



# The Relationship Between Intensity of Parental Anxiety and Severity of Asthma in 5- to 15-Year-Old Children

Javad Ghaffari,<sup>1</sup> Arefeh Shafaat,<sup>2,3,\*</sup> Jamshid Yazdani Charati,<sup>4</sup> and Ali Kheradmand<sup>5</sup>

<sup>1</sup>Department of Pediatrics, Mazandaran University of Medical Sciences, Sari, Iran

<sup>2</sup>Child and Adolescence Division, Department of Psychiatry, School of Medicine, Mazandaran University of Medical Sciences, Sari, Mazandaran, Iran

<sup>3</sup>Psychiatry and Behavioral Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Mazandaran, Iran

<sup>4</sup>Environmental Science, Plant Protection and Animal Health, Mazandaran University of Medical Science, Sari, Mazandaran, Iran

<sup>5</sup>Mazandaran University of Medical Sciences, Sari, Mazandaran, Iran

\*Corresponding author: Arefeh Shafaat, Zare Hospital, Neka Road, Sari, Mazandaran, Iran. Tel: +98-9111534191, Fax: +98-1133285109, E-mail: shafaat\_arefeh@yahoo.com

Received 2016 October 16; Revised 2017 January 03; Accepted 2017 September 13.

## Abstract

**Background:** Children of anxious parents are at higher risk of asthma exacerbation.

**Objectives:** Due to the high prevalence of anxiety and depression in parents of children with chronic diseases and also, because of the high prevalence of asthma, the present study was designed to evaluate the relationship between the parental anxiety intensity and the children's asthma severity.

**Methods:** It was a cross sectional study. Sampling was done continually among 134 parents of 5 to 15- years-old children with allergic asthma referred to allergy and asthma clinic in Sari during autumn and winter 2013. For checking parental anxiety we used Beck Anxiety Inventory and Global Initiative for Asthma (GINA) for assessing asthma severity in children. To evaluate the relationship between parental anxiety and severity of asthma in children Gamma and Kendall's Tau test was used.

**Results:** Kendall Tau and Gamma test showed that there is a significant relationship between the number of admissions ( $P < 0.001$ ) and the number of attacks with parental anxiety. These tests also demonstrated that there is relationship between FEV1/FVC (forced expiratory volume/forced vital capacity) and Beck test scores of parents ( $P < 0.001$ ).

**Conclusion:** The results of present study indicate the relationship between the intensity of anxiety for parents and severity of asthma in their children. Therefore, it is recommended that specialists do some interventions in order to control asthma better so that can better control their parental anxiety.

**Keywords:** Asthma, Children, Parental Anxiety

## 1. Background

Asthma is a chronic inflammatory disease of the airways of the lung, affect more than 300 million people in the world (1). It is a common chronic disease which is remarkably pathogenic. The prevalence of ever asthma has been reported from 2.7% to 3.5% but wheezing in the past 12 months' were 7.6% and 10.7% in children aged 6-7 and 13-14 years, respectively (2). In a study conducted in the North of Iran, the prevalence of asthma and wheezing has been recorded as 12% to 30% in elementary and guidance schools (3-5). Intelligence quotient (IQ) in children with moderate asthma is similar to healthy children but this disorder has a significant financial burden on family and country (6, 7). A child with asthma maybe hospitalized several times that this issue can be stressful for both parents and children due to disrupting the way of life and normal functions. When parents feel competent and mighty, they will be able to provide support for their sick children. Parents

often due to the lack of awareness about the origin of the sickness, how to perform medical procedures, economic consequences of the child disease, the imposed pain on the child during the illness, uncertainty about the future of the disease, and the risk of contagion experience feelings of anger, anxiety and guilt. These parents show their anxiety with inappropriate behavior, restlessness, irritability and isolation (8). A chronic course of asthma induces morbidity and mortality. Consequently, it creates a significant impact on children's anxiety and thus aggravated asthma (9). Calam et al. showed providing advices to the families about the management of children's behavior have been very useful, especially when parents have not any experience about the asthma disease (10, 11).

Ghaempanah et al. showed that depression among mothers of children with asthma is more common. Furthermore, improving the level of asthma control did not influence on improving mothers' maternal health (12).

In a study conducted by Silver *et al.*, showed that asthma caregivers were more anxious, but the severity of asthma symptoms with depression, anger and cognitive imbalance did not relate with general distress of the caregivers (13).

