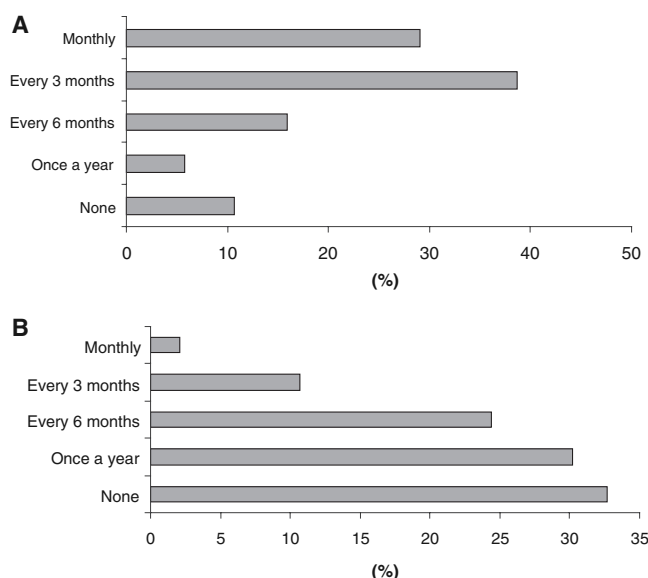


Figure 2. (A) Average frequency of visits to GPs ($n = 1241$). (B) Average frequency of visits to specialists ($n = 1309$).

feasibility of performing such studies on a large scale. The preliminary descriptive results provide interesting data on current asthma management in actual medical practice.

Our community pharmacy-based study was well accepted by both patients and pharmacists. Refusal rate was very limited and over 85% of patients who met inclusion criteria brought back their questionnaire to the pharmacy, which can be considered as very satisfactory. In addition, a strength of this study was the availability of computerized pharmacy records of drugs dispensed to complement the questionnaire data. The use of such records avoids patient recall bias that is common for medication use. It should be noted that dispensing of medication does not necessarily mean actual use by the patients. However, the data obtained from pharmacy records reflect actual use better than those obtained from prescription databases. With pharmacy records, it is known that the patients did not only receive a prescription from their physician but also bought the medications at the pharmacy.

Nearly 30% of patients were smokers. This high frequency is consistent with the conclusions of the AIR survey (23.7%) (6). This is of concern given the detrimental consequences of tobacco on respiratory function.

In our study, the control of asthma is adequate for a minority of the patients (28%). Episodes of shortness of breath, nocturnal awakening and use of rescue medication were commonly reported. In addition, a substantial number of patients consulted their GPs on a monthly basis. These findings are in line with the new AIR study recently conducted in 29 countries in North America, Europe and Asia (6). In spite of the appearance of new effective treatments for asthma control (COMB

Table 2. Dispensed anti-asthma medications*

<i>Asthma control treatments*</i>	
Inhaled corticosteroids (ICS)	
At least one unit dispensed [n (%)]	664 (46.7)
Average number of units dispensed per month in users [m (SD)]	0.56 (0.47)
Long-acting beta agonists (LABA)	
At least one unit dispensed [n (%)]	487 (34.3)
Average number of units dispensed per month in users [m (SD)]	0.73 (0.59)
Combination LABA-ICS (COMB LABA-ICS)	
At least one unit dispensed [n (%)]	836 (58.8)
Average number of units dispensed per month in users [m (SD)]	0.61 (0.40)
Combination LABA-ICS or Inhaled corticosteroids	
At least one unit dispensed [n (%)]	1271 (89.4)
Average number of units dispensed per month in users [m (SD)]	0.70 (0.62)
Oral xanthines	
At least one unit dispensed [n (%)]	86 (6.1)
Average number of units dispensed per month in users [m (SD)]	1.23 (0.83)
Leucotriene receptor antagonists	
At least one unit dispensed [n (%)]	389 (27.4)
Average number of units dispensed per month in users [m (SD)]	0.59 (0.38)
Asthma control regimens dispensed [n (%)]	
ICS alone	118 (8.3)
LABA + ICS (two separate medications)	210 (14.8)
COMB LABA-ICS alone	367 (25.8)
COMB LABA-ICS with other asthma control treatments	469 (33.0)
Other regimens	187 (13.2)
No asthma control treatment	70 (4.9)
<i>Asthma rescue medications*</i>	
Short-acting beta agonists	
At least one unit dispensed [n (%)]	1012 (71.2)
Average number of units dispensed per month in users [m (SD)]	0.60 (0.66)
Short-acting beta agonists + anti-cholinergic	
At least one unit dispensed [n (%)]	116 (8.2)
Average number of units dispensed per month in users [m (SD)]	0.94 (1.07)
Anti-cholinergic	
At least one unit dispensed [n (%)]	20 (1.4)
Average number of units dispensed per month in users [m (SD)]	0.43 (0.37)
<i>Oral corticosteroids*</i>	
At least one unit dispensed [n (%)]	611 (43.0)
Average number of units dispensed per month in users [m (SD)]	0.28 (0.40)
Change in therapy during the past 12 months†	
Any change [n (%)]	674 (43.2)
Addition of at least one medication [n (%)]	489 (31.4)
Suppression of at least one medication [n (%)]	219 (14.1)
Increased dose [n (%)]	184 (11.8)
Decreased dose [n (%)]	120 (7.7)
Total change of therapy [n (%)]	130 (8.3)

*Presence of the anti-asthma medication category in the patient's pharmacy records (calculated for the 1421 patients whose records were available for a period of at least 6 months).

