

Quality of asthma management in an urban community in Delhi, India

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Background & objectives: High prevalence and poor control of asthma make its management a major public health issue worldwide, especially in developing countries. Optimum review of asthma management in the community is essential to improve asthma control. This study was conducted to investigate the quality of asthma management, knowledge about asthma and quality of life of asthma patients referred to a public tertiary care chest hospital in Delhi.

Methods: Diagnosis of asthma was confirmed by symptoms and reversible spirometry in 50 referred patients on their first visit. Patients were interviewed using three questionnaires on quality of asthma management before visiting referral hospital, asthma knowledge and asthma quality of life (AQLQ). Correlation amongst quality of treatment, asthma quality of life, and asthma knowledge was also determined.

Results: Findings revealed that only 60 per cent of patients were informed about their disease, and 10 per cent had undergone lung function tests previously. Only 44 per cent of patients were prescribed inhalers. None were provided with any educational material. Patients had poor knowledge of aetiology, pathophysiology, medication and how to assess the severity of their asthma. The mean scores in AQLQ indicated a moderate degree of impairment in quality of life.

Interpretations & conclusions: This study provides evidence of unsatisfactory asthma management and patient-doctor interaction as patients had limited knowledge of asthma disease, its management and had poor quality of life as measured by a standardized questionnaire. Thus, there is need to implement suitable interventions to improve asthma management according to standard treatment guidelines in the community.

Key words: Asthma - asthma knowledge - asthma management - India - quality of life

Asthma, a chronic disease, is a major health care issue worldwide due to its increasing prevalence in many countries following trends of urbanization and industrialization. India alone has an estimated burden of more than 15 million patients¹. Despite the

existence of effective medicines, asthma control is poor globally and especially in developing countries². Poorly controlled asthma is associated with significant morbidity, mortality and socio-economic problems³. Assessing asthma management in the community is

essential to plan for intervention studies to improve asthma control. Hence, the present study was conducted to examine asthma management in the community in the capital city of India, Delhi.

Earlier studies have documented that important factors leading to under-treatment of asthma include non-availability and under-use of basic tools like the spirometer for diagnosis and management of asthma^{4,5}. Further, non-availability of essential inhalation medicines in most public sector hospitals and low affordability in developing countries make providing rational asthma management more difficult^{6,7}. It has been reported that poor knowledge of both practitioners and patients and doctors who do not provide education about self-management of asthma to patients are important barriers to effective treatment and management of asthma⁸⁻¹¹. Differences exist in prescribing patterns of anti-asthma medications across European countries, particularly under-use of asthma controller medications^{12,13}.

The gap in knowledge about asthma and its management is well recognized^{8,9,14,15}. Many international guidelines have been published with the aim to standardize the diagnosis and management of asthma with emphasis on patient education and providing self management plans to patients^{16,17}. Hence, patients' knowledge is an integral component in the long-term management of asthma.

With this background, the present study was designed with an aim to assess the quality of treatment in the community and knowledge about asthma and quality of life in asthmatic patients who were referred to a referral public tertiary care chest hospital in Delhi.

Material & Methods

A questionnaire-based study was conducted from March to December 2006 at the out-patient department of Vallabhbhai Patel Chest Institute, Delhi, a tertiary care referral hospital. Patients from National Capital, Delhi and nearby towns are referred to this public hospital. The study was approved by the Institutional Ethics Committee. Informed written consent was obtained from the patients.

Patients aged ≥ 18 yr who presented to the chest clinic for the first time with history suggestive of asthma were included. They were evaluated and the diagnosis of bronchial asthma was confirmed based on the symptoms and reversible spirometry as per the Global Initiative for Asthma (GINA) guidelines¹⁶.

Patients with an acute exacerbation of asthma and those with another concurrent respiratory disease or any systemic disease were excluded.

Spirometry was carried out on a dry rolling seal spirometer of computerized pulmonary function equipment (Benchmark Model, PK Morgan, UK) according to standardized guidelines of the American Thoracic Society/European Respiratory Society, 2005^{18,19}.