In a survey that was done by Zhou T *et al.*, showed that the families with low socio-economic level, low performance of caregivers is related to their high levels of anxiety and depression (14). Brown *et al.* showed increase the prevalence of asthma and deaths from among caregivers of children with Asthma with psychological symptoms. Frequency of hospitalizations due to asthma related with total scores of questionnaire, as well subcategories of depression, anxiety and somatic symptoms (15).

In the present study, we decided to evaluate the relationship between anxiety severities of caregivers of children with their disease severity.

## 2. Objectives

Due to the high prevalence of anxiety and depression in Iranian people especially in parents of children with chronic diseases and also, because of the high prevalence of asthma, the present study was designed to evaluate the relationship between the parental anxiety intensity and the children's asthma severity.

## 3. Materials and Methods

This study is a cross-sectional study with 134 patients according to the previous studies (9, 11, 12) and based on consideration of error of less than half a percent and a power of 80%. Selection of our patient was continuous sampling. Children (5-15 years old) with allergic asthma which confirmed by allergist and clinical immunologist referring to educational allergy clinic in Sari during the fall and winter in 92. The researcher explained the aim of the study for participants and their parents have completed the informed consent form. Children who had other diseases besides asthma were excluded from the study.

Beck questionnaire was used to assess parental anxiety. This questionnaire included 21 items that cover most common symptoms of anxiety. The subjects respond the amount of their resentment in the last week by putting crosses in the column before. Method of scoring answers Never [0], mild, medium [2] and severe [3]. Thus the range of scores was from 0 to 63 and it can be classified based on points [0-7] minimal, [8-15] mild, [16-25] average, and [25-63] severe (16).

Reliability and validity of the questionnaire were evaluated and approved at different age and sex in Iran (17). To

assess the severity of asthma in children questionnaire of Global Initiative for Asthma (GINA) was used (18). This questionnaire evaluated the frequency of attacks of asthma and asthma severity (during a month in the current year), Severity (mild, moderate and severe), severity of attacks (mild, moderate and severe), the need for medication FEV<sub>1</sub>/FVC (forced expiratory volume/forced vital capacity) (during the day), number of hospitalizations or going to the emergency department (during the current year), the number of missed school days due to exacerbation of the illness (within three months).

Demographic characteristics of parents were expressed with descriptive statistics. The relationship between parental anxiety and severity of asthma in children assessed by Kendall Tau and Gamma analyzer was used. Data were analyzed by using SPSS 16.

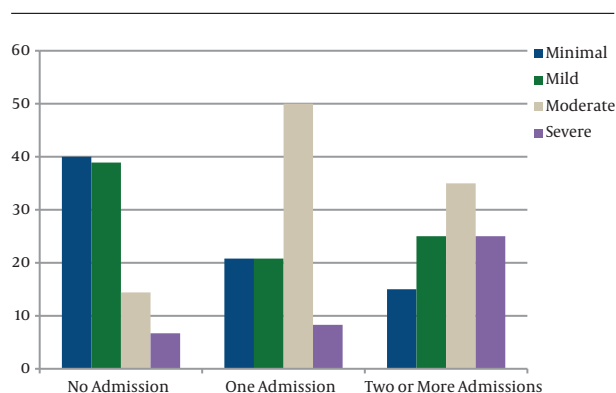
## 4. Results

One hundred and thirty four people participated in this study. The average age of participants was 36.17 years old that 90% of them mothers and 10% of them were the fathers of children with asthma. The average age of the children was  $40.2 \pm 7.9$  months. Ten percent of children have experienced asthma attack once, about 72% two times or three times, 16.5% four times, and less than 1 percent five times during the past year. Severity attacks of 23.88% of children were mild and 76.12% of them were moderate. 2.14% of children need for one-time use of the drug, 67.9% of them twice, 15.7% three times and 2.2% four times use of the drug. 2.67% of children did not mention the history of hospitalization due to asthma attacks during the past year. 17.9% of children one time and 14.9% two times mentioned the history of hospitalization due to asthma attacks.

22.4% of children reported missing the school onetime and 9.7% missed the school two times during the past three months due to exacerbation of asthma attacks, and 67.9% of did not miss the school during the last one month due to exacerbation of asthma attacks. FEV<sub>1</sub>/FVC was in the normal range (> 80%) in 5.4%. In 47% of children the ratio was between 80% to 85% (mild asthma), and in 48.5% of children the ratio was between 60% to 80% (moderate asthma).

