

Asthma Self-Management: A Study in an Emergency Room of a Chest Hospital in Delhi, India

Anita Kotwani¹, Sushil Shendge²

¹Department of Pharmacology, V. P. Chest Institute, University of Delhi, Delhi, India

²Department of Pharmacology, University College of Medical Sciences, Delhi, India

Address for Correspondence: Anita Kotwani, Department of Pharmacology, V. P. Chest Institute, University of Delhi, Delhi 110007, India. Email: anitakotwani@gmail.com

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Abstract

Objectives: Poorly controlled asthma imposes a considerable burden and is a serious public health problem in the developing world. A key challenge for healthcare professionals is to help patients to engage in self-management behaviours with optimal adherence to appropriate treatment. The aim of the present study was to investigate the pattern of self-management in asthmatic patients enrolled as out-patients in a tertiary care referral public chest hospital, in Delhi, India.

Methods: The study population was adult asthma patients (n=200) visiting the emergency room (December 2008-December 2009) of a chest hospital for asthma exacerbation. The data was collected through a questionnaire regarding the self-management of asthma.

Results: Enrolled patients (64.0% female) were registered as asthma out-patients in the study hospital for a mean of 5.4±4.4 years. Patients visiting the emergency room (ER) and having an unscheduled visit to doctor at least twice in the previous 12 months were 86.5% and 91.0%. Patients were classified according to the disease severity as having intermittent (17.0%) or persistent (83.0%) asthma. Not all patients had metered dose inhalers at home. Only 2.0% of patients were prescribed peak flow meters and were keeping a diary of their readings. With one exception, patients did not have written action plans for treatment provided by doctor or health facility. No statistical difference was found in the pattern of self-management of patients having persistent or intermittent asthma.

Conclusions: Findings revealed poor self-management of asthma and poor communication from doctors regarding self-management to the patients. Suitable actions and interventions are needed by health professionals to implement patient self-management asthma programme for optimum asthma control.

Keywords: Asthma; asthma control; asthma education; emergency room; self-management; India

Introduction

The prevalence of asthma is growing worldwide and the rate is higher in developing countries [1]. Due to the chronic nature a lifelong adherence to medication and optimal self-management advice by doctors is needed for asthmatics [2]. This paper highlights the analysis of self-management behaviour of asthmatic patients visiting the emergency room of a public hospital due to uncontrolled asthma. International guidelines state that the aim of asthma management is to achieve and maintain control [2,3]. Controlled asthma is characterised by minimal or no symptoms during the day and at night, no asthma attacks, no limitations on physical activities and exercise,

nearly normal lung function and minimal or no side-effects from medications [2].

Pharmaceutical therapy is most effective if patients use inhaled corticosteroids regularly [4], but many patients refuse long-term use of medicines [5]. Another very important measure to improve asthma-related health outcomes is to optimise self-management. This comprises of asthma education, usage of written asthma action plans and keeping an asthma diary with regular measurement of peak flow variability. These factors are very effective at reducing morbidity and mortality [6].

However, in some countries, the implementation of these measures is poor despite its importance. In the real world where patients make choices this may reflect conflicting priorities, asthma is a considerable burden on healthcare systems, mainly as a result of poor control. Studies from the developed world have shown that only between 3.0 and 33.0% of asthmatics use a personal asthma action plan [7-10]. The literature on the self-management behaviour of asthma patients from the developing world including India is scarce. Since self-management by asthmatics is an integral component of asthma control, this study investigated the practices of health professionals by studying the pattern of self-management of asthmatic patients presenting to hospital.

Methods

Setting and study population

This cross sectional study was conducted in the emergency room (ER) of an urban referral public chest hospital attached to Vallabhbai Patel Chest Institute (VPCI), Delhi, India. Adult patients aged 18 to 60 years visiting ER with asthma exacerbation and who were registered with VPCI for a minimum of one year with confirmed diagnosis of asthma by reversible spirometry were enrolled. After the patient was treated for his/her acute attack and was clinically stable, then they were asked to participate in the study. Patients were enrolled after obtaining written informed consent. The study was approved by the Institutional Ethics Committee. A pilot study was conducted in 50 patients from December 2008 to February 2009. The main study was conducted in a further 200 patients from March 2009 to December 2009. A total of 213 patients were approached but 13 refused to participate in the study.