Information on quality of prior treatment, patients' knowledge about asthma and quality of life was obtained by using three questionnaires administered by one of the authors (AK). The two questionnaires, Asthma Knowledge and Asthma Quality of Treatment were developed on the basis of the GINA guidelines¹⁶. There is no "gold standard" for knowledge and, therefore, only content validity is relevant. The content of knowledge a patient is expected to have served as the basis for development of the questionnaire. Repeatability was tested by re-administration on another occasion and comparing the two sets of responses.

The "Asthma Quality of Life Questionnaire"²⁰ is a standard tool extensively used for this purpose and its repeatability and validity have been well studied. The questionnaires were administered in a random order.

Quality of Treatment Questionnaire (Appendix 1): A questionnaire was developed based on the GINA guidelines for asthma management, both in English and a local language, Hindi. Hindi version of the questionnaire was used for all patients. It contains 20 questions which have been divided into the following four domains – Information about the health care provider (3 questions), Diagnosis and assessment of severity (4 questions), Treatment (6 questions) and Patient education (7 questions). Many questions in this questionnaire made inferences about the doctor talking to his/her patient about the diseases, treatment, education the patient received, and whether the patient had been given information about self-management. These questions gave insight into doctor-patient interaction, such as how doctors explain spirometry, techniques and precautions to be taken on the use of inhalers, the purpose of each inhaler, written action plans provided to the patient and how doctors explain the early signs of worsening of asthma and its management. Subject responses were categorical (yes/no) as well as structured multiple-choice. The percentage of subjects with different responses to each question was calculated.

Appendix – 1	
Quality of Treatment Questionnaire for Asthmatics	
Question	Response
1. How many doctors have you consulted so far?	One/two/more than 2
2. Where have you taken treatment from so far?	Govt Hospital/Pvt Hospital/Pvt Clinic
3. Do you know the specialization or qualifications of your doctor(s)? If Information available from records on his/her doctor's qualifications, please enter or otherwise, write NA	Yes/No
4. Has your previous doctor told you what are you suffering from? If yes, please specify the name of the disease	Yes/No
5. Has your previous doctor told you about the severity of your disease?	Yes/No
6. Have you ever taken a lung function test (Spirometry: physician to explain briefly)? If yes, how many times so far?	Yes/No
7. Has your doctor assessed your disease with a peak flow meter (<i>show the PEF meter</i>)?	Yes/No
8. Has your doctor prescribed any inhalation device? Which one?	Yes/No (if no, go to Ques no. 16)
9. If yes, how many types of inhalation medicines are you taking	
10. If more than one, has your doctor told you about the purpose of the each inhalation drug and when each has to be taken?	Yes/No/NA
11. How did you learn the use of inhalers?	From the doctor/package insert/Other clinic staff/another patient/others
12. Has your doctor advised you on any precautions while using inhalers?	Yes/No
13. For how many years have you been using the inhalers?	
14. Has your doctor given you a written plan to manage your disease (other than the prescription)?	Yes/No
15. Has your doctor told you what the early signs of worsening of asthma are?	Yes/No
16. Has your doctor told you what to do if symptoms increase at any time?	Yes/No
17. Has your doctor advised you to use a peak flow meter at home (<i>show the PEF meter</i>)?	Yes/No
18. Has your doctor told you about any preventive measures, other than the use of drugs, to lessen your symptoms?	Yes/No
19. Has your doctor told you how long treatment will continue?	Yes/No
20. Has your doctor provided you any educational material about your disease?	Yes/No
Current medication: PFT (today):	

Asthma knowledge questionnaire (Appendix 2): This was developed in both English and Hindi and designed to obtain information about different aspects of the disease that a patient is expected to be given to make him/her an active partner in self-management. The 28 questions were divided into the following six domains – Aetiology (3 questions), Pathophysiology (3 questions), Symptoms and assessment of severity (8 questions), Medication (8 questions), Prevention (4 questions) and

Natural history (2 questions). Subject responses were scored on a categorical scale where 0 represented 'no knowledge/no response' and 1 represented knowledge of the subject addressed in a particular question. A final score was obtained by summing these scores. The maximum possible score was 28. The scores were expressed as percentage of the maximum possible score. The percentage of subjects with different responses to each question was also calculated.

