

## ORIGINAL ARTICLE

Iran J Allergy Asthma Immunol  
June 2008; 7(2): 85-90

# A Survey of Pediatricians' Knowledge on Asthma Management in Children

Mohammad Gharagozlou, Hengameh Abdollahpour, Zahra Moinfar, Mohammad Hassan Bemanian, and Mojtaba Sedaghat

*Department of Allergy and Clinical Immunology of Children's Medical Center Hospital,  
Immunology, Asthma and Allergy Research Institute, Medical Sciences/University of Tehran, Tehran, Iran*

*Received: 2 May 2007; Received in revised form: 23 October 2007; Accepted: 10 February 2008*

### ABSTRACT

Asthma is one of the most common acute and chronic conditions in children, and the pediatricians are expected to provide an important role for asthma care in this age group, however there is no published information describing the different aspects of their practices about children asthma in Iran. This study was done to characterize the knowledge of the Iranian pediatricians about the diagnosis, treatment and education of asthma in children.

Validated questionnaires were completed by 193 pediatricians from different parts of Iran during the International Congress of Pediatrics in Tehran. A total of 193 returned questionnaires (96.5%) were eligible for the survey and analysis.

About 49% of the respondents were male and 18% were sub-specialists. Wheezing was the most common mentioned symptoms in taking asthma into consideration. About 40% of these physicians had no plan for doing spirometry in eligible children and 35.2% of them did not have familiarity with peak flowmeter. Also about 17.6% of them paid no regular visits to their asthmatic patients. Only 29% of the respondents indicated that they would prescribe inhaled corticosteroids for a 6-year-old child with moderate persistent asthma and 73.3% of them would prescribe inhaled bronchodilator (Salbutamol) for an acute asthmatic attack as the first drug, while 17.1% of them used epinephrine injection for this purpose. About 42.2% of the respondents did not consider any education or action plan for their patients and only 60.6% of them had access to standard guidelines and educational programs.

The results show that there are numerous aspects of children asthma management in Iran which are not consistent with standardized guidelines and recommendations. This survey and the attained information suggest areas for interventions to improve the pediatricians' knowledge about asthma and the disease management.

**Key words:** Asthma; Children; Knowledge; Pediatricians; Practice

### INTRODUCTION

Asthma is one of the most common acute and chronic conditions in children which brings about

reasons for absence from school and, an increased attendance in hospital emergencies<sup>1</sup>. In the study based on International Study of Asthma and Allergies in Childhood (ISAAC), the current asthma symptom (wheezing) prevalence among 13-14 year old Iranian students was about 10.9%.<sup>2</sup>

Pediatricians have the most important role in diagnosis, management and follow up of these young

---

**Corresponding Author:** Mohammad Gharagozlou, MD;  
Department of Allergy and Clinical Immunology, Children's Medical  
Center Hospital, Tehran Iran. Tel: (+98 21) 6693 3926, Fax: (+98 21)  
6642 8995, E-mail: gharagoz@tums.ac.ir

patients, but there is limited published information describing different aspects of their knowledge and practice about asthmatic children in Iran. There are numerous reports about under treatment of asthma throughout the world, despite the availability of standard treatment guidelines.<sup>3-6</sup> Among different reasons of asthma under treatment, physicians' nonadherence to standard guidelines may play an important role.<sup>7-10</sup> On the other hand some studies have also been carried out to find out the obstacle that pediatricians face when using asthma guidelines which showed lack of awareness as the most reported reason.<sup>11,12</sup> A change within these physician communities is needed to ensure proper and acceptable management.<sup>13,14</sup> The current study describes the common patterns of practices among Iranian pediatricians regarding children asthma.

## MATERIALS AND METHODS

### Survey Approach

We made a questionnaire with 34 closed questions of which some were multiple choices based on NAEPP<sup>15</sup> guidelines. After the preparation of the first prototype, and consultation with 5 asthma and allergy fellows, we made the final version of the questionnaire. It covered mainly the following items; (1) demographic information about the respondents and their practice settings; (2) asthma diagnosis; (3) treatment of asthma patients; (4) follow up of patients; (5) education of asthmatic patients.

