An assessment of asthmatic patients at four Western Cape community pharmacies

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Objectives. To identify the profile of asthmatic patients visiting community pharmacies and to assess the appropriateness of their current asthma therapy.

Design. Patients were identified as either chronic, newly diagnosed or undiagnosed. Asthma status was assessed from their current symptom and medication profiles and from performance in an airways responsiveness test. Reversibility of > 15% was suggestive of probable airflow obstruction and such patients were referred to a medical practitioner.

Setting. Four community pharmacies located in different socio-economic areas, viz. Khayelitsha, Wynberg, Mitchell's Plain and Vrijzee, were selected.

Subjects. Participants over the age of 6 years, who suffered from recurrent cough, wheeze, chest tightness and/or breathlessness and used over-the-counter (OTC) and/or asthma medications, completed a questionnaire and participated in the airways responsiveness test.

Outcome measures. Effective control of asthma based on minimal symptoms, appropriate use of bronchodilator and anti-inflammatory therapies and absence of airflow obstruction.

Results. Of the 220 participants, 120 were identified as chronic, 7 as newly diagnosed and 93 as undiagnosed. Chronic asthmatics suffered daily symptoms and used inadequate prophylactic anti-inflammatory therapy. Many undiagnosed asthmatics were unaware of their symptoms and took OTC medication indiscriminately. Based on peak expiratory flow rate measurements, > 50% of the screened patients displayed a reversibility of > 15%.

Conclusions. Chronic and many undiagnosed asthmatic patients frequent community pharmacies for their medication. Such patients suffer recurrent asthma symptoms and use medication inappropriately, which

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results in suboptimal lung function. Pharmacists should play a more participatory role in the detection and management of asthma in the community.

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Asthma prevalence is on the increase in many countries.[1] In addition, there is general failure to identify the symptoms early and to initiate appropriate anti-asthma therapy.[2] Patients, as well as their health care providers, overlook the occurrence of chronic cough, wheeze, chest tightness and/or breathlessness as classic signs of asthma.[3] Poor perception of these asthma symptoms leads to inappropriate treatment.[4] Many patients frequent community pharmacies for medication and use over-the-counter (OTC) cough remedies and bronchodilators.[5-7] However, extensive use of such preparations actually masks the severity of the underlying condition and results in infrequent medical consultations.[7] Consequently, these patients are undertreated, and their condition may deteriorate and ultimately require costly and long-term therapy. This situation could be reversed if patients who suffer from poorly controlled symptoms are identified and referred for appropriate medical assessment.[8]

Patients can be identified from their symptom and medication profiles and from their performance in a very simple lung function test. Such screening provides an overall subjective and objective assessment of a patient's asthma status.[9] Also the frequency with which symptoms occur is an indication of asthma severity.[8,9] Since airways of asthmatic patients are hyperreactive, one method to identify asthmatics is the use of a simple airways responsiveness test with an inhaled bronchodilator and a portable peak flow meter.[10,11] Screening of asthmatic patients at community pharmacies has not yet been undertaken in South Africa. The objectives of this study were therefore to identify the profile of asthmatic patients visiting community pharmacies and to assess the appropriateness of their current treatment.

Method

The study was approved by the Ethics Subcommittee of the Senate Research Committee of the University of the Western Cape and was conducted in the spring, from September to November 1994.

Selection of pharmacies. Four community pharmacies located in different socio-economic areas of the Western Cape were selected. The pharmacy in Khayelitsha served people of a lower socio-economic black community, while that in Mitchell's Plain served a lower- to middle-class coloured community. The pharmacies in Vrijzee and Wynberg served mainly middle- to upper-middle class white communities.

Selection of patients. At each pharmacy patients were selected by one of the authors (AB) who was trained in the screening techniques beforehand. Patients were selected on the basis of their symptom and medication profiles and performance in an airways responsiveness test. Patients as young as 6 years, who were capable of using a peak flow meter, were included.

Each patient's symptom and medication profile was used to assign them to one of three categories, viz. chronic, newly diagnosed or undiagnosed. The chronic group had a clinical diagnosis of asthma and had been receiving asthma therapy for 6 months or longer. Patients who presented at pharmacies with prescriptions for asthma therapy for the first time and who may have had a clinical diagnosis of asthma were identified as newly diagnosed asthmatics. The undiagnosed group included patients who complained of recurrent cough, wheeze, chest tightness and/or breathlessness, and who had sought medication for the treatment thereof during a self-initiated visit to the pharmacy.