Appendix – 2 Asthma Knowledge Questionnaire	
Question	Answers
Section A - Etiology of asthma	
1. Asthma symptoms can be caused by:	
Allergy	Yes/No/Can't say
Air pollution or any other type of irritant (dust, fumes, <i>etc.</i>)	Yes/No/Can't say
Living with a person who has asthma	Yes/No/Can't say
A common cold	Yes/No/Can't say
Exercise	Yes/No/Can't say
Certain foods	Yes/No/Can't say
Certain drugs	Yes/No/Can't say
Without obvious reason	Yes/No/Can't say
2. I can pass my asthma to persons I am living with	Yes/No/Can't say
3. Asthma is more likely if a blood-relative in the family or in previous generation already has asthma	Yes/No/Can't say
Section B - Pathophysiology	
4. In asthma, the breathing tubes in lungs become narrow due to swelling of their walls	Yes/No/Can't say
5. In asthma, the breathing tubes also become narrow due to tightening of muscle around them	Yes/No/Can't say
6. In asthma, the breathing tubes also become narrow due to mucous (sputum) collection	Yes/No/Can't say
Section C – Symptoms and assessment of severity	
7. Symptoms of asthma are breathing difficulty with wheezing or whistling sound	Yes/No/Can't say
8. Asthma symptoms vary in severity from time to time, being less sometimes and more at other times	Yes/No/Can't say
9. Asthma symptoms are more likely to occur at night or early morning	Yes/No/Can't say
10. I can judge how severe my asthma is	Yes/No/Can't say
11. Severity of asthma can be measured by a test of blowing out air into a machine	Yes/No/Can't say
12. Severity of asthma can also be measured at home using a simple device called a peak flow meter	Yes/No/Can't say
13. Asthma attacks can be dangerous	Yes/No/Can't say
14. I can make out when my asthma is worsening	Yes/No/Can't say
Section D - Medication	
15. Asthma medicines can be given as tablets/syrups/inhalers	Yes/No/Can't say
16. The best way to take asthma medicine is by inhalation	Yes/No/Can't say
17. Asthma medicines are usually of two types – one to give immediate relief from symptoms (relievers) and other to prevent symptoms (preventers)	Yes/No/Can't say
18. I know which is the drug for regular use and which is to be used if breathlessness occurs	Yes/No/Can't say
19. The most effective drugs for controlling asthma are called steroids	Yes/No/Can't say
20. Steroids can be harmful, but given by inhalers are usually free from significant harmful effects	Yes/No/Can't say
21. Medicine for asthma has to be taken till my symptoms persist and then can be stopped	Yes/No/Can't say
22. Medicine for asthma has to be taken even after symptoms are no longer there, till my doctor advises me to	Yes/No/Can't say
Section E - Prevention	
23. If I can identify and avoid factors that increase my symptoms, my asthma will be controlled better	Yes/No/Can't say
24. I can prevent or reduce asthma symptoms by taking the reliever inhalers just before exposure to anything that triggers the symptoms	Yes/No/Can't say
25. I can prevent asthma symptoms if I take my medication regularly	Yes/No/Can't say
26. If the asthma symptoms are getting worse, I know how to change my medication	Yes/No/Can't say
Section F - Natural history	
27. Asthma cannot be cured	Yes/No/Can't say
28. Although asthma cannot be cured, it can usually be controlled fairly well	Yes/No/Can't say
Scoring - All responses marked as “Yes” get 1 point except where “No” is the correct answer	
All responses marked “No” or “Can't say” get 0 point	

Asthma quality of life questionnaire (AQLQ): AQLQ (provided kindly by Professor E. Juniper) is a standardized, widely available and validated instrument to assess quality of life in asthmatic patients. The Hindi version was used. The 32 questions of AQLQ are divided into the following four domains – symptoms (12 questions), activity limitations (11 questions), emotional function (5 questions), and environmental stimuli (4 questions). Patients respond to each question on a seven-point scale and recall their experiences during the previous two weeks. Each domain score also ranges from 1 to 7 with 1 representing the greatest impairment possible or most of the time and 7 represents the least or none of the time.

Statistical analysis: Scores obtained from AQLQ and Asthma Knowledge Questionnaire were expressed as Mean \pm SD. Correlation between quality of treatment, asthma quality of life, the pulmonary function test parameter (Forced expiratory volume in one second, FEV₁) and asthma knowledge was determined by using the Pearson correlation coefficient.

