Asthma control in general practice
A cross-sectional survey of 16580 patients

Summary

Introduction Little information is available about asthma control in patients followed by general practitioners care in France, although such control is one of the essential aims of their treatment.

Objectives The ER'Asthme survey sought to assess asthma control among patients visiting their general practitioner (GP) and to determine the factors associated with it.

Methods This cross-sectional included patients with asthma diagnosed at least 12 months earlier, aged more than 6 years, and followed by a GP. It collected data on self-assessed health status, asthma control (assessed by a 3-level composite score based on the Canadian consensus criteria as adapted by ANAES: optimal, acceptable and unacceptable), and compliance.

Results The study included 16 580 patients; 85% were older than 20 years, and 54% were male. Patients answered the question about their asthma control as follows: 53% “excellent” or “fine”, 39% “not very good” and 8% “poor”. GPs, however, assessed asthma control as optimal in 21% of patients, acceptable in 7% and unacceptable in 72%. Concordance between these two assessments was thus poor: Kappa coefficient 34.5% (95% CI [33.5%; 35.5%]). Only 59% of patients reported complete compliance with their maintenance treatment. Factors associated with optimal control were: use of fixed combination therapy (inhaled corticosteroid+long-acting beta-agonist) (OR: 3.7; 95%CI [3.5; 4.2]) normal BMI (OR: 2.4; 95%CI [2.0; 2.9]), non-smoker status (OR: 2.4; 95%CI [2.1; 2.6]), age<50 (OR: 2.3; 95%CI [2.1; 2.6]) and good compliance (OR: 1.6; 95%CI [1.5; 1.8]).

Conclusion Patients with asthma overestimate their asthma control, which often remains inadequate. Maintenance treatment with a fixed combination, BMI, smoking, age and compliance all influence the level of asthma control.
Methods

This cross-sectional descriptive study took place in France between February and July 2003. It surveyed a random sample of general practitioners in private practice (randomly drawn from a national file) and enrolled them as investigators. Its principal aim was to assess asthma control in a population of asthma patients followed by general practitioners. Its secondary objectives were to profile this population’s social, demographic, and clinical characteristics and describe their treatment adherence and quality of life. Finally, it sought to assess the factors that predict asthma control. All investigators were instructed to include the first three patients who met the inclusion criteria (age ≥ 6 years, asthma diagnosed by a physician at least 1 year earlier) and who spontaneously sought care for their asthma.

<table>
<thead>
<tr>
<th>Table 1</th>
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<tr>
<td><strong>Asthma control according to the Canadian consensus</strong></td>
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</table>

### How often do you need to take your short-acting β2-agonist?

- Never
- Less than once a week
- Several times a week
- Every day

### How many times have you been awakened at night by shortness of breath, coughing or trouble breathing?

- Never
- Less than once a week
- Several times a week
- Almost every night

### Have you had an attack of shortness of breath, coughing or respiratory discomfort during the day?

- Never
- Less than once a week
- Several times a week
- Almost every day

### Does your asthma limit your daily activities?

- Never
- Less than once a week
- Several times a week
- Almost every day

### Have you had recourse to emergency medical services because of your asthma?

- Yes
- No

All responses are classified as type  as optimal control
At least one response is classified as type  as acceptable control
At least one response is classified as type  as poor control

At inclusion, the physician collected the following information:
- general characteristics including: sex, age, body mass index (BMI), work status, place of residence, smoking status, time since asthma onset, related diseases;
- current asthma status and treatment;
- asthma control at inclusion (defined by Canadian consensus and ANAES criteria as described below);
- possible adaptation of maintenance therapy.

At the same time, patients were asked to complete a self-administered questionnaire intended to:
- identify their maintenance treatment and assess adherence with a validated questionnaire;
- assess quality of life.

Asthma control was analyzed according to the criteria identified by the Canadian consensus report and the recent ANAES guidelines, published in September 2004. They list 3 levels of asthma control: optimal, acceptable, and unacceptable, based on the answers to 5 questions (Table 1). The questions covered the previous month and asked about these specific indicators: perceived frequency and intensity of attacks, recourse to short-acting β2-agonists, nocturnal awakening, coughing or dyspnea, and use of emergency medical services.

Treatment adherence was assessed with the PMAQ-3w7 questionnaire, which evaluates compliance with the prescribed medication over a recall period of the past 3 days and during the weekend preceding questioning. Its translation into French was validated according to international standards. Data from this questionnaire were classified as follows: complete compliance = all doses taken, partial compliance = at least one dose was missed.