Patients were informed verbally and provided with a written brochure to outline all the procedures involved in the study. After informed consent had been obtained, each participant was required to complete a questionnaire (Appendix 1) in order to provide a subjective assessment of his/her asthma status. In addition, they all participated in an airway responsiveness test to obtain an objective lung function assessment.

Assessment of airway responsiveness. The degree of responsiveness of the airways to an inhaled bronchodilator was considered to be suggestive of the presence of reversible airway obstruction. Each patient received instructions on the use of the Mini Wright peak flow meter and the Bricanyl turbuhaler for inhalation of the bronchodilator, terbutaline.

The test procedure involved the measurement of three peak expiratory flow rates (PEFRs); the PEFR is the maximum rate at which air can be expelled forcefully from the airways of the lungs.[9] The highest PEFR was designated the pre-bronchodilator PEFR (pre-PEFR). Thereafter, the patient inhaled two puffs (0.50 - 1.0 mg) of terbutaline. After 10 minutes another three PEFRs were recorded, the highest of which was designated the post-bronchodilator PEFR (post-PEFR). The degree of responsiveness (or reversibility) was calculated from the formula:

$$\% \text{ reversibility} = \frac{\text{post-PEFR} - \text{pre-PEFR}}{\text{pre-PEFR}} \times 100.$$

The predicted PEFR for a particular individual was determined from a nomogram which listed the PEFRs of normal healthy individuals for both sexes of varying age and height and was compared with the observed PEFR measurements.[12] An improvement in lung function (as determined from the degree of reversibility) was calculated from pre- and post-bronchodilator PEFR measurements. Reversibility of > 15% was considered positive for airway responsiveness. This indicated the probable presence of airflow obstruction and confirmed the presence of asthma.[9-11]

Data analysis

Differences between average pre- and post-PEFRs and the degree of reversibility among the three groups were assessed by means of Student's *t*-test. A *P*-value of less than 0.01 was considered significant.

Results

A total of 220 patients participated in the study. The proportion of patients in each of the three asthma categories and their age and sex distribution are reflected in Tables I and II, respectively. Table III summarises the responses of each participant to the questionnaire on symptom and medication profiles. Over 50% of the chronic asthmatics suffered daily and nocturnal symptoms and the majority used bronchodilator therapy (67%), while only 15% took concurrent anti-inflammatory therapy. All the newly diagnosed asthmatic patients suffered from daily symptoms and were prescribed bronchodilators without anti-inflammatory therapy. In the undiagnosed asthma cases, the majority of patients complained of nocturnal symptoms which had persisted for more than 3 weeks. They also recognised that exposure to trigger factors such as cigarette smoke, cold air or exercise resulted in chest tightness. A variety of OTC self-medications were used by the undiagnosed patients, including bronchodilators (52%), expectorants (18%), antihistamines (19%) and antitussives (11%).

Table I. Proportion of chronic, newly diagnosed and undiagnosed asthmatics recruited from four Western Cape community pharmacies

			Number and proportion of patients per asthma category					
	Total recruited in study (*N* = 220)		Chronic (*N* = 120)		Newly diagnosed (*N* = 7)		Undiagnosed (*N* = 93)	
Location of pharmacy	No.	%	No.	%	No.	%	No.	%
Khayelitsha	35	16	18	15	0	0	17	18
Wynberg	39	18	22	18	1	14	16	17
Mitchell's Plain	140	63	76	63	4	57	60	65
Vrijzee	6	3	4	3	2	29	0	0

Table II. Sex and age distribution of chronic, newly diagnosed and undiagnosed asthmatics recruited

	Chronic (*N* = 120)	Newly diagnosed (*N* = 7)	Undiagnosed (*N* = 93)
Male	48	3	36
Female	72	4	57
Age			
Range	6.1 – 80	6.5 – 47	6.1 – 79
Mean (SD)	40 (18)	24 (13)	43 (19)

The average lung function values, i.e. predicted, pre- and post-PEFRs for the three categories of asthmatic patient, are presented in Table IV. There was no significant difference between the three patient groups in respect of their average pre- and post-PEFRs. However, within each group the average pre-PEFR was significantly lower than the post-PEFR for the chronic ($P < 0.0001$), newly diagnosed ($P < 0.001$) and undiagnosed ($P < 0.0001$) patients. For the newly diagnosed group an average post-PEFR of above 90% of the predicted PEFR was observed. Over 50% (123/220) of the patients in each of the three asthma groups displayed a > 15% reversibility in their PEFRs and were subsequently referred for optimisation of their asthma therapy.

