Asthma Control and Compliance in a Cohort of Adult Asthmatics: First Survey in Israel

Daniel Starobin MD[1], Marina Bargutin MD[2], Itzhak Rosenberg MD[1], Alexander Yarmolovsky MD[1], Tali Levi RN[1] and Gershon Fink MD[1]

[1]Pulmonary Institute and [2]Department of Medicine C, Kaplan Medical Center, Rehovot, Israel
Affiliated to Hadassah-Hebrew University Medical School, Jerusalem, Israel

Key words: asthma, non-compliance, asthma control test, quality of life, asthma education program

Abstract

Background: Asthma control and treatment compliance are widely investigated issues around the world. Studies have demonstrated relatively low asthma compliance and control in 40–90% of asthma patients in different countries. There are no available data on the Israeli adult asthmatic population

Objectives: To investigate the level of asthma control and compliance in adult asthmatic patients.

Methods: This cross-sectional study of consecutive adult asthmatic patients visiting the pulmonary clinic used a combined questionnaire that included demographics, data on asthma severity and management, and asthma control and compliance scores. Each patient was interviewed and questionnaires were filled out during a routine visit.

Results: The study group comprised 142 males (35.4%) and 259 females (64.6%). Compliance was found optimal in 8 patients (2%), fair in 146 (36%), partial in 156 (39%) and poor in 92 (23%) of the participating asthmatic patients. Asthma control was found optimal in 26 (7%), fair in 124 (31%), partial in 122 (30%) and poor in 129 (32%). Sephardic and Ashkenazi Jewish origin, higher level of education, and treatment protocol including either single fixed-dose inhalers or short-acting beta-agonist bronchodilators significantly improved compliance in our cohort. Socioeconomic status and compliance were found to positively affect asthma control, whereas active smoking negatively affected asthma control in the study patients.

Conclusions: The figures of optimal asthma control and compliance to treatment in Israeli adult asthmatics are low and worse than reported in other studies abroad.

IMAJ 2007;9:358–360

Medical treatment in asthma is effective in reducing symptoms, improving lung function and enhancing quality of life. Inadequate compliance was found to be the main treatment problem in 30–70% of asthma patients [1,2]. Uncontrolled asthmatic patients overuse medical facilities, creating a serious economic burden on the health services [3-6]. On the other hand, studies have shown that improved patient compliance might result in better asthma control and quality of life [7]. Compliance in asthmatic patients can be improved by a variety of methods [8]. Given the central role of compliance in asthma treatment, it has been thoroughly investigated worldwide. Interestingly, large disparities in compliance rates have been shown in different countries.

While no solid data on asthma control and compliance among adult Israeli asthmatics have been published, Israeli practitioners belive that figures of optimal asthma control and compliance are low. The present study is the first Israeli survey of asthma control and compliance in adult asthmatic patients.

Patients and Methods

This cross-sectional study was conducted in the Pulmonary Institute of the Kaplan Medical Center and the affiliated community pulmonary clinic (Clalit Health Services) in the city of Ashdod. Data were collected from 401 consecutive asthma patients who visited these facilities between 1 October 2005 and 10 March 2006.

A combined questionnaire – including demographic data, educational level, self-determined socioeconomic status, smoking history, asthma control and treatment-compliance scores – was filled out by each patient with the assistance of the medical staff. Each patient was interviewed and questionnaires were completed during a routine visit. No therapeutic interventions were performed until completion of the study protocol. Data on spirometry, severity of asthma and prescribed anti-asthma medications were compiled by the medical staff. Asthma severity was defined both by clinical criteria and pulmonary function test according to criteria of the American Thoracic Society [9,10]. The Asthma Control Test [11] and Asthma Compliance Questionnaire [12] from similar studies abroad were adapted for our study. Both the ACT and the ACQ consist of five questions, each with five answer options. Each answer was assigned a score ranging from 1 to 5, with the total questionnaire score ranging from 5 to 25 points. A maximal score (25 points) on the ACT signified good asthma control, 24–20 points fair control, 19–15 points partial control, and a lower than 15 point score indicated poor control. Accordingly, a maximal score (25 points) on the ACQ signified optimal compliance with therapy, 24–20 points fair compliance, 19–15 partial compliance, and a lower than 15 point score indicated poor compliance. The Ethics Committee of the Kaplan Medical Center approved the study.

