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Willingness of patients to perform self-management of asthma and the role of inhaled steroids

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Objective – Asthma self-management is a generally accepted effective treatment strategy for asthma patients. Acceptance by patients may be a barrier for successful implementation. In this study, the role of inhaled steroids in starting asthma self-management is described. **Design** – Cross-sectional explorative study.

Setting – General practice.

Subjects – 283 adult steroid-requiring asthma patients were invited by their GP to participate in a self-management programme.

Main outcome measures – In a multivariate logistic regression model, the relation between baseline dosage of inhaled steroids, occupational status, age and sex as independent variables and willingness to participate as dependent variables was explored.

Results – Of all invited, 148 (52%) were willing to participate. Subjects not using inhaled steroids were least willing to participate

(43/143 = 30%). Subjects with low doses of inhaled steroids (< 400 mcg daily) were most willing to participate (44/54 = 81%). Unemployed asthmatics had a higher tendency to participate than patients with a regular job.

Conclusion – Acceptance of self-management by patients is not a limiting issue in promoting self-management of asthma in general practice. High acceptance in patients taking low or intermediate doses of inhaled steroids makes general practice the most appropriate setting for self-management. A selection procedure is recommended.

Key words: asthma, family practice, self-management, corticosteroids.

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A key component of asthma guidelines is educating the patient. The finding that education should not be administered without an action plan, self-monitoring and regular review (1) has led to the introduction of self-management programmes. Several randomised controlled trials have demonstrated that self-management of asthma is beneficial from the perspective of both GPs and patients (2,3).

When implementing self-management, there are certain barriers (time investment, division of tasks, materials) that may be encountered by GPs, and setting up an asthma clinic can be a good solution in overcoming these problems (4). To make this implementation process more efficacious, identification of all patients who may profit from self-management and selection of those willing to participate in such treatment strategy are the first steps.

One of the key components of asthma self-management is tapering off inhaled steroids. Fear and dislike of inhaled steroids are described as playing a role in compliance (5,6). It is likely that asthmatics have a high interest in the possibility of reducing their personal dosage of inhaled steroids. On the other hand, subjects using higher doses of inhaled steroids may be more reluctant as dose reduction may lead to unwanted loss of asthma control (7). This paper studies the role of the dosage of inhaled steroids in the

introduction of self-management in general practice. Based on findings from a pilot study we included age and sex in this study too (8).

During the initial recruitment we observed that lack of time due to work was one of the most frequent reasons for non-participation. Employment or study thus may be a barrier for patients to participate so this factor was included as well.

PATIENTS AND METHODS

In this cross-sectional explorative study, 23 GPs first identified all asthma patients requiring inhaled steroids aged between 16 and 60 years from their practice population. The information sources used were problem list codings (based on the International Classification of Primary Care), prescription data from practice records and the local pharmacist and annual influenza vaccination campaign lists. All selected patients were invited to participate in a self-management programme consisting of three initial education and training visits, regular (weekly or daily) self-assessment of symptoms and peak flow and adjustment of inhaled steroids according to their self-assessed asthma condition. Patients could indicate their willingness to participate by returning an enclosed form to the investigators. Patients who did

not return the form were classified as not willing to participate. For patients who refused to participate, or did not respond to the invitation, the following data were provided anonymously by the subject's GP: age, sex, dosage of inhaled steroids and occupational status. Patients willing to participate were invited to a lung function laboratory where they were checked for in- and exclusion criteria, as defined in Table I, and data on age, sex, dosage of inhaled steroids and occupational status were collected.

Analysis

The dependent variable in this study was willingness to participate (yes/no). Independent variables were 'usage of inhaled steroids', 'occupational status' age and sex. Usage of inhaled steroids was defined as: none, low dose (< 400 µg daily), intermediate dose (between 400 and 800 µg daily) and high dose (> 800 µg daily). Based on presumed differences in effectiveness and deposition, the dosage of a dry powder inhaler was halved to obtain equipotent dosages with metered dose inhalers (9). The cut-off points for fluticasone were < 125, between 125 and 250 and > 250 µg daily for low, intermediate and high doses, respectively. Occupational status was defined as being unemployed versus having a regular (part time) job or study.