Study questionnaire and data collection

Questionnaire design was based on the Asthma Exacerbation Response Questionnaire [11]. The questionnaire was modified to suit local needs and behaviour. The questionnaire was translated backward and forward in the local language and patients were subsequently interviewed in the same language. Study data was collected by completion of the questionnaire administered orally by one of the study investigators (SS). The questions were asked in a relaxed atmosphere to reduce any psychological pressure on the patients. Patients were assured of the confidentiality of the study and anonymity of their responses. The questionnaire was piloted with 50 patients to ensure the clarity of the questions and their relevance to possible answers. A pilot study with large numbers was needed to determine the language to be used by the investigators to reduce any potential for misunderstanding when posing questions. The pilot sample was not included in the final analysis. The final questionnaire contained 51 questions divided into six domains: Socio-demographic profile (14 items), clinical profile (4 items), morbidity and activities of living (9 items), access to care (5 items), asthma attack prevention (13 items), and emergency actions (6 items).

Statistical method

Statistical analysis was carried out using the SPSS™ version

16.0 for Windows statistical software package. Detailed descriptive statistics were used to provide frequencies on various characteristics of the study sample. Chi square (X²) was used to test the significance of the differences between categorical variables. Significance was set at $p < 0.05$. To check the pattern of self-management of asthma patients and any significant difference by severity of diseases, patients were classified into two groups; persistent asthma and intermittent asthma. Both the clinical impairment and risk components were taken into consideration [11, 12]. Persistent asthmatics were classified as:

- Having daytime symptoms at least three days per week or,
- at least three night-time awakenings per month or,
- short acting beta-2 agonist use for symptom control at least three times per week,
- or any physical limitation or at least two exacerbations per year requiring oral systemic corticosteroids use.

All other patients were classified as having intermittent asthma.

Results

Socio-demographic characteristics

Data were collected from asthmatic patients (n=200) who visited the emergency room and their characteristics are shown in Table 1. Of these patients, 51.5% were between 30-44 years and females constituted 64.0 % of the total sample size. Only 10.0% of the study population was illiterate and 52.5% patients had a family history of asthma. More than half of patients (62.5%) had monthly incomes less than INR 10,000 and 4.5% had more than INR 40,000/month.

Table 1: Socio-demographic Characteristics of Study Patients (n=200)

Age (In years)	18-29	67 (33.5%)
	30-44	103 (51.5%)
	45-60	30 (15.0%)
Sex	Male	72 (36.0%)
	Female	128 (64.0%)
Income (INR/Month)	<10000	125 (62.5%)
	10000-20000	40 (20.0%)
	20000-40000	26 (13.0%)
	>40000	9 (4.5%)
Totalf Family members	1-4	68 (34.0%)
	5-8	113 (56.5%)
	>9	19 (9.5%)
Education	Illiterate	20 (10.0%)
	<10th	60 (30.0%)
	≥10th & Graduation	71 (35.5%)
	Graduation Post-graduation	33 (16.5%) 16 (8.0%)
Employment Status	Employed	69 (4.5%)
	Unemployed	11 (65.5%)*
Number of smokers in the household	0	146 (73.0%)
	1	52 (26.0%)
	2	2 (1.0%)
Smoking history	Non-smoker	184(92.0%)
	Ex-smoker	3(1.5%)
	Current smoker	13(6.5%)
Family History of Asthma	Yes	105 (52.5%)
	No	95 (47.5%)

* 88.3% females (n=113) were homemakers.

Clinical profile

The mean duration of registration as out-patients with VPCI was 5.4±4.4 years and 51.5% had FEV1 value ≤60% of predicted value. Almost all (99.5%) patients were prescribed inhaled corticosteroids in fixed combinations with long or short acting β-agonists (Table 2). The most common combination prescribed was budesonide+formeterol and only one patient was prescribed beclomethasone alone. In addition, 80.0% patients were prescribed reliever medications to be taken on as required basis (Table 2).

