

## Evaluation of Factors Contributed in Nonadherence to Medication Therapy in Children Asthma

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Received: 8 June 2011 ; Received in revised form: 6 August 2011 ; Accepted: 27 November 2011

### ABSTRACT

Asthma is one of the most common chronic inflammatory disorders in children. Nonadherence to medical therapy is a major cause of poor clinical outcome the objective of this study was evaluating factors, which are resulted in nonadherence to medical therapy in children with asthma.

In this descriptive study, 150 children with asthma and nonadherent to medication therapy were enrolled. General information and probable causes of nonadherence were recorded in self-report questionnaire and data were analyzed.

In our study, 57.3% of children were male. Approximately 43% of children belonged to age group 6-9 years old. Prevalence of probable causes of nonadherence to treatment were concern about treatment expenses (34.7%), fear of cardiac complications (34.7%), concern about drug dependency (38.7%), belief to growth inhibition (30.7%) and fear of osteopenia (32%). There was statistically significant reverse association between treatment with multi-drug regimens and concern about bone mineral abnormalities, cardiac complications and drug dependency ( $p=0.0001$ , 0.014 and 0.012 respectively). In addition, there was a significant association between mild asthma and fear about drug dependency ( $p=0.001$ ).

According to our results, factors such as prolonged duration of treatment, various therapeutic regimens, and receiving multiple drugs before diagnosis of asthma pose the highest frequencies for nonadherence.

**Keywords:** Children Asthma; Compliance; Nonadherence; Treatment Adherence

### INTRODUCTION

Asthma is a chronic disease which is known with

temporary air flow obstruction as a result of chronic inflammation in respiratory tracts; therefore, anti-inflammatory drugs have essential role in asthma control.<sup>1</sup> Asthma requires regular use of controller medication to improve symptoms and prevent exacerbations.<sup>2</sup> However, inadequate patient adherence/compliance to prescribed treatment regimens is a major cause of poor clinical outcome. Adherence rates in

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these patients are generally about 50%.<sup>3</sup> Nonadherence in asthma treatment results in increasing mortality, morbidity, and it is associated with increasing treatment costs.<sup>4</sup> Since asthma is one of the most common chronic diseases in children, and is associated with increased hospitalization and absence from school, its treatment and specially adherence to medical therapy have been an interesting field of research for pediatricians.<sup>1,5,6</sup>

According to increasing rates of asthma all over the world, many studies have been conducted on compliance in medication treatment in adults and pediatric asthma in the recent years and in some report, factors contributed in adherence have been evaluated.<sup>4,7-12</sup>

Overall prevalence of asthma symptoms at a national level was estimated as 13.14% in an Iranian research.<sup>3</sup> Since factors associated with noncompliance to medication therapy for asthmatic children may be not be similar in different regions in the world due to different cultures, believes and education, we designed this study to evaluate associated factors of nonadherence to medication therapy in Iranian asthmatic children.

## MATERIALS AND METHODS

This is a case series study on 150 children with asthma who had been referred to asthma and allergy clinic in the children's Medical Center hospital during 2009-2010. Children under 15 years old with following criteria were included in this study: diagnosis of asthma confirmed by an asthma and allergy subspecialist at least since 6 months ago (diagnosis must be confirmed according to history, examination and spirometry and peak expiratory flowmetry); in addition they must have at least one criterion for nonadherence to asthma treatment. These criteria for definition of nonadherence in our study were:

- 1- Parents reporting that prescribed doses of therapeutic medications have not been used.
- 2- Patients (older than 7 years) reporting that they had not used prescribed doses of drugs.
- 3- If number of used canisters that patient had applied within previous 6 months were fewer than estimated needed canisters according to prescribe doses of inhaled corticosteroids.

Finally, patient with any chronic diseases were excluded from the study. After selecting patients with inclusion criteria and omitting exclusion criteria and

after obtaining patients and their families verbal consent for participation in the investigation, designed questionnaires were completed as a self-report questionnaire. In these forms general information as well as probable causes of nonadherence were recorded such as costs of drugs, concern about osteopenia/ osteoporosis, cardiac complications and growth inhibition. Data were analyzed by SPSS-16 software. Quantitative data were shown as frequency and percent. We used chi square test for comparing qualitative data and finding their associations. *p*- value less than 0.05 was considered as significant level.