ACT = Asthma Control Test

ACQ = Asthma Compliance Questionnaire

Statistical analysis

The statistical analysis was performed in three stages. For the first stage we used descriptive statistics to describe the study population. For the second stage correlation between the dependent (Compliance and Control) and the independent variables was measured. For the third stage logistic regression models were estimated separately for each dependent variable. In the final model we used the variables that were found to be statistically significant at a level of $P \leq 0.2$. Pearson correlation coefficients (r) and the significance for it (P) were calculated between the variables. A P value ≤ 0.05 was considered statistically significant.

Results

The questionnaires of 401 adult asthma patients aged 18–85 (mean 55.9 ± 16.6 years) were completed. There were 142 males (35.4%) and 259 females (64.6%). The ethnic origin of participants was as follows: Sephardic Jews* 40.6%, Ashkenazi Jews* 36.9%, Yemenite Jews 12.5%, Ethiopian Jews 8.7%, Arabs 0.5%, and 0.7% other ethnic groups. Education level was academic in 20% of participants; 44.6% finished secondary school and 35.4% did not. Patients' socioeconomic status as self-defined and reported by participants was low in 18.7%, middle in 58.4%, and high in 22.9% of patients.

Asthma severity and medical treatment

Asthma as defined according to spirometric criteria was mild in 68.1%, moderate in 24.9% and severe in 7% of patients. Clinical criteria defined mild intermittent asthma in 25.7%, mild persistent asthma in 38.4%, moderate asthma in 31.2% and severe asthma in 4.7% of the patients.

Asthma diagnosis prior to the study was less than 1 year in 1.7% of patients, 1 to 5 years in 15.5%, 6 to 10 years in 23.9%, 11 to 20 years in 27.2%, and above 20 years in 31.7% of patients.

Thirty-three patients (8.2%) were active smokers and 66 patients (16.4%) were former smokers; the remainder had never smoked.

Specialist follow-up was regular in 272 patients (67.8%); in 129 patients (32.2%) the follow-up was irregular or absent.

Anti-asthmatic medications were prescribed for *all* study participants: short-acting beta-agonist bronchodilators were recommended as needed in 10.2% (41 patients), and continuous treatment was prescribed in the remaining 89.8% (360 patients). In 270 (67.3%) of the latter, a fixed-dose inhaler was recommended.

Asthma control and compliance to treatment data

Optimal asthma compliance was found in only 2% of patients, while in 36%, 39% and 23% of patients, asthma compliance was fair, partial and poor, respectively. In a similar fashion, optimal asthma control was obtained in only 7% of patients, in the remaining 31%, 30% and 32%, asthma control was fair, partial and poor, respectively [Table 1].

*Sephardic refers to Jews of North African or Middle East origin, and Ashkenazi to Jews originating from Western Europe.

Table 1. Asthma compliance and control according to questionnaire results

	Optimal No. (%)	Fair No. (%)	Partial No. (%)	Poor No. (%)
Compliance, by ACQ	8 (2%)	146 (36%)	156 (39%)	92 (23%)
Asthma control, by ACT	26 (7%)	124 (31%)	122 (30%)	129 (32%)

Table 2. Factors significantly affecting compliance with therapy in asthma patients

	P	OR
Ashkenazi Jews	0.006	2.5
Sephardic Jews	0.001	2.8
Education	< 0.0001	2.8
Fixed-dose inhaler	< 0.0001	3.9
Short-acting beta-agonist	0.01	2.5

Table 3. Factors with significant influence on asthma control

	P	OR
Socioeconomic status	0.034	2.00
Compliance to therapy	0.058	1.65
Active smoking	0.011	0.29