We used the SF-36 questionnaire to assess quality of life. This self-administered generic quality of life questionnaire evaluates 8 dimensions of daily life (physical functioning, role limitations because of physical health conditions, bodily pain, social functioning, general mental health, role limitations because of emotional problems, vitality, and general health perceptions) over the preceding 4 weeks. This questionnaire has proved useful in assessing quality of life in patients with respiratory diseases.

Statistical analysis used SAS software, version 8.2 (SAS Institute, North Carolina, United States). The descriptive analysis covered the entire country (all 22 French administrative regions).

Multivariate analysis used a forward stepwise logistic regression model, with a threshold for entry into the model of 5%. The dependent variable was level of asthma control (well controlled = optimal control or acceptable control and no risk factors; poorly controlled = unac-
ceptable control or acceptable control and at least one risk factor). The explanatory variables were either the variables identified as significantly associated (p < 0.05) with control during the initial bivariate analyses, or variables of interest (currently considered as potential determinants, such as smoking status), which were forced in the model.

**Results**

Of the 4561 physicians recruited, 81% included at least one patient. Of the 17 487 patients included, 95% completed and returned the self-administered questionnaire. The analysis included 16 580 patients (met inclusion criteria and returned usable questionnaires).

**SOCIAL AND DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION**

Table 2 summarizes the population’s characteristics. More than half the subjects were men, 62% lived in urban areas, and 85% were at least 20 years old. Half were working (belonged to the labor force). BMI (18.5-25 kg/m²) was normal for 52%, while 30% were overweight (25-30 kg/m²), 11% obese (BMI ≥ 30 kg/m²), and 8% underweight (< 18.5 kg/m²). They had had asthma for an average of 13.2 ± 11.0 years. Overall, 46% reported no related diseases, while 43% mentioned allergic rhinitis, 15% allergic conjunctivitis, and 11% ectopic dermatitis.

**ASTHMA CONTROL**

The physicians’ questions about allergy control covered the previous 4 weeks and specified responses at a frequency ranging from several times a week to every day: 44% of patients reported to the physician that they had taken short-acting ß2-agonists, 21% that they had had nocturnal asthma attacks, 34% daytime attacks, and 33% overall discomfort in their daily activities; 10% reported seeking emergency medical services. Overall, 21% had optimal control, 7% acceptable control, and 72% unacceptable control. The percentage of patients with unacceptable asthma control increased significantly with age (figure 1).

Asthma control was significantly associated with type of treatment (table 3). Based on answers to the PMAQ-3w questionnaire, 59% of patients were considered adherent (95% CI [57.7; 59.4]).

The response to the question “How is your asthma doing?” allowed patients to report how they perceived their asthma control: 53% rated it “excellent” or “fine” and 47% “not very good” or “poor”. There is a discrepancy between the patient’s perception and reality, defined by the

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Patients’ demographic characteristics</th>
<th>Data presented as numbers (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Overall population</td>
<td>n = 16 580</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>8758 (54)</td>
<td>[52.9; 54.5]</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>7548 (46)</td>
<td>[45.5; 47.1]</td>
<td></td>
</tr>
<tr>
<td>Age groups (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>189 (1)</td>
<td>[1.0; 1.3]</td>
<td></td>
</tr>
<tr>
<td>8-12</td>
<td>705 (4)</td>
<td>[4.0; 4.6]</td>
<td></td>
</tr>
<tr>
<td>13-14</td>
<td>516 (3)</td>
<td>[2.9; 3.4]</td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>1213 (7)</td>
<td>[7.0; 7.8]</td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>2459 (15)</td>
<td>[14.4; 15.5]</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>2548 (16)</td>
<td>[14.9; 16.0]</td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>2809 (17)</td>
<td>[16.5; 17.6]</td>
<td></td>
</tr>
<tr>
<td>51-60</td>
<td>2336 (14)</td>
<td>[13.7; 14.7]</td>
<td></td>
</tr>
<tr>
<td>61-70</td>
<td>1922 (12)</td>
<td>[11.2; 12.2]</td>
<td></td>
</tr>
<tr>
<td>&gt; 70</td>
<td>1776 (11)</td>
<td>[10.3; 11.3]</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.4 ± 4.6</td>
<td>[24.3; 24.4]</td>
<td></td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>6266 (38)</td>
<td>[37.4; 38.9]</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>10 177 (62)</td>
<td>[61.2; 62.6]</td>
<td></td>
</tr>
<tr>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current smokers</td>
<td>3095 (19)</td>
<td>[18.4; 19.6]</td>
<td></td>
</tr>
<tr>
<td>Former smokers</td>
<td>4243 (26)</td>
<td>[25.3; 26.7]</td>
<td></td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>8991 (55)</td>
<td>[54.3; 55.8]</td>
<td></td>
</tr>
<tr>
<td>Occupational status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>8262 (50)</td>
<td>[49.4; 51.0]</td>
<td></td>
</tr>
<tr>
<td>Not working</td>
<td>8200 (50)</td>
<td>[49.0; 50.6]</td>
<td></td>
</tr>
</tbody>
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**Figure 1** Level of asthma control by age group

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answers to the physicians’ questions about specific criteria (figure 2). The patients tend to overestimate their asthma control (table 4). Analysis of the consistency between perception of asthma control and asthma control measured by their responses to the physicians’ questions showed a kappa coefficient of 34.5% (95% CI [33.5; 35.5]), a rather mediocre agreement between these two judgments.