Results

Fifty adult patients (26 men and 24 women) completed the three interviewer administered questionnaires. Of these, 22, 18 and 10 patients, respectively had mild, moderate and severe persistent asthma. Twenty eight patients said that they had asthma for over 10 yr, and four patients had for more than one year but less than two years. Only eight patients had asthma for less than 1 yr.

Quality of treatment (Table I): Information about health care providers - Of the 50 patients, 33 (66%) had consulted more than one doctor before visiting the referral chest clinic. Up to 22 (44%) patients had no knowledge about their doctor's qualification. Among those who knew the qualifications of their doctor, 12 (24%) patients consulted MBBS doctors, 10 (20%) went to doctors with MD degree and 6 (12%) consulted practitioners from the alternative systems of medicine (homeopathy, unani, etc.) or unqualified medical practitioners.

Diagnosis and assessment of severity - Only 30 (60%) patients were informed by their doctors that they were suffering from asthma; of these, only 11 (22%) patients were told about the severity of their disease. Lung function test and peak flow measurement were done in only 5 (10%) and 9 (18%) of patients, respectively.

Treatment - Of the total 50 patients, only 22 (44%) were prescribed inhaled therapy by their doctors. Of these 22 patients, only 10 were aware of the medicine in the inhalers and the purpose of inhalation. Of these 10 patients, eight were prescribed both reliever and preventer inhalers whereas two patients received only reliever therapy. Twelve patients revealed that they learnt the use of inhalers from the package insert, other patients or hospital staff other than their doctor.

Patient education - None of the subjects were provided with any educational material about the disease process. Only 6 (12%) patients were given a written plan to manage asthma in the event of a worsening condition but the content was never discussed by the doctor so these patients could not recall. Only 3 (6%) patients recalled having been given information regarding the early signs of worsening of asthma. One patient had an objective mean of assessing his asthma as he was advised to use a peak flow meter at home. Four patients were told about the measures to be taken if asthma symptoms increase. Up to 33 (66%) of patients revealed that they were not given any instructions regarding the preventive measures to lessen the symptoms of asthma.

Asthma knowledge: Scores obtained in different domains revealed that a large proportion of patients lacked basic knowledge about asthma and its treatment (Fig.).

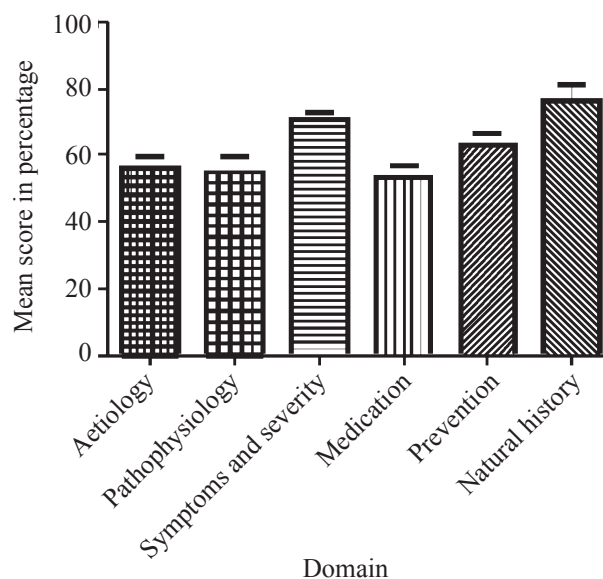


Fig. Mean scores of different domains of Asthma Knowledge Questionnaire.

Table I. Asthma Quality of Treatment Questionnaire Analysis (n=50)

Details of previous treatment	Yes	No	Not applicable
<i>Information about the health care provider</i>			
More than 1 doctor consulted	33 (66)	17 (34)	-
Knowledge about doctor qualification	28 (56)	22 (44)	-
<i>Diagnosis and assessment of severity</i>			
Informed about diagnosis	30 (60)	20 (40)	-
Severity of disease	11 (22)	39 (78)	-
Lung function test done	5 (10)	45 (90)	-
Peak flow meter assessment	9 (18)	41 (82)	-
<i>Treatment</i>			
Prescribed any inhalers	22 (44)	28 (56)	-
Aware of the name of inhalers	10 (20)	12 (24)	28 (56)
Purpose of each inhalation explained	10(20)	12 (24)	28 (56)
<i>Patient education</i>			
Preventive measure to lessen the symptoms	17 (34)	33 (66)	-
Written plan given to manage the disease	6 (12)	44 (88)	-
Information regarding early signs of worsening of asthma care	3 (6)	47 (94)	-
Measures to be taken if symptoms increase	4 (8)	46 (92)	-
Advised to use peak flow meter at home	1 (2)	49 (98)	-
Provided any educational material about the disease	0 (0)	50 (100)	-
Value in parentheses indicate percentage of responses			