Table III. Symptom and medication profiles of chronic, newly diagnosed and undiagnosed asthmatic patients screened at four Western Cape community pharmacies

	Asthma category		
Patient profile	Chronic (*N* = 120) (%)	Newly diagnosed (*N* =7) (%)	Undiagnosed (*N* = 93) (%)
Symptom profile			
Onset of asthma during			
Childhood	51		
Adulthood	48		
Adolescence	1		
Frequency of symptoms			
Daily and/or nocturnal	66	86	67
Seasonal	34	14	33
Symptom history (undiagnosed patients only)			
Duration of symptoms > 3 weeks			79.5
Chronic cough			62
Nocturnal awakenings due to asthma symptoms			81
Allergic response to house-dust, animal fur, food, etc.			35
Family history of allergy			24
Family history of asthma			28
Chest tightens upon exposure to trigger factors (smoke, cold air or exercise)			70
Medication profile			
Bronchodilator therapy only	70	57	
Bronchodilator and anti-inflammatory therapy	15		
Antibiotics prescribed		43	
OTC bronchodilators only	15		52
Expectorants and bronchodilator preparations			18
Antihistamines			19
Antitussives			11

Table IV. Measured lung function parameters of chronic, newly diagnosed and undiagnosed asthmatic patients screened at community pharmacies

Lung function parameters (l/min)	Chronic (*N* = 120) (mean (SD))	Newly diagnosed (*N* = 7) (mean (SD))	Undiagnosed (*N* = 93) (mean (SD))
Average predicted PEFR	491 (90)	453 (147)	474 (105)
Average pre-PEFR	289 (125)	342 (131)	315 (115)
Average % predicted pre-PEFR	59 (23)	75 (9)	66 (18)
Average post-PEFR	344 (136)	405 (131)	363 (116)
Average % predicted post-PEFR	70 (25)	92 (15)	76 (18)
Average % reversibility	16.6 (11)	17.2 (9)	14.5 (9)
% with > 15% reversibility	59	71	50.5

Average predicted PEFR — average predicted PEFRs determined from nomogram for normal healthy individuals;[12] average pre-PEFR — average PEFR of patient group before inhaling terbutaline; average % predicted pre-PEFR — $= \frac{\Sigma \text{ pre-PEFR}}{n \text{ predicted PEFR}} \times \frac{100}{1}$; average post-PEFR — average PEFR, 10 minutes after inhaling terbutaline; average % predicted post-PEFR — $= \frac{\Sigma \text{ post-PEFR}}{n \text{ predicted PEFR}} \times \frac{100}{1}$; average % reversibility — average % reversibility calculated from: % reversibility $= \frac{\text{post-PEFR} - \text{pre-PEFR}}{\text{pre-PEFR}} \times \frac{100}{1}$

Discussion

Although epidemiological studies on asthma have been conducted worldwide at numerous schools, hospitals and clinics, an assessment of asthmatic patients visiting community pharmacies in South Africa has not yet been undertaken.[1] Community pharmacies are often the first port of call for patients seeking self-medication; we therefore aimed to identify the profile of asthmatic patients and assess the appropriateness of their current medication in the Western Cape.

The study was conducted during spring, i.e. September to November, when grass pollen and mould counts may be expected to be high.[13] Allergic responses to house-dust mite also appear to peak in November in this region.[14] Participants in this study would doubtless have been exposed to these environmental allergens which, in many cases, may have triggered their airway hyperreactivity.

Of the 220 participants, the majority (140) were recruited from the Mitchell's Plain pharmacy. This was mainly due to the eagerness of patients in this area to participate, although it could also signal a higher proportion of asthmatics in this region of the Western Cape. Constant exposure to industrial pollution, dust and, especially, the high incidence of cigarette smoking among the coloured population could have resulted in a high proportion of the Mitchell's Plain community being predisposed to respiratory diseases.[13] In contrast, only 35 patients were recruited from the Khayelitsha pharmacy. This is an economically disadvantaged area, and since anti-asthma medication is expensive when purchased from pharmacies, the majority of patients obtain their medication supplies from government-subsidised day hospitals. Figures for the affluent areas of Wynberg (39) and Vrijzee (7) were generally low because of patients' unwillingness to participate.