QUALITY OF LIFE
The quality of life dimensions that appeared most changed were general health perceptions and vitality (figure 3). Analysis of the patients’ quality of life and asthma control showed a significant correlation between these two variables. All scores increased significantly with asthma control (p < 0.0001 for all dimensions). The better the asthma control, the better the quality of life.

FACTORS PREDICTIVE OF ASTHMA CONTROL
In the initial bivariate analysis, the variables significantly associated with asthma control (p < 0.05) were sex, age, smoking status, BMI, severity of disease as measured by treatment (GINA classification), the principal types of treatment, the number of drugs included in the treatment, and compliance. The multivariate analysis of data from 10 749 patients (sample with no missing information for any of the variables selected in the bivariate analysis) showed that the probability of optimal asthma control was significantly higher in:

• patients taking fixed combination treatment of inhaled corticosteroids (ICS) + long-acting β2 agonists, compared with patients receiving ICS alone (OR: 3.7; 95% CI [3.5; 4.2])

<table>
<thead>
<tr>
<th>Table 3</th>
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<tr>
<td>Distribution according to level of asthma control and antiasthma treatment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Optimal</th>
<th>Acceptable</th>
<th>Unacceptable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>*<em>Fixed ICS</em>/β2LA **</td>
<td>69</td>
<td>58</td>
<td>43</td>
<td>50</td>
</tr>
<tr>
<td>ICS + β2LA</td>
<td>10</td>
<td>9</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>ICS</td>
<td>11</td>
<td>15</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>β2SA *** only</td>
<td>6</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Combined as needed ****</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>No treatment</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Chi-2 test: p < 0.0001

*ICS: inhaled corticosteroids
** β2LA: Long-acting β2-agonist
*** β2SA: Short-acting β2-agonist
**** As needed combinations: fixed combination of ICS/β2LA + β2LA; fixed combination of ICS/β2LA + β2LA + anti-leukotriene; other combinations.
- nonsmokers, compared with current smokers (OR: 2.4; 95% CI [2.1; 2.8]) and with former smokers (OR: 1.4; 95% CI [1.2; 1.5])
- patients with a normal BMI compared with obese patients (OR: 2.4; 95% CI [2.0; 2.9])
- patients aged 15-50 years compared with those older than 50 (OR: 2.3; 95% CI [2.1; 2.6])
- patients whose treatment includes 1 or 2 drugs, compared with those with 3 or more drugs (OR: 1.8; 95% CI [1.6; 2.2])
- compliant compared with noncompliant patients (OR: 1.6; 95% CI [1.5; 1.8])
- patients with intermittent symptoms compared with severe asthma (OR: 1.6; 95% CI [1.2; 2.0])
- men compared with women (OR: 1.2; 95% CI [1.1; 1.4]).

**Table 4**

<table>
<thead>
<tr>
<th>Assessment by the physician</th>
<th>Optimal</th>
<th>Acceptable</th>
<th>Unacceptable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>2095</td>
<td>280</td>
<td>992</td>
<td>3367</td>
</tr>
<tr>
<td>Good</td>
<td>1298</td>
<td>546</td>
<td>3470</td>
<td>5314</td>
</tr>
<tr>
<td>Not very good/Poor</td>
<td>131</td>
<td>237</td>
<td>7385</td>
<td>7753</td>
</tr>
<tr>
<td>Total</td>
<td>3524</td>
<td>1063</td>
<td>11 847</td>
<td>16 434</td>
</tr>
</tbody>
</table>

*Kappa coefficient: 34.5% [33.5; 35.5]; Consistency: mediocre*

**Discussion**

Because of its size (16 580 patient files retained for analysis) the ER’Asthme study provides highly useful information about the management of asthma in 2004 in France by general practitioners as well as some answers to questions about asthma control and its determinants. It observed in a reliable and documented fashion both the level of asthma control in patients seeing general practitioners and some therapeutic and pragmatic approaches that should improve these results. After the Aire study showed the inadequacy of asthma control in Europe, the ER’Asthme study shows that patients with asthma overestimate their actual asthma control. Is this overestimation linked to a perception that their asthma is minor and that treatment therefore needs to...
provide only minimal results? Or was the question “How is your asthma doing?” an inadequate measure for assessing disease control?