The use of a fixed-dose inhaler (Symbicort™ or Seretide™) was found to mostly improve compliance ($P < 0.0001$, odds ratio = 3.9). Education also had a strong positive effect on compliance ($P < 0.0001$, OR = 2.8). Sephardic Jewish ethnicity had the most positive influence on compliance ($P = 0.001$, OR = 2.8), followed by Ashkenazi ethnicity ($P = 0.006$, OR = 2.5). The use of short-acting beta-agonists also improved compliance ($P = 0.01$, OR = 2.5). None of the investigated factors was found to negatively affect compliance [Table 2].

Socioeconomic status and compliance with prescribed therapy were found to contribute to significantly better asthma control in our patients ($P = 0.034$, OR = 2.0 and $P = 0.058$, OR = 1.65, respectively). Active smoking was found to be a factor significantly jeopardizing asthma control ($P = 0.011$, OR = 0.29) [Table 3].

Discussion

Our study is the first survey of asthma control and compliance in Israeli adult patients. This cross-sectional investigation was performed in a combined cohort of consecutive asthma patients visiting both an outpatient hospital clinic and a community pulmonary service. The study cohort comprised a multi-ethnic, multi-religious Israeli population with a wide range in socioeconomic and educational status. Despite the size and the variability of our cohort, we cannot claim that it is representative of the whole Israeli asthmatic population. This is admittedly a limitation of our study.

In our methodology we used known validated questionnaires. ACT was applied for assessing asthma control because it was proven in previous studies to be a reliable tool [11]. While

OR = odds ratio

different questionnaires were used to examine compliance to treatment in asthmatics, Walewski et al. [12] validated ACQ as a reliable questionnaire for this purpose.

The most striking finding in our study was the very low rate both of compliance with asthma therapy and asthma control. The compliance rate in our cohort (7%) was much below the lowest rate of compliance reported in other studies – 20% [13-17]. We do not have a clear explanation for this striking difference. Factors positively affecting compliance to therapy in our study were ethnicity (Ashkenazi and Sephardic Jews), level of education and types of prescribed medications, while no negatively affecting factors were identified. As suggested, those with a higher level of education are more likely to comprehend therapy goals and inhaler usage [18]. Our results are in concordance with previously published data that demonstrated better compliance in more educated patients and in fixed-dose inhaler users as well. The dependence of compliance on ethnic origin found in our work was previously reported in multi-ethnic societies [19]. However, the factors of younger age, male gender, non-smoking and less severe asthma – which had a positive effect on compliance in other studies – did not appear to affect compliance in our cohort [14].

Optimal asthma control in this survey was as low as 2%, far below the figures reported in similar studies. The worst results were published by de Marco et al. [13], with optimal control in 10% of 630 Italian asthmatic adults, contrasting with the figures of Soriano et al. [15], who reported optimal asthma control in as much as 35% of 2050 patients from 7 countries in Western Europe. Chapman and colleagues [16] showed that, according to criteria, only 24% of Canadian asthmatics may be defined as well controlled. In a United States study 73% of adult asthmatic patients had criteria of uncontrolled asthma over a 3 year follow-up period (i.e., 27% well controlled) [17]. As logically anticipated, asthma control is strongly correlated to adherence to treatment. This correlation was found in previous studies as well as in ours.

Higher socioeconomic status was found to improve asthma control, according to our study as well as in previous publications. Active smokers had worse asthma control in our cohort; conversely, non-smoking improves asthma control, as shown in earlier investigations. Male gender and younger age did not significantly influence asthma control in our participants, in contrast to previous reports.