### Study Population

Based on the recommendation of Iranian Health, Treatment and Medical Education Ministry (HTMEM), we have about 2000 pediatricians in our country, therefore a 10% sample of this population was meaningful for our project. Population of our study was pediatricians from different parts of Iran who participated in 14th International congress of Pediatrics, October 2002 in Tehran, Iran. This Congress is held yearly in Tehran and pediatricians from all parts of the country participate in it, thus it was a good opportunity for us to have a suitable sample for this study. Finally, out of 200 questionnaires distributed to the pediatricians attending the congress, 193 (96.5%) filled-out questionnaires were returned to us by pediatricians.

### Data Analysis

We studied the responses and analyzed the data with SPSS (Statistical Package for the Social Sciences) software.

## RESULTS

Of 193 responses, we arrived at results which are presented in the following parts.

### General Characteristics of Responding Pediatricians

The demographic characteristic of the responding pediatricians is shown (Table 1). About half of the pediatricians were between 30 and 39 years. Most of the participants were general pediatricians and the rest were sub-specialists. The majority of participants worked in the state hospitals. The respondents estimated that patients with asthma represented an average of 8.1% of their practice.

### Diagnostic Approach and Clinical monitoring of the Patients

In response to the question, "Which symptoms persuade you to suspect of asthma?" "wheezing" was the symptom that majority mentioned followed next by "chronic cough" (Table 2).

**Table 1. General characteristics of the participated pediatricians**

Characteristics	Abundance (%)
<b>Sex</b>	
Female	99(51.3)
Male	94(48.7)
<b>Age(years)</b>	
≤29 years old	6(3.1)
30-39	90(46.6)
40-49	42(21.8)
50-59	38(19.7)
60-69	12(6.2)
≥70	5(2.5)
<b>University Certificate</b>	
General pediatricians	159(82.4)
Sub-specialists	34(17.6)
<b>Place of activity</b>	
Private office	104(53.8)
Private hospital	29(15)
State hospitals	60(31.1)
<b>Estimated percentage of patients with asthma in practice</b>	8.1

## Pediatricians' Knowledge on Asthma Management

**Table 2. Which symptoms persuade you to suspect asthma?**

Symptoms	%
Wheezing	76.6
Chronic cough	60.6
Dyspnea	48.7
Exercise intolerance	34.7

**Table 3. What are the commonest symptoms that bring an asthmatic child to a pediatrician?**

Symptoms	%
Chronic cough	49.2
Wheezing	48.7
Dyspnea	32.6
Exercise intolerance	8.8

**Table 4. Approaches to initial evaluation of Asthma by Iranian Pediatrician**

Approaches	%
<b>Self management of patients by physicians</b>	81.9
<b>Referral of patients to specialist</b>	16
<b>Methods of first evaluation of the patients</b>	
Clinical manifestation	91.2
Spirometry	24.4
Chest X-Ray	40.9
Peak flowmetry	9.8
Sputum examination	2.6
Skin test	1
<b>Percent of physicians using spirometry</b>	
Acutely symptomatic patients	10.4
Asymptomatic patients	43
For both groups	32.6
Once a year	29.5
Twice a year	21.8
More than twice a year	8.3
<b>Physicians who knew proper use of peak flowmeter</b>	47.1
<b>Physicians who used peak flowmeter</b>	
Never	50.7
Rarely	14
Sometimes	19.2
Often	7.8
Only for symptomatic patients	0.5
No answer	7.8

Moreover the pediatricians believed that the commonest symptom which bring children to pay a visit to physicians is chronic cough (49.2%) (Table 3).

**Table 5. Approaches to clinical monitoring of patients by Iranian pediatricians**

Approaches	%
<b>Regular patients visit</b>	78.25
<b>Monitoring selected outcomes during office visits</b>	
Frequency and severity of day-time symptoms	78.8
Frequency of $\beta$ 2-agonist use	43.5
Activity level	39.9
Frequency disturbed sleep due to asthma symptoms	29
Peak flow diary review	4.7

In this survey 81.9% of the pediatricians, followed up their own patients and 16% referred them to asthma specialist (Table 4).

As the first evaluation approach for a probable asthmatic child, more than 90% of the pediatricians used clinical manifestations, and chest radiography (CXR) was the most widely used diagnostic test for initial evaluation.

Table 5 shows how the pediatricians followed and monitored their asthmatic patients.