Aetiology - When patients were asked to identify the causative factors for asthma, 25 (50%) patients believed that asthma is a contagious disease and could be contracted by living with another asthma patient. Up to 74 per cent of patients (37) were not aware of the fact that drugs can also cause asthma symptoms.

Pathophysiology - Between 36 and 68 per cent patients (18-34) had knowledge of the underlying pathologic process during an asthma attack.

Symptoms and assessment of severity - Between 80 and 90 per cent patients (40-45) were aware of the symptoms of asthma. However, only 14 (28%) patients knew about the early signs of worsening of asthma. Merely 5 (10%) patients knew that the severity of asthma can be judged by a peak flow meter and the remaining 45 (90%) patients had no understanding of the concept. Ten per cent of patients did not think that asthma can be dangerous and can result in death during an attack.

Medication - Sixty per cent of patients did not know whether the drug prescribed to them was a “reliever” or

“preventer” of asthma symptoms. Up to 30 per cent of patients did not believe that the best way of taking asthma medicines is by inhalation. Seventy eight per cent patients did not think steroids were the most effective drugs for controlling asthma and 68 per cent believed that steroids are in fact harmful even when given by inhalation route.

Prevention - Up to 68 per cent of patients knew that asthma could be prevented by avoiding trigger factors and by taking medication regularly.

Natural history - Thirty (60%) patients believed that asthma cannot be cured but 44 (88%) patients mentioned though asthma cannot be cured but can usually be controlled.

Asthma Quality of Life

The overall quality of life impairment due to asthma was moderate with a mean value of 3.68 ± 0.78 . Mean scores in each domain are as shown in Table II.

Activity limitation - Asthma limited the activities of all patients except one with moderate to severe

Table II. Asthma Quality of Life Questionnaire analysis

Domain	Mean Score \pm SD
Activity limitation	3.7 \pm 1.04
Symptoms	3.84 \pm 0.51
Emotional function	3.9 \pm 0.68
Environmental stimuli	2.95 \pm 0.28

Score 1 indicates severe impairment; Score 4 indicates moderate degree of impairment and score 7 indicates no impairment

Table III. Pearson correlation coefficients between quality of treatment (QoT), asthma quality of life (AQLQ), pulmonary function test (FEV₁) and asthma knowledge (AK)

	QoT	AQLQ	FEV ₁
QoT		-0.009	0.033
AQLQ	-0.009		-0.150
PFT	0.033	-0.150	
AK	0.371*	0.024	0.084

* Correlation is significant at $P < 0.05$ (2-tailed)

limitation observed in 80 per cent of the patients. Strenuous activities such as running and walking upstairs led to symptoms in 94 and 88 per cent of patients respectively. Up to 60 per cent of patients reported moderate to very severe problems during sleep due to asthma.

Symptoms - Moderate to severe symptoms were observed in up to 36 (72%) patients. Up to 34 (68%) patients recalled waking up with asthma symptoms most of the time. Nocturnal asthma occurring most of the time over the past two weeks was reported by 27 (54%) patients.

Emotional function - About 82 per cent of the patients felt frustrated as a result of asthma and 84 per cent were concerned about having asthma in the past two weeks. Thirty eight per cent patients revealed that they felt worried most of the time when they did not have their asthma medicines with them.

Environmental stimuli - Environmental triggers such as dust, weather, air pollution, and strong smells were reported to have provoked recent asthma symptoms in 47 patients. Passive smoke exposure had provoked asthma in 37 (74%) patients. More than 80 per cent patients (40) reported avoiding situations because of potential exposure to these triggers.

Pulmonary function and correlation: Correlations between quality of treatment (QoT), asthma quality of life (AQLQ), and asthma knowledge (AK) were studied.

A significant correlation was seen only between the quality of treatment and asthma knowledge ($P < 0.05$) (Table III).