Asthma is a clinically diagnosed disease and many newly diagnosed asthmatics are consequently identified by medical practitioners from whom they receive their first prescription for asthma therapy. An improvement in the post-bronchodilator PEFR to over 90% of the predicted PEFR in the newly diagnosed group was observed, which suggests that the prescribed bronchodilator therapy was appropriate for the severity of the symptoms. Many patients also received antibiotics which, in the majority of patients, could not be regarded as appropriate therapy for asthma.

Of major concern is the high proportion of undiagnosed patients (42%) identified. These patients took a variety of OTC medications which seemed to mask the severity of their condition. For example, 62% of the undiagnosed patients suffered from a chronic cough, which may be an important manifestation of asthma.[15] Our results suggest that many people with symptoms of chronic cough may indeed be undiagnosed asthmatics who use OTC remedies indiscriminately.

Chronic asthmatics generally showed signs of undertreatment as a result of insufficient use of anti-inflammatory asthma medication (Table III). Only 9.5% of the total number screened received anti-inflammatory therapy despite the fact that more than 50% of the patients suffered daily and nocturnal symptoms.

Inappropriate treatment was also evident in 8 chronic asthmatics whose anti-asthma therapy consisted of the concomitant use of two bronchodilators. Excessive use of bronchodilators was previously observed in New Zealand and is believed to have contributed to the high asthma mortality rate recorded in that country.[16] In the present study, the majority of patients who tended to use medication inappropriately were undertreated and a similar phenomenon was observed in Australia.[7]

Reversibility of airways obstruction is one of the hallmarks of asthma and distinguishes it from other chronic obstructive airways diseases such as chronic bronchitis and emphysema.[17] The airway responsiveness test provided a simple objective indication of the degree of reversibility of airflow obstruction. Patients who suffered from reversible airflow obstruction were, however, often unable to perceive its presence.[4] This finding perhaps suggests that many asthmatic patients who frequent community pharmacies could be unaware of the fact that they have airflow obstruction. Objective lung function assessments, like the airways responsiveness test, could therefore be used to identify such patients and provide valuable clinical information that will serve as a basis for referral. Such assessments could easily be conducted at community pharmacies and would enable pharmacists to become integral members of the asthma health care team.

In conclusion, there is a large number of chronic and undiagnosed asthmatics who frequent pharmacies for their medication. Many of these patients are undertreated, tend to use their medication inappropriately and suffer recurrent symptoms. This could lead to probable airflow obstruction and suboptimal lung function. Pharmacists could play a more participatory role in assisting the health care team in the detection and management of asthma. A team approach to patient care and patient education would minimise the morbidity and help reduce the burden of asthma in this country.

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Appendix 1. Data sheet for the identification of an asthmatic patient at a community pharmacy

1. General details

Patient #: _____
Age: _____ years
Sex: _____
Height: _____ cm

2. Asthma status

	Frequency		
Symptoms	Daily	Nocturnal	Seasonal
Cough			
Wheeze			
Breathlessness			
Chest tightness			

Symptom history (for **undiagnosed** patients only)

a. Have symptoms been present for > 3 weeks?
b. Do you suffer from a chronic cough?
c. Do your symptoms cause you to stay awake at night?
d. Are you allergic to house-dust, certain foods, animal fur, etc.?
e. Does anyone in your family suffer from any type of allergy?
f. Do you have a family history of asthma?
g. Does exercise, smoking or cold air, etc. cause your chest to go tight?

3. Medication

Medication	Dose and frequency
Bronchodilator(s):	_____
Anti-inflammatory agent(s)	_____
Other(s):	_____

4. Lung function assessment

Results of airways responsiveness test:

PEFRs (l/min)	1	2	3
Pre-inhalation			
Post-inhalation			

% reversibility: _____
Predicted PEFR: _____ l/min

5. Referral note issued: Yes/No

Letter of referral

Name of pharmacy: _____
Address: _____
Telephone: _____
Dear doctor _____
re: Patient: _____

The aforementioned patient has presented with the following symptoms: cough, wheeze, chest tightness, breathlessness, nocturnal symptoms.
Peak expiratory flow rate (PEFR) measurements were taken 10 minutes before and after the inhalation of 2 puffs of a bronchodilator, terbutaline. The patient's results were as follows:

Pre-inhalation PEFR:	_____ l/min
Post-inhalation PEFR:	_____ l/min
% reversibility obtained:	_____

We would be grateful if you could please manage further.

_____
Pharmacist