## RESULTS

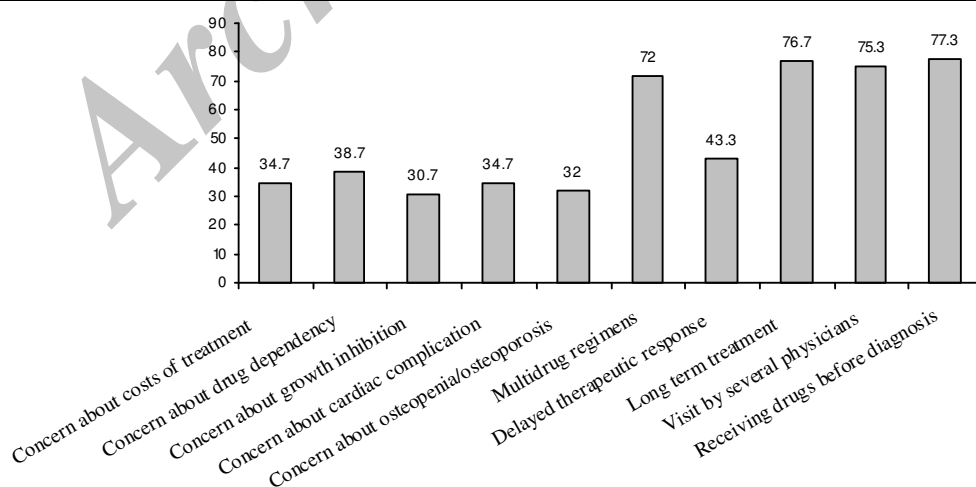
One hundred and fifty cases were enrolled in our study. General information and demographic characteristics of these children have been summarized in table 1 and figure 1. According to this table, 42.7% of children belonged to age group 7-9 years old. Levels of education in parents were diploma or less, in more than 80% of children. There was a significant association between severity of asthma and multidrug regimens ( $p=0.0001$ ). In addition, the results of our research showed a significant association between mild asthma and fear about drug dependency ( $p=0.001$ ).

As indicated in table 1, 115 (76.7%) patients had long term treatment (more than a month) whereas, 35(23.3%) stated that their treatment duration was not so prolonged. Forty patients (27.7%) experienced at least one drug side effect including: urticaria, oral candidiasis, headache, hoarseness, fine tremor in hands and palpitation. Frequencies of each probable factor contributed in nonadherence to medical treatment have been summarized in table 1. Comparison of these rates shows that concern about drug dependency has been the most frequent reason that stated as nonadherence to treatment by patients or parents. The results of our study show that there is statistically significant reverse association between treatment with multi-drug regimens and concern about bone mineral abnormalities, cardiac complications and drug dependency ( $p=0.0001$ , 0.014 and 0.012 respectively). This means that patients who are on treatment with multi-drug regimens have less concern about drug side effects and dependency. According to present research, a significant association was found between fear of drug dependency with other wrong believes such as growth inhibition, cardiac complications and osteopenia/ osteoporosis ( $p=0.0001$  for each one).

## Nonadherence Factors in Children Asthma

**Table 1. Factors contributed in nonadherence to medication therapy in asthmatic children**

Variables		Frequency	Percent
Gender	Male	86	57.3
	Female	64	42.7
Age (unit)	0-3	0	0
	4-6	33	22
	7-9	64	42.7
	10-12	35	23.3
	13-15	18	12
Father education level	Less than diploma	61	45.7
	Diploma	56	37.3
	Associate of science	4	2.7
	Bachelor of science	23	15.3
	Master of science	4	2.7
	PhD& MD	2	1.3
Mother education level	Less than diploma	63	42
	Diploma	58	38.7
	Associate of science	5	3.3
	Bachelor of science	21	14
	Master of science	0	0
	PhD& MD	3	2
Insurance	Yes	131	87.3
Asthma severity	Mild	63	42
	Moderate	34	22.7
	Severe	53	35.3
Receiving effective drugs before diagnosis		116	77.3
Visit by several physicians		113	75.3
Visit by one physician		37	24.7
Delayed therapeutic response	Yes	65	43.3
	No	40	26.7
Side effects		40	26.7
Multidrug regimens	Yes	108	72
	No	115	76.7
Long term treatment	Yes	115	76.7
Concern about costs of treatment		52	34.7
Concern about drug dependency		58	38.7
Concern about growth inhibition		46	30.7
Concern about cardiac complication		52	34.7
Fear about osteopenia/osteoporosis		48	32



**Figure 1. The most common causes of nonadherence to medication therapy in asthmatic children**

## DISCUSSION

Asthma is a chronic disease that requires regular use of controller medication to improve symptoms and prevent exacerbations.<sup>2</sup> However, inadequate patient adherence/compliance to prescribed treatment regimens is a major cause of poor clinical outcome and results in increasing mortality, morbidity, and it is associated with increasing treatment costs.<sup>3,4</sup> Since asthma is one of the most common chronic diseases in children, and is associated with increased hospitalization and absence from school, its treatment and specially adherence to medical therapy have been an interesting field for researches of pediatricians.<sup>1,5,6</sup>

In our study, nonadherence in males was more frequent than females. In other studies this predominance is found, too.<sup>13</sup> Asthma is more frequent in males and it may be an explanation for predominance of males.