Beck Anxiety Inventory score of parents 32.8% was less than 7 (minimal anxiety), and scores of 33.6%, 23.9% and 9.7% respectively were 8 to 15, 16 to 25 and greater than 26 respectively. Kendall Tau B and Gamma test showed that there is a significant relationship between the number of admissions ( $P < 0.0001$ ) and the number of attacks ( $P < 0.0001$ ) with parental anxiety (Figure 1).

Kendall Tau and Gamma test showed a significant correlation between FEV<sub>1</sub>/FVC and the Beck test scores of par-



**Figure 1.** The Relationship of Parent's Anxiety (Beck Test Scores) with Children's Hospital Admission

ents ( $P > 0.0001$ ). The Beck test scores and other measures of asthma showed a significant relationship between the severity of asthma including the times of using salbutamol ( $P > 0.0001$ ), school absences ( $P = 0.02$ ), and attack intensity ( $P > 0.0001$ ).

## 5. Discussion

The results of this study showed that 33.6% of parents of children with asthma had moderate to severe anxiety. In a study that was done by Ghaempanahv et al., mothers of children with asthma reported symptoms of depression more than normal levels of society ( $P < 0.001$ ) (12). In this study, there was a significant relationship between parental anxiety scores and measures of asthma severity (Including the number of attacks per month in the last year, intensity of the attacks, the need of using the drug, FEV<sub>1</sub>/FVC, the number of admissions during the last year and the number of school absences during the last 3 months) was observed in children. The findings of study of Silver et al. showed that caregivers who their children in terms of severity of asthma symptoms were classified with moderate-severe, were more anxious than other caregivers (13). The result of this study suggested that there is a relation between parental anxiety and admissions of children with asthma. This finding is in line with the study of Brown et al. (15). In their study used Brief Questionnaire which contains sub-categories somatic, anxiety and depression. Frequency of hospitalizations due to asthma attacks during the last 12 months was significantly higher than children whose caregivers had lower scores in Brief Questionnaire.

Their study results showed that the frequency of hospitalizations due to asthma was associated with total scores of questionnaire and with subcategories of depression,

**Table 1.** Distribution of Asthma Attack Variables and Demographic Characteristics of Parents

Variables	No. (%)	
Mean age of the children	9.07 ± 2.40	
Asthma attack, N	1	14 (4.10)
	2	61 (5.45)
	3	36 (9.26)
	4	22 (4.16)
	5	1 (0.7)
Medication, dose/day	1	19 (2.14)
	2	91 (9.67)
	3	21 (7.15)
	4	3 (2.2)
Hospitalization, N	0	90 (2.67)
	1	24 (9.17)
	2	20 (9.14)
Missing the school, d	0	91 (9.67)
	1	30 (4.22)
	2	13 (7.9)
Severity of attacks	Slight	32 (88.23)
	Moderate	102 (12.76)
	Severe	6 (5.4)
FEV <sub>1</sub> /FVC	85 <	6 (5.4)
	85 - 80	63 (47)
	80 - 75	65 (5.48)
Parents, %	134	
Mothers	90	
Fathers	10	
Age of parents (mean), y	36.17 ± 5.16	

anxiety and somatic symptoms. Parental anxiety may be due to child care responsibilities or may be a duty of care for children with asthma (15). Cross-sectional and longitudinal studies indicate a relationship between maternal anxiety and asthma. Although it's effective mechanism and their relationship is not recognized correctly. Epidemiological studies suggest that anxiety during pregnancy and after giving birth predict the development of childhood asthma. The proposed mechanism is changes in gene expression that regulate immune responses and the hypothalamic-pituitary-adrenal axis. On the other hand, maternal anxiety and asthma kids may not have the cause-effect relationship. For example, the relationship between asthma and anxiety may be due to the environmental stressors (Shared environment) in the family or the family creates stress in children (11).

The possibility of having a child with asthma is higher in mothers who have experienced anxiety and depression during pregnancy and after childbirth or other times. There is also evidence of reverse causality relationship. This means that, caring of children with eczema and asthma with higher levels of depression, anxiety, sleep deprivation and reduced quality of life of parents of children with asthma (10).

Sometimes, it is necessary a child to be hospitalized several times during the course of chronic diseases and this can be stressful for their parents. Parents as the most important people in the child support system can transmit Stress and anxiety to their children (4-6).