Conclusions

The low asthma control and compliance figures were worse compared to similar studies abroad and to those predicted empirically before the study. The results of our investigation mandate, first of all, a loud call for action toward better asthma control in the Israeli population. Our results will have to be confirmed, with a higher number of asthmatic patients in different regions of Israel. The importance of our survey lies in the fact that it identifies some sectors of the Israeli population where more intensive interventions are warranted, as better compliance was shown to improve asthma control in our cohort of asthmatics. It is obvious that improvement in compliance is mandatory for achieving better control. The data derived from this survey might be taken as the foundation for any future action to improve asthma control and increase compliance.

References

1. National Institutes of Health. Global Initiative for Asthma – Global strategy for asthma management and prevention. NIH Publication No. 02-3659. Bethesda, MD: National Heart, Lung, and Blood Institute, 2002.
2. Rand CS, Wise RA. Measuring adherence to asthma medication regimens. Am J Respir Crit Care Med 1994;149(2 Pt 2):S69-76; discussion S77–8.
3. Creer TL. Understanding and dealing with noncompliance in asthma. J Respir Dis 1991;12:S43.
4. Kohler CL, Davies SL, Bailey WC. Self-management and other behavioral aspects of asthma. Curr Opin Pulm Med 1996;2:16–22.
5. Berg J, Dunbar-Jacob J, Rohay JM. Compliance with inhaled medications: the relationship between diary and electronic monitor. Ann Behav Med 1998;20:36–8.
6. Bosley CM, Parry DT, Cochrane GM. Patient compliance with inhaled medication: does combining beta-agonists with corticosteroids improve compliance? Eur Respir J 1994;7:504–9.
7. Thoonen BP, Schermer TR, Van Den Boom G, et al. Self-management of asthma in general practice, asthma control and quality of life: a randomised controlled trial. Thorax 2003;58:30–6.
8. Manning P, Greally P, Shanahan E. Asthma control and management: a patient's perspective. Ir Med J 2005;98:231–2, 234–5.
9. Crapo RO, Casaburi R, Coates AL, et al. Guidelines for methacholine and exercise challenge testing. Am J Respir Crit Care Med 2000;161:309–29.
10. Guidelines for the evaluation of impairment/disability in patients with asthma. American Thoracic Society. Medical section of the American Lung Association. Am Rev Respir Dis 1993;147:1056–61.
11. Nathan R, Sorkness C, Kosinski M, et al. Development of the Asthma Control Test: a survey for assessing asthma control. J Allergy Clin Immunol 2004;113:59–65.
12. Walewski KM, Cicutto L, D'Urzo AD, et al. Evaluation of a questionnaire to assess compliance with anti-asthma medications. J Asthma 2004;41(1):77–83.
13. de Marco R, Bugiani M, Cazzoletti L, et al. The control of asthma in Italy. A multicentre descriptive study on young adults with doctor diagnosed current asthma. Allergy 2003;58:221–8.
14. Godard P, Huas D, Sohier B, et al. Asthma control in general practice: a cross-sectional survey of 16,580 patients. Presse Med 2005;34(19 Pt 1):1351–7.
15. Soriano JB, Rabe KF, Vermeire PA. Predictors of poor asthma control in European adults. J Asthma 2003;40:803–13.
16. Chapman KR, Ernst P, Grenville A, et al. Control of asthma in Canada: failure to achieve guideline targets. Can Respir J 2001;8(Suppl A):35–40A.
17. Stempel DA, McLaughin TP, Stanford RH, et al. Patterns of asthma control: a 3-year analysis of patient claims. J Allergy Clin Immunol 2005;115:935–9.
18. Paasche-Orlow MK, Riekert KA, Bilderback A, et al. Tailored education may reduce health literacy disparities in asthma self-management. Am J Respir Crit Care Med 2005;172:980–6.
19. Apter AJ, Reisine ST, Affleck G, et al. Adherence with twice-daily dosing of inhaled steroids. Am J Respir Crit Care Med 1998;157:1810–17.

Correspondence: Dr. G. Fink, Pulmonary Institute, Kaplan Medical Center, Rehovot 76100, Israel.
Phone: (972-8) 944-1438; Fax: (972-8) 944-1063
email: gershonfi@clalit.org.il