Each of the factors was first studied univariate using the Pearson chi-square test for categorical variables and Student's t-test for age. All factors with an alpha < 0.05 were included in a multivariate logistic

Table I. Inclusion and exclusion criteria.

Inclusion criteria:

- Treated for asthma by the GP
- and age between 16 and 60 years
- and FEV₁ more than 40% of the predicted value and more than 55% of predicted 15 min after inhalation of 800 µg salbutamol or 6 weeks after inhalation of 800 µg budesonide twice daily
- and reversibility FEV₁ (after bronchodilation with 800 µg salbutamol MDI or 8 weeks treatment with 800 µg budesonide twice daily) of at least 10% of the predicted value
- or PC₂₀ histamine < = 8 mg/ml

Exclusion criteria:

- Smoking history of 15 or more pack years
- Serious other diseases than asthma with a low survival rate
- The patient has had exacerbations during a period of 1 month before the start of the study
- Other diseases which influence bronchial symptoms and/or lung function (e.g. decompensatio cordis, sarcoidosis)
- The patient is unable to inhale medication correctly or to measure and record their peakflow adequately and it is unlikely that this can be taught

Table II. Willingness to participate and the dosage of inhaled steroids (Pearson chi-square = 61.94, p < 0.0001).

	Willing to participate (%)	Not willing to participate (%)
No inhaled steroids	43 (30)	100 (70)
Low dosage of inhaled steroids	44 (81)	10 (19)
Intermediate dosage of inhaled steroids	43 (78)	12 (22)
High dosage of inhaled steroids	18 (58)	13 (42)
Total no. of subjects	148 (52)	135 (48)

regression by stepwise forward inclusion of each separate factor and all first-degree interactions between factors identified. The log-likelihood method was used with a threshold of 0.05 for inclusion of each factor. Analysis was performed using the SPSS 9 software package (10).

RESULTS

A total of 283 patients were invited by their GPs and 148 (52%) were willing to participate. In Table II, the relation between use of inhaled steroids and willingness to participate is summarised. The percentage of non-participants is relatively high in subjects not using inhaled steroids (although they should) and there is a reciprocal relationship between dosage of inhaled steroids and willingness to participate (Pearson chi square 61.94, p < 0.0001). Based on the selection criteria defined, all selected patients should require inhaled corticosteroids. However, 143 (51%) of all selected patients were not using inhaled steroids at the time of selection. Within this group, 43 patients (43/143 is 30%) were willing to participate. From all patients who did use inhaled steroids, 105 out of 140 (75%) were willing to participate.

The relation between occupational status and willingness to participate is outlined in Table III. Unemployed subjects have a higher tendency to participate (Pearson chi square 16.32, p < 0.0001).

Table III. Willingness to participate and occupational status (Pearson chi-square = 16.320, p < 0.0001).

	Willing to participate (%)	Not willing to participate (%)
Unemployed	37 (69)	17 (31)
Regular job or study	89 (55)	73 (45)
Unknown	22 (33)	45 (67)
Total no. of subjects	148 (52)	135 (48)

Table IV. Relation between dosage of inhaled steroids, occupational status and willingness to participate: multivariate logistic model.

	Odds ratio	95% confidence interval
Dosage of inhaled steroids		
None	0	
Low	10.59	4.70–23.88
Intermediate	8.39	3.82–18.35
High	3.06	1.33–7.04
Occupational status		
Unemployed	0	
Regular job/education	0.40	0.19–0.84
Unknown	0.39	0.17–0.91

The mean ages of participants and non-participants were 38 and 36, respectively ($p = 0.078$, t-test). Within the female group, 95 of 181 subjects (53%) were willing to participate, within the male group this was 53 out of 102 (52%) (Pearson chi square 0.01, p -value = 0.932).

Based on the above findings, a multivariate logistic regression model was tested with dosage of inhaled steroids, occupational status and age. Usage of inhaled steroids and occupational status were statistically significant independent determinants of willingness to participate. There were no significant interactions. Table IV gives the results of the tested model.