### Medications used in Treating Patients with Asthma

Table 6 displays our physicians' approaches to asthma therapy. As the first choice for a child with acute asthma attack most of the pediatricians (61.7.3%) used inhaled salbutamol, but a number of them (31.3%) still used epinephrine injection for this condition. A high number of physicians (65.3%) reported that they used a spacer device. Most important reason among those who did not use spacer devices was the low availability of spacers. Most physicians reported the use of inhaled corticosteroids for their patients (76.7%). Among those who did not prescribe inhaled corticosteroids for asthmatic children, the most important reported reason was a feeling about the long time side effects and the existence of better choices instead of corticosteroids. For patients  $\geq 5$  years with moderate persistent asthma, inhaled  $\beta$ 2-agonists were the most frequently prescribed medication (reported by 52.3% of physicians). Only 39% of them reported the prescription of inhaled corticosteroids for this group of patients. The survey also included the following hypothetical clinical scenario: "For a patient with continued symptoms who uses inhaled salbutamol three times a day as his or her only medication, what would you prescribe next?"

**Table 6. Pharmacotherapeutic Approaches to Asthma reported by Iranian pediatricians**

Approaches	%
<b>Selected drug for acute asthma attack</b>	
Inhaled salbutamol	61.7
Epinephrine injection	31.1
Aminophylline	11.4
Corticosteroids injection	21.2
Inhaled corticosteroids	9.3
<b>Prescription of a spacer device</b>	65.3
<b>Motive for not to use spacer devices</b>	
Not available	16.5
No belief	2.1
Non-educable patients	1.6
Little time for education to patients	2.1
Expensiveness of the device	1.6
No response	76.1
<b>Prescription of inhaled corticosteroids for persistent asthma in a 6 y/o child with moderate persistent asthma</b>	
Inhaled salbutamol	52.3
Inhaled corticosteroids	29
Na Cromolyn	23.8
Ketotifen	26.4
Oral salbutamol	15.5
Theophylline	6.5

**Table 7. Additional pharmacotherapeutic approaches to uncontrolled mild asthmatic child**

Physician responses	%
No change	40.9
Increase dose of inhaled salbutamol	4.1
Inhaled corticosteroids	13
Ketotifen	7.3
Long acting $\beta_2$ -agonist	7.3
Na Cromolyn	3.6
Oral corticosteroids	1.6
Combination therapy	16.1
No response	6.2

Table 7 shows the most common response that we received was, continuing that medication. Only 4.1% of respondents prescribed inhaled corticosteroids for such a case. A low percent of them also prescribed ketotifen and long acting  $\beta_2$ - agonists for this scenario.

### Education

Most physicians believed that education to patients

**Table 8. Pediatricians approach to asthma education**

Topics	%
<b>Physicians approach to asthma education</b>	
Directly by physicians	42
By nurses	2.6
By books	2.1
Hospital-based	26.4
No education for patients	2.1
<b>Participation in professional education programs</b>	
Yes	47.2
No	49.7
<b>Use of asthma guidelines</b>	35.8

was useful to control the disease. Moreover most of them reported incorporating some types of patient education with informal asthma education carried out by a doctor or a nurse or by referring patients to formal asthma education in hospital-based programs (Table 8).

Some physicians reported participating in a professional education related to the management of asthma. A minority of the clinicians reported use of asthma guidelines.

### DISCUSSION

Among the Iranian pediatricians who participated in this survey, awareness about the standard guidelines was low.

Clinical manifestations of asthma were the most important role for diagnosis of asthma among our pediatricians.

NAEPP guidelines recommend spirometry as a diagnostic test for all patients at initial presentation,<sup>3</sup> however this does not appear to be the common practice of Iranian pediatricians. Similarly there were studies which had implicated the underutilization of spirometry in the evaluation of asthmatic children.<sup>16-19</sup>

Using CXR was reported more than spirometry for diagnosis of the disease, while as we already know this is often normal in asthmatic patients<sup>1</sup> and can not help the physician to diagnose the disease, but spirometry in eligible cases can greatly help them to diagnose or rule out the illness.<sup>1</sup> Nowadays peak flowmetry (PEFR) is one of the commonest methods used for initial evaluation and monitoring of asthma<sup>1</sup>, but half of our pediatricians did not have enough knowledge about application of this tool and did not prescribe it for their patients. Although the most reported excuse for this