Table 2: Prescribed Medicines to Study Patients for Asthma Treatment

Medication	Frequency	%
<i>Controller Medications</i>		
Budesonide + Formeterol	136	68.0
Fluticasone + Salmeterol	50	25.0
Fluticasone + Formeterol	13	6.5
Beclomethasone	1	0.5
<i>Reliever Medications</i>		
Salbutamol	92	46.0
Levosalbutamol	62	31.0
Levosalbutamol and Tiotropium	3	1.5
Salbutamol and Tiotropium	2	1.0
Tiotropium	1	0.5

Morbidity and Activities of Living

Morbidity data and asthma control in the previous 12 months are shown in Table 3. Half of the patients (50.5%) reported visiting the emergency room (ER) two to four times in the last 12 months. Patients visiting the ER five to ten times were 25.5% and 10.5% patients visited ER more than ten times in the past year for the treatment of their exacerbations. Similar trends were observed for unscheduled visits to the doctor, with 58.0% of patients having two to four unscheduled visits to the doctor in the past one year and 25.0% of patients having five to ten unscheduled visits to their doctor. For the treatment of their uncontrolled asthma, 61.0% of patients were advised to take oral steroids 2-4 times and 6.0% were advised 5-7 times in the past one year.

For the daytime symptoms, 32.5% of patients reported having one or more symptom of asthma at least three days per week in the previous three months. Among these patients, 82.5% had one or more night-time symptoms at least three nights per month and 46.0% had night-time awakenings at least three nights per month (Table 3). Over half (56.5%) had restricted

exercise or other activities at least three days per month. Accordingly, 83.0% of patients were found to have persistent asthma and 17.0% had intermittent asthma as previously defined [12].

Table 3: Morbidity and Activity of Living of Study Patients (n=200)

a. In past 12 months, how many times have you been hospitalized overnight) for asthma?	0-1 2 or more	193 (96.5%) 7 (3.5%)
b. In past 12 months, how many times have you been treated in emergency room for asthma?	0-1 2-4 5-10 >10	27 (13.5%) 101 (50.5%) 51 (25.5%) 21 (10.5%)
c. In past 12 months, how many times have you visited your doctor (unscheduled) for asthma?	0-1 2-4 5-10 >10	18 (9.0%) 116 (58.0%) 50 (25.0%) 16 (8.0%)
d. In past 12 months, how many times have you been advised to take oral steroids for asthma?	0-1 2-4 5-10 >10 No data	64 (32.0%) 122 (61.0%) 12 (6.0%) 1 (0.5%) 1 (0.5%)
e. In the past 3 months, how many days have you had at least one of the symptoms of asthma?	0-10 11-20 21-30 31-40 41-50 >50	24 (12.0%) 53 (26.5%) 58 (29.0%) 23 (11.5%) 8 (4.0%) 34 (17.0%)
f. In the past 3 months, how many nights have you had at least one of the symptoms of asthma?	0-10 11-20 21-30 31-40 41-50 >50	35 (17.5%) 58 (29.0%) 52 (26.0%) 26 (13.0%) 8 (4.0%) 21 (10.5%)
g. In the past 3 months, how many nights have you woken up due to one or more symptoms of asthma?	0-10 11-20 21-30 31-40 41-50 >50	108 (54.0%) 62 (31.0%) 14 (7.0%) 13 (6.5%) 2 (1.0%) 1 (0.5%)
h. In the past 3 months, how many days have you missed your work/office due to one or more of the symptoms of asthma?	0-10 11-20 21-30 31-40 41-50 >50	173 (86.5%)* 24 (12.0%) 2 (1.0%) 0 (0.0%) 0 (0.0%) 1 (0.5%)
i. In the past 3 months, how many days have you restricted exercise or other activities due to one or more of the symptoms of asthma?	0-10 11-20 21-30 31-40 41-50 >50	87(43.5%) 69 (34.5%) 23 (11.5%) 3 (1.5%) 9 (4.5%) 9 (4.5%)

* 65.5% were unemployed (including female homemakers)

Access to Care

Most of the patients (96.0%) had V. P. Chest Institute as their usual source of care for both groups of patients, persistent and intermittent disease (Table 4). In addition, 25.5% of patients reported to have other care sources as well (27.7% vs. 14.7% for persistent and intermittent groups). Few patients (7.5%) also reported to be trying different types of treatment for their

asthma other than that prescribed by chest physicians at V. P. Chest Institute. These treatments included mainly Ayurvedic, Homeopathic and Unani medicines. In case of worsening of asthma symptoms and for acute exacerbation, 84.5% rushed to their usual source of care that is V. P. Chest Institute. No statistically significant difference in behaviour of access to care was observed in asthma patients whether they had persistent or intermittent type of asthma (Table 4).