Analysis of the consistency between patients’ perception of asthma and asthma control measured by specific questions based on the Canadian consensus criteria shows that the most closely correlated responses were those between a perception of excellent control and actual optimal control. Consistency and kappa correlation values increased when we took into account the presence of risk factors such as age > 50 years, smoking, obesity, and use of emergency medical services in the past month. Accordingly practitioners must go beyond the patients’ responses to overly general questions such as “How is your asthma doing?” Assessing the factors predictive of poor control and taking the time to question the patient regularly and very precisely about their recent asthma experience would provide a clearer understanding of actual asthma control and allow earlier decisions about possible adjustments of treatment.

The ER’Asthme study shows that asthma control in France is unsatisfactory: 72% of patients had poorly controlled asthma. This observation was still more marked among patients at least 50 years of age, where asthma control was classified as poor in 79% of patients. Although the ER’Asthme study presents a rather alarming assessment of the current situation, it also provides information useful for improving asthma control. One important finding that should help improve asthma control is that patients with a fixed combination treatment of ICS + long-acting β2-agonists accounted for a significantly higher proportion (p < 0.0001) of those with optimal control (69%) than of those with acceptable (58%) or unacceptable (43%) control. Only 11% of patients with optimal control took ICS alone, and only 10% took ICS and long-acting β2-agonists “as needed”. The Goal study previously showed the fixed combination of ICS + long-acting β2-agonists provided asthma control superior to that of ICS alone 16. Looking at the results of the ER’Asthme and Goal studies together, we see that the fixed ICS + long-acting β2-agonist combinations today play a significant role in obtaining good or even excellent asthma control, especially among patients not controlled with ICS alone. The Anaes guidelines9 stated that ICS is the basis of treatment of persistent asthma and that its combination with a long-acting β2-agonist should be considered if asthma control deteriorates with ICS. The results of this study suggest that fixed combinations of these two drugs could be used for several weeks or months in patients with asthma poorly controlled by ICS alone; afterwards, experimentation could again help establish the minimum effective dose.

In accordance with previous results, the ER’Asthme study observed that optimal control is obtained more frequently among nonsmokers, those with a normal BMI17, and mild asthma16.18. Thus, stopping smoking, management of obesity by dietary and other lifestyle changes aimed at returning to a normal BMI, and the prescription of fixed drug combinations all contribute to the likelihood of optimal asthma control. Compliance is also an essential factor, but for each individual it is necessary to find a means of promoting compliance with the treatment prescribed.

This study shows that the quality of life of patients with asthma is poorer than that of the general population (p < 0.05 in comparing the different SF-36 scores between the study population > 15 years and a general population sample of the same age). Although quality of life of patients with asthma was worse than that of the general population, the better the asthma control, the better the quality of life.

Conclusion

The ER’Asthme study describes the current status of asthma control in general practice in France. It stresses that asthma control is not currently satisfactory: 72% of patients have poorly controlled asthma, according to the ANAES criteria. It also brings out the differences between patients’ perception about asthma control and the minimum effective dose.

Conflicts of interest:
Philippe Godard states that he participates in various scientific advisory boards, in particular for GlaxoSmithKline and AstraZeneca; Dominique Huas reports participate on scientific advisory boards for GlaxoSmithKline; Bertrand Sohier, Cécile Priibli and Isabelle Boucot are employed by GlaxoSmithKline.

What was known

- Asthma control is not satisfactory (72% of patients have poor asthma control).
- Patients underestimate the severity of their asthma.
- Smoking plays a harmful role in asthma.
- The more severe the asthma, the more likely control is to be poor.

What this article adds

- Fixed drug combinations and obesity play a role in asthma control.
- The question “how is your asthma doing?” is not sufficient by itself to assess asthma control.
- Factors influencing asthma control are age, body mass index, smoking, compliance, and type of treatment.
their asthma control and the assessment by their physicians based on specific and careful questioning. The question “How is your asthma doing?” does not elicit a reliable response. This implies that the physician must ask precisely and regularly about risk factors such as smoking, obesity, and poor compliance and about signs of poor control based on objective criteria. The study also shows that patients treated by a fixed combination of ICS + long-acting β2-agonists are four times as likely to attain optimal control than patients taking ICS alone (OR: 3.7; 95% CI [3.3; 4.2]).

References


17. Saint Pierre Ph, Bourdoin A, Chanez P, Daures JP, Godard Ph. Are the overweight asthmatics more difficult to control? Allergy 2005; in press.


Acknowledgments

The authors thank the general practitioners who participated in the ER’Asthme study and contributed to improving our knowledge of asthma control in France.