## Pediatricians' Knowledge on Asthma Management

defect was low availability of this device, they also should learn more about the use and importance of this device in asthma educational programs. A similar survey of US (Chicago area) primary-care physicians including pediatricians showed routine use of spirometry and peak flow measurement by 75.3% of participants.<sup>17</sup> About one fifth of the participants did not have regular visits and follow-ups of their patients, which can lead to the severity of the disease and increasing the number of acute asthma attacks in a patient. Referral of patients to an asthma specialist or a pulmonologist was reported only by 16% of the participants; however the guidelines recommend referral for patients with a history of life-threatening exacerbations and some other reasons<sup>15</sup>. This finding is significantly lower than the reported referral percent of the children in the US studies.<sup>16,18</sup>

Although monitoring of the patients by knowing about the severity and number of asthma attacks is the first recommended way, the guidelines also recommend the use of PEFr monitoring as an objective assessment of airway obstruction. However in our study only a minority of the pediatricians used PEFr monitoring as a part of regular care for their patients.

In the area of treatment of an acute asthma attack, the majority of the participants reported the use of inhaled salbutamol, but a great number of them still used epinephrine, which is not a standard practice regarding the present guidelines in the management of an acute asthma attack.<sup>1</sup>

Guidelines prescribe anti-inflammatory therapy for all patients with moderate persistent asthma.<sup>15</sup> In contrast to the recommended therapy for this group of patients, only one third of the Iranian pediatricians prescribed inhaled anti-inflammatory (corticosteroids) for these cases. The reasons as they reported for this mismanagement were existence of better choices for treatment of asthma and also the fear of the long term side effects of inhaled corticosteroids. Thus we can conclude that most of the participating Iranian pediatricians were not aware that anti-inflammatory therapy is the mainstay of treatment for patients with moderate to severe persistent asthma. The prescription of such inhalers for similar patients was more than 80% by the studied physicians in US.<sup>16</sup>

MDI devices were recommended for using inhaled drugs,<sup>1</sup> but a minority of the participants reported to prescribe them for asthmatic patients, because of the low availability of these tools. Not enough time for

educating their patients, how to use these devices, was another reported reason. For a patient with continued symptoms who uses inhaled salbutamol three times a day as his or her only medication more than 40% of the participants recommended continuation that therapy which in fact is mismanagement. The reason for this discrepancy is unclear; one possibility is that low awareness of physicians about classifying asthma severity and stepwise approach to therapy for asthma children.

Patient education is also an essential component of asthma care. The NAEPP guidelines suggest that in addition to education delivered by the clinician, all patients may benefit from formal asthma education programs. This study showed Iranian pediatricians made limited use of formal asthma education programs. This may be related to limited availability or awareness of the pediatricians about these programs.

Factors that cause low adherence of the pediatricians to asthma guidelines are lack of awareness, familiarity or agreement and external obstacles like patients' factor and low availability of the guidelines. One study demonstrated that primary care physicians disagreed with several items of NAEPP guidelines because of different factors.<sup>20</sup>

In this study half of the pediatricians reported participating recently in asthma related educational programs; whereas different studies showed that continuing medical education can increase the knowledge of physicians after graduation especially in younger physicians.<sup>21, 22</sup>

Several limitations of this study should be noted. First, limited information was available about the non-responders who did not attend the congress. Second, like other self-reported data, respondents may have reported what they believed to be acceptable, instead of their actual practice and last that these findings reflected asthma care at a single point of time.

This study highlighted a lot of differences between the recommended management of asthma and the primary care which is carried out in our society. An understanding of the reasons for these differences can help us to decrease the number of mismanaged asthmatic patients. Repeating this study in the future may provide knowledge on changing trends in asthma care in Iran. With this information about pediatricians' asthma care practices, perceptions, and beliefs, it may be possible to conduct targeted interventions to improve primary care for asthma in Iran.

## ACKNOWLEDGEMENTS

This study was supported by an investigational grant from Immunology, Asthma and Allergy Research Institute (IAARI), Tehran University of Medical Sciences, Tehran, Iran.

We are very grateful to all pediatricians and colleagues who participated in this study.