Table 4: Access to Care, Persistent vs. Intermittent Disease

		Persistent n=166	Intermittent n=34	*p Value
Usual source of care	VPCI Other	159 (95.8%) 7 (4.2%)	33 (97.1%) 1 (2.9%)	1.000
Care sources other than VPCI	Yes No	46 (27.7%) 120 (72.3%)	5 (14.7%) 29 (85.3%)	0.171
Any other type of treatment receiving other than medicine prescribed by chest physicians	Yes No	14 (8.4%) 152 (91.6%)	1 (2.9%) 33 (97.1%)	0.453
Source of care in case of asthma symptoms bother	VPCI Other	138 (83.1%) 28 (16.9%)	31 (91.2%) 3 (8.8%)	0.357
Source of care in case of acute exacerbation	VPCI Other	137 (82.5%) 29 (17.5%)	32 (94.1%) 2 (5.9%)	0.150

*Chi square test

Self-management: Asthma Attack Prevention and Preparedness, Emergency Actions

Nearly three quarter (73.5%) of participants reported having a metered dose inhaler, whereas only 15% had a nebulizer at home for prevention of asthma attacks (Table 5).

Table 5: Self-management for Prevention of Attack and Emergency Actions, Persistent vs. Intermittent Asthma

	Persistent n=166	Intermittent n=34	*p Value
<i>Asthma attack prevention/preparedness</i>			
a. Have metered dose inhaler at home	118 (71.1%)	29 (85.3%)	0.134
b. Have nebulizer at home	27 (16.3%)	3 (8.8%)	0.399
c. Avoid known allergens/smoking/bad weather	133 (80.1%)	28 (82.4%)	0.951
d. Use home remedies, herbs or teas	30 (18.1%)	10 (29.4%)	0.204
e. Have peak flow meter	4 (2.4%)	0 (0.0%)	-
<i>Emergency Actions</i>			
a. Written action plan and any educational material	1 (0.6%)	0 (0.0%)	-
b. Use peak flow meter	1 (0.6%)	0 (0.0%)	-
c. Use/increase the frequency of the medicines	164 (98.8%)	33 (97.1%)	1.000
d. Begin taking oral medicine	8 (4.8%)	0 (0.0%)	0.409
e. Visit doctor	166 (100%)	33 (97.1%)	0.378
f. Use home remedies, herbs or teas	36 (21.7%)	7 (20.6%)	1.000

*Chi square test

Only 32.5% of patients reported that they visited an asthma clinic routinely as asked by the physicians (even if no symptoms) and nearly half (45.5%) did not follow their treatment medication plan as directed by the physician. Nearly all (98%) of the patients were never prescribed peak flow meters by doctors and of the four patients who had peak flow meters, only one was using it regularly and maintaining a diary. No statistically significant difference was observed in self-management behaviours between intermittent and persistent asthmatics indicating that severity of disease does not influence self-reported behaviour. The actions in case of emergency were also found to be similar. One patient in the study had a written action plan from the doctor/facility of advice to take during an asthmatic emergency.

Discussion

As far as the authors are aware, this is the first in-depth study in India to report self-management by asthma patients. As self-management of asthma is an integral part of asthma management it is important to understand the extent to which it might be occurring. Based on the results of this study, suitable interventions can be planned for optimal asthma management and control. The study hospital is one of the reputed public chest hospitals in India and asthma patients from Delhi and nearby cities are referred to this hospital. World Bank socioeconomic indicators suggest that the study population is also very similar to the Indian population [13].

Chronic diseases are a serious public health issue in India as it requires long term therapy and access and affordability of medicines is poor, and management of asthma is complex [14, 15]. Earlier studies have indicated that asthma management and pharmacotherapy is not optimal in the community setting within urban India [16-18]. A recent study showed that asthma patients referred to hospital and treated with pharmacotherapy according to standard treatment guidelines demonstrated improvement in various parameters of asthma control within 2-8 weeks [19]. However, long term asthma control required that the doctors or other hospital staff help patients adopt self-management behaviours with optimal adherence to appropriate treatment [20].