†Calculated for 1559 patients.

LABA-ICS), patients' asthma control can still be improved. Surprisingly, most patients considered their asthma as well or totally controlled (76%). Such an unexpected result has been described previously (6).

Most patients were dispensed efficient anti-inflammatory asthma control treatments (89%), the use of LABA-ICS combinations was predominant, which is in agreement with current guidelines (7). Many experimental studies have demonstrated the benefit of the association of the two drug categories (8, 9). A small minority of patients were dispensed LABA without any other anti-asthma therapy. Despite their low number (2.3%), these patients are nevertheless of concern given the increased risk of exacerbation or death due to the absence of concomitant anti-inflammatory medication (10). In addition, for a few patients, there was no record of asthma control treatment reported in their pharmacy records (4.8%). Some of them may suffer from intermittent asthma, although this assumption cannot easily be verified. Short acting beta agonists were dispensed at a surprisingly high level given the frequent use of LABA-ICS control treatments by patients. This result is in line with the AIR study findings (6) and supports the hypothesis of inadequate asthma control.

This study has several limitations. Firstly, our sample of regular pharmacy customers may not be representative of the overall general population of asthma patients. Intentionally, only regular customers were recruited in order to maximize the reliability and exhaustiveness of the computerized pharmacy records. An inadequate level of asthma control was highlighted in these selected patients who buy anti-asthma medication regularly. It can be assumed that even worse results may have been observed in a representative sample of asthma patients.

Moreover, the level of dispensed medication may have been underestimated in our study. Firstly, medications that patients may have bought in other pharmacies could not be recorded. However, this bias may be limited since only regular costumers of the pharmacy were selected. Secondly, the period for which computerized dispensation records were available before inclusion varied between patients. Consequently, the actual level of dispensing to patients with shorter records may have been underestimated. To assess the consequences of this potential bias, we conducted a sensitivity analysis in the subpopulation of patients for whom at least 12 months of records were available. The patterns observed remained virtually unchanged (data not reported). In our study, the diagnosis for asthma had not been confirmed by a specialist at inclusion. Of note, most patients (67%) had visited a specialist at least once during a year. Nevertheless, our sample may include some patients with COPD. To reduce this potential bias, the age limit for inclusion was set at 50. In addition, two sensitivity analyses were conducted in nonsmokers and in patients younger than 40, respectively. Our conclusions remained unchanged (data not reported). If a selection bias cannot be

formally excluded, its influence on our results is probably limited.

Our findings have several implications. The results clearly show that asthma management is far from optimal, even in this selected population of regular customers of community-pharmacies. These findings raise questions about how asthma control treatments are used in practice. Notably, there is a discrepancy between, on one hand, the fact that LABA-ICS combinations are frequently provided to patients as asthma control treatments and, on the other, the observation that asthma control in these patients was poor and use of rescue medication frequent. This suggests that these asthma control therapies may not be being used properly or adequately by the patients. Surprisingly, few of them considered their asthma to be uncontrolled. This paradox suggests that patients are relatively unaware that most of their asthma-related troubles are due to inadequate control, and that more appropriate behaviours toward asthma control therapy could improve this situation.

Our data suggest that improvement in the management of asthma and better patient education are necessary. Previous studies have reported that better knowledge of the disease by the patients improved adherence to treatment and changed their perception of the disease (11). Also, when the patients were better educated about their disease, they were less likely to experience asthma-related adverse events (12, 13). Education should stress the importance of regular use of asthma control medications. Explanation and demonstration of how to use inhalator devices should not be overlooked (14). Educational programmes should also target physicians since only a quarter of patients were provided with written action plans in case of attacks, despite their proved beneficial impact on asthma control (15, 16). In addition, a recent study reported the lack of universal definitions among physicians regarding essential notions, such as asthma control or exacerbations, especially between GPs and specialists (17).

More generally, additional explanations provided by pharmacists about asthma and its treatment could contribute to improve the quality of care of the patients. Pharmacists are ideally placed in the healthcare system to provide such education, since they are in regular contact with most patients when they come to buy their treatments. This service would be complementary to the education received by patients from the physician, who has the leading role in disease management. Patient awareness and asthma control capacity should be reinforced. The potential benefits of pharmacist contribution to asthma management have been reported previously.

A study conducted in New Zealand reported significantly improved asthma control and reduced use of bronchodilators in patients who received information about asthma from the pharmacist (18). Similar conclusions were also drawn from an educational programme carried out in Australian pharmacies (19). In particular,

pharmacists could play a helpful role in monitoring the use of anti-asthma medications and to convince patients to measure their peak flow regularly, for instance at pharmacy visits. Moreover, pharmacists are well placed to verify the safety of anti-asthma therapy.

Of interest, the Allergic Rhinitis and its Impact on Asthma (ARIA) workshops developed a guide specifically for the pharmacists, to help them in advising patients with allergic rhinitis (20). Briefly, this guide summarizes recommendations regarding the diagnosis of allergic rhinitis (and co-morbid asthma), the assessment of the severity of rhinitis and information on disease management.

In conclusion, the preliminary results of this community-pharmacist based study highlight the inadequate level of asthma control in this population and the need to improve the quality of asthma management. To achieve this goal, better knowledge of the disease and its treatment by the patients is clearly needed.

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