## REFERENCES

1. Liu AH, Spahn JD, Leung DYM. Childhood Asthma. In: Behrman RE, Kliegman RM, Jenson HB (eds). Nelson textbook of pediatrics. New York: Mosby, 2004: 760-774.
2. Worldwide variation in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 1998; 12:315-35.
3. Hartert TV, Windom HH, Peebles SR Jr, freidhoff LR, Toggias A. Inadequate out-patient therapy for patient with asthma admitted to urban hospitals. *Am J Med* 1996; 100(4):386-94.
4. Cerveri I, Zoia MC, Bugiani M, Corsico A, Carosso A, Piccioni P, et al. Inadequate antiasthma drug use in the north of Italy. *Eur Respir J* 1997; 10(12):2761-5.
5. Ferrante E, Pantaleo C, Quatela M, Basso S, Pistelli R. Current practice in assessment and treatment of asthma in young males in Italy. *Monaldi Arch Chest Dis* 2000; 55(5):361-4.
6. Roghmann MC, Sexton M. Adherence to asthma guideline in general practices. *J Asthma* 1999; 36(4):381-7.
7. Neffen H, Fritscher C, Schacht FC, Levy G, Chiarella P, Soriano JB, et al. The asthma insights and reality in Latin America survey. *Rev Panam Salud Publica* 2005; 17:191-7.
8. Rabe KF, Adachi M, Lai CK, Soriano JB, Vermeire PA, Weiss KB, et al. Worldwide severity and control of asthma in children and adults: the global asthma insights and reality surveys. *J Allergy Clin Immunol* 2004; 114(1):40-7.
9. Webber MP, Hoxie AM, Odlum M, Oruwariye T, Lo Y, Appel D. Impact of asthma intervention in two elementary school-based health centers in the Bronx, New York city. *Pediatr Pulmonol* 2005; 40(6):487-93.
10. Stevens MW, Gorielick MH. Short term out-comes after acute treatment of pediatric asthma. *Pediatrics* 2001; 107:1357-62.
11. Cabana MD, Ebel BE, Cooper-Patrick L, Power Nr, Rubin HR, Rand CS. Barriers pediatricians face when using asthma practice guidelines. *Arch Pediatr Adolesc Med* 2000; 154(7): 685-93.
12. Cabana MD, Lewis TC. Improving physicians adherence to asthma guidelines. *JCOM* 2001; 8:35-46.
13. Lee PL, Luo JP, Shieh WM, Nien CT, Yang PC, Kuo SH. Hospital based management of acute asthmatic exacerbation: an assessment of physicians' behavior in Taiwan. *J Asthma* 2001; 38(7):574-83.
14. Canonica GW, Baena-Cagnani CE, Blaiss MS, Dahl R, Kaliner MA, Valovirta EJ; GAPP Survey Working Group. Unmet needs in asthma: Global physician and patient (GAPP) survey: global adult findings. *Allergy* 2007; 62(6):668-74.
15. National Asthma education Program, National Heart, Lung and Blood institute, Expert panel report: Guideline for diagnosis and management of asthma (NHI pub no 97-4051). Bethesda, MD: US department of Health and Human Services, 1997.
16. Civelek E, Sekerel BE. Management of childhood asthma: Physicians' perspective in Turkey. *Pediatr Allergy Immunol* 2004; 15(4):372-5.
17. Grant EN, Moy JN, Turner-Roan K, Daugherty SR, Weiss KB. Asthma care practices, perceptions and beliefs of Chicago-area primary care physicians. *Chest* 1999; 116(4 Suppl 1): 145s-54s.
18. Janson S, Weiss k. A national survey of asthma knowledge and practices among specialists and primary care physicians. *J Asthma* 2004; 41(3):343-8.
19. Finkelstein JA, Lozano P, Shulruff R, Inui TS, Soumerai SB, Ng M, et al. Self-reported physician practices for children with asthma: are national guidelines followed? *Pediatrics* 2000; 106(4 Suppl):886-96.
20. Picken HA, Greenfield S, Teres D, Hirway PS, Landis JN. Effects of local standards on the implementation of national guidelines for Asthma. Primary care agreement with national asthma guidelines. *J Gen Intern Med* 1998; 13(10): 659-63.
21. Clark NM, Gong M, Schork MA, Evans D, Roloff D, Hurwitz M, et al. Impact of education for physicians on patient outcomes. *Pediatrics* 1998; 101(5):831-6.
22. Rovithis E, Lionis C, Schiza SE, Bouros D, Karokis A, Vlachonikolis I, et al. Assessing the knowledge of bronchial asthma among primary health care physicians in Crete: a pre- and post-test following an educational course. *BMC Med Educ* 2001; 1:2.