Discussion

Our study has identified substantial deficiencies in the management of asthma in an urban community in India. Other studies from different parts of the world have also reported under-treatment or under-use of essential asthma medication^{8,9,13,14,21,22}. In India, a majority of asthma patients in the community are managed by general practitioners in the private sector and non-specialized public sector physicians in primary/secondary health care facilities. Our previous study indicated that in many States of India essential inhalation medicines for asthma were not available in public sector⁷. Earlier studies from India and other countries have documented that general practitioners have poor knowledge about preventive therapy for asthma and its management^{8,12,21,23} which contributes to increased morbidity and mortality.

Guidelines recommend that the diagnosis and follow up of patients should be based on the evaluation of the frequency of symptoms and on the level and variability of the peak expiratory flow rate. However, in the present study, a spirometer or peak flow meter was used for diagnosis in only 10 and 18 per cent of patients, respectively. Non adherence to recommended treatment guidelines has been reported not only from developing but from developed countries as well^{24,26}. Results from these studies revealed that only 43 per cent of Australian general practitioners and 33 per cent of Spanish pediatricians routinely measured airways function with spirometers and peak flow meters²⁵. Underutilization of these objective tools in management of asthma is a cause for concern.

Inhalers which are considered to be the mainstay of asthma therapy were prescribed to only 44 per cent of patients in our study. These findings are consistent with several other studies that also reported the underutilization of inhalers^{22,24-27}. The primary reason reported in earlier studies was the non-availability of free inhalers (medicines) in public facilities, where a large proportion of populations received prescribed oral medications, and low affordability at private sector facilities due to the high cost of inhalers^{27,28}. Consequently, to save cost, patients are prescribed and dispensed affordable oral medications²⁹. Further, a survey conducted in Pakistan revealed that a few practitioners felt inhalers were addictive and should be reserved only for severe cases²².

It is of concern that many subjects were not aware of their doctor's qualification and the majority had consulted more than two doctors at primary and secondary healthcare before visiting the referral (tertiary) chest hospital. Another disappointing fact was that up to 40 per cent of patients were not given the diagnostic label of asthma by their doctors. This finding is consistent with an earlier study from Australia which reported that most practitioners believed that informing a patient that he or she has asthma is not important⁹. This fact also shows that most doctors at primary and secondary care facilities do not make a diagnosis based on lung function tests, as the equipment is not available in these facilities and they prescribe only symptomatic treatment. The findings of this study also gave an insight into doctor-patient interaction; only 10 patients were told by the doctor about the purpose of each inhaler and were advised how to use inhaler. Only 10 per cent of the patients were told about the peak flow meter and none of the patients were given any written education material. A poor doctor-patient relationship is also highlighted in other studies³⁰. Hence, there is a pressing need for developing good partnerships between patients and doctors for the best practice in the treatment of asthma.

Our study revealed that a majority of the patients were misinformed about the aetiology of the disease, and its pathophysiology and management, whereas higher scores were observed in the domains of symptoms and natural history. Patients probably knew enough about the symptoms of asthma because of their own personal experience. Earlier studies also document that patients are ignorant or have distorted knowledge of their disease and the prescribed treatment which leads to poor compliance^{26,31,32}. Non adherence to the standard treatment leads to uncontrolled symptoms, limitation of daily life activities, unscheduled urgent healthcare visits and progression of the disease resulting in poor quality of life³³.

The findings of our study indicate that prescriber as well as patient awareness and education is needed for effective management of asthma in the community. A systematic review by the Cochrane Airways group showed that written self-management action plans had significant benefits in reducing morbidity³⁴. Effectiveness of patient education for asthma management has been shown in several studies from India and elsewhere³⁵⁻³⁷. There is an enormous gap between evidence-based standard guidelines for asthma management and clinical practice.

Limitations of our study include a small sample size from one chest hospital and a potential for recall bias. Generalization of the results should be done with caution as this study was done in at one referral hospital of Delhi.

In conclusion, this study provides evidence of unsatisfactory asthma management, poor doctor-patient interaction and poor patient education at primary and secondary care levels. Similar baseline studies are needed from other parts of India. Prescriber education at all levels of healthcare and proper patient education will enable patients to comply with treatment regimens and consequently improve the quality of life of asthma patients.

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