Bender study in 2000 showed that compliance decreases with increasing age.<sup>13</sup> It is explained with independency sense in adolescences; whereas, in our study the most frequent age group was 7-9 years and adherence increased with increasing age. It may be due to shame from applying inhalers in the school.

Most of the nonadherent children (80%) in our study had parents with educational degrees equal to diploma or less. It is similar to Mansour study in Ohio.<sup>10</sup> Whereas, in another research in California, nonadherent children had high educated parents.<sup>14</sup> These differences may be due to socio-economical and cultural differences in various regions of the world. In our country, high educated parents have more information about diseases and therefore had more therapeutic compliance. Moreover, wrong believes and taboos are less in high educated families in Iran.

Multidrug regimens may be an associated factor for nonadherence. In our investigation 72% of asthmatic children were under treatment with multi-drug regimens. This reason for noncompliance has been shown in a study conducted by Bender on anticonvulsant drugs.<sup>15</sup>

The results of our study showed that patients who were on treatment with multi-drug regimens had significantly less concern about bone mineral abnormalities, cardiac complications and drug dependency.

It seems that drug side effects are a probable reason for nonadherence in asthmatic children. Nevertheless,

frequency of medication side effects was only 26.7% in our research. It is notable that, in Bender study in 2007, drug side effects had no significant role in nonadherence.<sup>16</sup> Near to half of our participants mentioned to delayed therapeutic response; whereas, in Bender study on 75 nonadherent asthmatic patients most patients agreed with significant role of delayed therapeutic response in noncompliance.<sup>16</sup>

According to our findings, 75.3% of our patients were visited by several physicians. It may be associated with increasing nonadherence because it may be due to lack of confidence to physician or unavailability of physicians. In a study in Ohio 53% of patients were visited by one and 37% by two physicians.<sup>10</sup>

Distribution of asthma severity in our patients was: 42% severe asthma, 22.7% moderate asthma and 35.3% mild disease. In a similar study<sup>10</sup> most of patients had moderate asthma (55%).

Mild disease may be related to nonadherence, because patients with mild disease think that they do not need treatment and also they may believe to drug dependency. In this field, we also found a significant association between mild asthma and concern about drug dependency.

It is clear that knowledge of pediatricians about novel medications in asthma with low side effects and short duration are effective in adherence to medical treatment. Gharagozlou study showed that the rate of knowledge of pediatricians were less than standards.<sup>5</sup> In our study, 77.3% of children had received various treatments before definitive diagnosis. This rate is in association with mild asthma. This statistics emphasize the importance of physicians knowledge.

In our study prevalence of concern about treatment expenses as a probable cause of nonadherence to treatment was 34.7% which is noticeable. In another research in Canada, it was revealed that costs had significant role in adherence.<sup>16</sup> So, economical consideration must be noticed in providing guidelines for treatment of asthma.

In our study prevalence of other probable causes of nonadherence to treatment were fear of cardiac complications (34.7%), concern about drug dependency (38.7%), belief to growth inhibition (30.7%) and fear of osteopenia/ osteoporosis (32%).

According to present research, a significant association was found between fear of drug dependency with other wrong believes such as growth inhibition, cardiac complications and

osteopenia/osteoporosis. It means that having a wrong belief may be associated with other wrong beliefs. In a study in 2007, various beliefs and their influences on the asthma were evaluated.<sup>17</sup> It indicates that cultural beliefs are different in various regions in the world.

Our study is a cases series and has some limitations. We have only described frequencies of probable contributed factors and have found their associations. Designing further studies with larger sample size and case-control studies are necessary for achieving more valid and accurate results.

### CONCLUSION

Regarding to the results of our study, factors such as prolonged duration of treatment, multi-drug regimens, and receiving various drugs before diagnosis of asthma showed highest frequencies for nonadherence. Thus, simple therapeutic regimens, and short term treatments and also educating patients and parents are recommended for increasing the rate of adherence to medication therapy in asthmatic children.

### ACKNOWLEDGEMENTS

Thanks to participants of this study (children and their parents), staff of Children's Medical Center especially Mrs. Marzieh Eskandari. This study has been supported by Tehran University of Medical Sciences.

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