DISCUSSION

In this study, dosage of inhaled steroids and occupational status were identified as independent factors associated with willingness to start asthma self-management. In general, half of all invited asthmatics are willing to participate.

In a focus group study exploring views of asthma patients on self-management, Jones et al. found that 34 out of 35 patients stated that these plans were not relevant for them personally (11). This is in contrast to our results and to findings by Paterson et al. (12), who interviewed 120 patients from a nurse run asthma clinic in general practice. The majority of patients interviewed were in favour of asthma care aiming to teach people to manage their asthma for themselves. Additionally, in a Dutch outpatient clinic population willingness to participate in a self-management programme was 68% (13). This comes close to our findings that the participation rate was 75% within the group of subjects already using inhaled steroids.

The finding that willingness to participate is lower in patients with high dosages of inhaled steroids supports our hypothesis that these patients are truly steroid dependent. Other studies have shown that discontinuation of inhaled steroids is often accompanied by exacerbations (7). On the other hand, there is a substantial group of patients in whom periodic treatment (14,15) or at least dose reduction (7) has proved possible.

One of the most striking findings in our study was that 51% of invited patients did not use inhaled steroids, although they should, on the basis of the criteria defined. These criteria were based on national guidelines for general practice (16,17), which are in this respect comparable to international guidelines (3,18). Willingness to participate appears to be associated with prescription of inhaled steroids. This is an important finding, which may be explained by the selection criteria used in this study. GPs were instructed to include all patients possibly requiring inhaled steroids in their invitation list. Based on information sources used, GPs could not properly estimate the need for inhaled steroids in all cases. As patients who were not willing to participate did not visit the lung function laboratory we could not verify their actual need for inhaled steroids. It is justifiable that patients who can do without inhaled steroids are unwilling to participate. Although it seems obvious that these subjects will be least willing to participate, this may be an oversimplification. Willingness to participate may also depend on reasons for not using inhaled steroids (e.g. steroid resistance, non-compliance) and whether these can be modified or not.

Another factor identified in this study was the role of occupational status. The finding that occupational status was not always known to the GP hampers interpretation of our findings. If the unknown group consists of a relatively high number of unemployed subjects, the difference found might decrease or even disappear. If there is a relatively high number of subjects with a regular job or education, the difference observed could become even more prominent. Based on our findings, the initial observation that patients with a regular job were more reluctant to participate in a self-management programme seems true, but generalisation to all asthma patients is uncertain.

In our study, we may have underestimated willingness to participate, because of two of our exclusion criteria: the presence of exacerbations one month prior to the study and the presence of other diseases that influence bronchial symptoms. Earlier studies indicate that patients are more accessible for a new treatment strategy closely after having had an exacerbation and in the presence of comorbidity (19). Espe-

Table V. Identification and assessment of asthma patients possibly interested in self-management.

STEP 1	STEP 2	STEP 3	STEP 4
Identify asthmatics:	Assess current steroids	Assess need for inhaled steroids	Advised action
Information sources: problem list codings Current prescription Influenza campaign list	No inhaled steroids	Not required	No further action
		Required	First discuss with patient and initiate treatment
	Low-intermediate dosage		Offer self-management programme
	High dosage	Earlier reduction failed	No further action
		Dosage reduction might be possible	First discuss dose reduction

cially for patients unjustly not using inhaled steroids, willingness to participate may have been higher had patients with a recent exacerbation been included.

This study certainly does not cover all possible factors influencing the willingness of patients to participate in self-management programmes. However, factors identified in this study are all easily accessible for the GP, making them relevant for a quick assessment. Based on our findings, we recommend the procedure summarised in Table V to select and invite patients possibly interested in self-management in general practice.

Finally, results from this study show that most patients are interested in self-management plans. Acceptance of guided self-management plans by patients is therefore not a limiting issue in promoting the use of self-management of asthma. Patients on low or intermediate dosages of inhaled steroids were most willing to participate. As this group is predominantly treated in general practice, high acceptance of self-management in this category of patients makes general practice the most appropriate setting for this treatment strategy.

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