A systematic Cochrane review for asthma control re-iterates the need for self-management and recommends self-monitoring by peak expiratory flow and written action plans for adults [6]. The review also outlines that patients should be educated about their condition, obtain regular medical review, monitor their condition at home with either peak flow or symptoms and use a written action plan. Analysis of the results of trials comparing asthma self-management education to usual care reveal that asthma patients, who were educated about their asthma, visited the doctor regularly and who used a written action plan had fewer visits to the emergency room, less hospital admissions, better lung function, improvement in peak expiratory flow, fewer symptoms, and used less rescue medication [6].

This study based in India has given an in-sight into the self-management of asthma patients, doctor-patient interaction and

the observations are far from ideal [6, 20]. The limitation of the study is that it was conducted in the emergency room in a single hospital and so the results may not be generalisable. However, all patients enrolled were registered in the study hospital as asthma patients for a minimum of previous one year and the institute is a tertiary referral centre. The findings for self-management were similar in almost all patients indicating the pattern for the self-management of asthma in the study hospital. Another aim was to determine whether self-management patterns by patients or providing information by doctors varied according to the severity of the disease, i.e., intermittent or persistent asthma. Results of this study have shown similar pattern of self-management in persistent and intermittent asthma. Only four patients had peak flow meters which were prescribed by doctors at other private clinics and only one patient was using it regularly as reinforcement of the need for and importance of peak flow meter use was not undertaken at the study hospital. It is accepted that peak expiratory flow (PEF) is useful for monitoring airway changes if used properly [21], especially in that segment of the population labelled as “poor perceivers” of worsening symptoms [22]. The newly revised National Heart, Lung, and Blood Institute Asthma Guidelines recommend that patients with moderate to severe persistent asthma and those with a prior history of severe exacerbations (NHLBI, 2007, p. 59) should perform long-term daily PEF monitoring [20]. Hence, efforts should be made by treating physicians to introduce peak flow meter use to their patients as a cost-effective intervention to improve asthma self-management [23].

Another component of self-management of asthma is providing education and training material along with a written and personalised asthma action plan. This was given to one patient in our study population at a private clinic. Though the guidelines recommend and promote written action plans, implementation of this strategy is poor globally [24]. Earlier studies report that patients including minority ethnic groups [25] have a desire for greater involvement in treatment decisions [26] and would find receipt of personal written action plans helpful [27]. The authors believe that one of the main reasons for not following the guidelines of asthma education and targeted written action plan is due to the limited time and competing demands during a typical visit in a public facility.

A study demonstrated that asthma education can be given by well trained lay persons, with outcomes comparable with those achieved by practice nurses [28]. Roberts *et al.*, [29] have developed electronic pictorial asthma action plan (E-PAAP) software; the basic template offered by the software can be modified for each patient with ease. This group has also developed a pictorial asthma action plan which can be used for patients with limited literacy skills [30]. Accordingly, in Indian hospitals either the same or a modified template could be adapted or new innovative efficient methods developed so that physicians are able to provide training and written action plans to each asthma patient. Nurses, social workers, or other suitable staff could be trained to provide educational material to

asthma patients and to have face-to-face interaction that could improve asthma education and ultimately, treatment adherence and concordance with asthma management.

Conclusion

This questionnaire-based study conducted in the emergency room of a chest hospital in Delhi, India revealed that the self-management programme for asthmatics is far from optimum. Findings indicate that the usual source of care for study patients was the study hospital for routine treatment as well as in case of emergency indicating patients' faith in their physicians. A written plan and a good doctor-patient interaction will further improve the faith of patients towards the doctor and will help in asthma control of patients. The doctor-patient interaction may also improve the adherence to therapy which was shown to be poor in the study population. Good practices of imparting asthma education and self-management programme should be followed by health professional staff. It is to be hoped that providing patients with the self-management plan and asking patients to keep diary of peak flow meter readings will improve asthma control and will reduce the morbidity and mortality related to asthma.

Authors' contribution

Anita Kotwani conceived and designed the study. Both the authors (AK and SS) are responsible for the reported research, analysis and interpretation of data, revising of the manuscript, and have approved the manuscript as submitted. Sushil Shendge was responsible for administering the questionnaire.

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Conflict of interest

None of the authors have any conflict of interest.

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