In our study, there was a significant relationship between the parental anxiety and number of attacks, attack intensity, need to use the drug, FEV1/FVC, absence from school, the hospital admissions of their children.

This study had some limitations that are as follows; being a cross-sectional study, and we cannot speak with certainty about the causality relationship between asthma and anxiety. The second was the lack of a control group in this study and also we did not mention psychiatric history of parents.

The results of this study show a high prevalence of anxiety in parents of children with asthma and its relation with the severity of asthma. Therefore, it is suggested specialists to better control asthma do some interventions to control the anxiety of parents of children with asthma at a lower level. It is also suggested that in future studies the effect of parental anxiety treatment through the interventions such as behavior therapy, pharmacotherapy on the severity of asthma be evaluated.

## Acknowledgments

Authors wish to thank all people who helped to do the research and the ones that participated in the study.

## Footnotes

**Authors' Contribution:** Ali Kheradmand completed the questionnaires. Arefeh Shafaat supervised the project and conducted final data analysis. Javad Ghaffari advised and guided the study. Jamshid Yazdani Charati performing the statistical analyses. All authors read and approved the final manuscript.

**Declaration of Interest:** None.

**Funding/Support:** None.

## References

1. Kliegman R, Nelson W. *Nelson textbook of pediatrics*. Philadelphia, PA: Elsevier/Saunders; 2011.
2. Ghaffari J, Aarabi M. The prevalence of pediatric asthma in the Islamic Republic of Iran: A systematic review and meta-analysis. *J Pediatr Rev*. 2013;1(1):2-11.
3. Ghaffari J, Mohammadzadeh I, Khalilian A, Rafatpanah H, Mohammadjafari H, Davoudi A. Prevalence of asthma, allergic rhinitis and eczema in elementary schools in Sari (Iran). *Caspian J Intern Med*. 2012;3(1):372-6.
4. Zamanfar D, Gaffari J, Behzadnia S, Yazdani-charati J, Tavakoli S. The Prevalence of Allergic Rhinitis, Eczema and Asthma in Students of Guidance Schools in Mazandaran Province, Iran. *Open Access Macedonian Journal of Medical Sciences*. 2016;4(4):619-23. doi: [10.3889/oamjms.2016.112](https://doi.org/10.3889/oamjms.2016.112).
5. Mohammadzadeh I, Ghafari J, Barari SKR, Tamadoni A, Esmaili D, Alizadeh NR. The prevalence of asthma, allergic rhinitis and eczema in north of Iran: The international study of asthma and allergies in childhood (ISAAC). *Iran J Pediatr*. 2008;18(2):117-22.
6. Ghaffari J, Abbaskhanian A, Jalili M. IQ scores of children with moderate asthma: a comparison with healthy children. *Oman Med J*. 2014;29(1):71-4.
7. Ghaffari J, Hadian A, Daneshpoor SMM, Khademloo M. Asthma Burden in the Hospitalized Patients in North of Iran. *Int J Pediatr*. 2014;2(4.1):257-66.
8. Sanjari M. Child hospitalization and parents' anxiety. *Iran J Nurs*. 2004;17(39):41-8.
9. Markson S, Fiese BH. Family rituals as a protective factor for children with asthma. *J Pediatr Psychol*. 2000;25(7):471-80. [PubMed: [11007804](https://pubmed.ncbi.nlm.nih.gov/11007804/)].
10. Calam R. Childhood asthma, behavior problems, and family functioning. *J Allergy Clin Immunol*. 2003;112(3):499-504. doi: [10.1016/S0091-6749\(03\)01606-3](https://doi.org/10.1016/S0091-6749(03)01606-3).
11. Kaugars AS, Klinnert MD, Bender BG. Family influences on pediatric asthma. *J Pediatr Psychol*. 2004;29(7):475-91. doi: [10.1093/jpepsy/jsh051](https://doi.org/10.1093/jpepsy/jsh051). [PubMed: [15347697](https://pubmed.ncbi.nlm.nih.gov/15347697/)].
12. Ghaempanah Z, Fazlollahi MR, Noorbala AA, Movahedi M, Kazemnejad A, Pourpak Z, et al. Impact of maternal mental health on pediatric asthma control. *Tanaffos*. 2013;12(4):23-7.
13. Silver EJ, Warman KL, Stein RE. The relationship of caretaker anxiety to children's asthma morbidity and acute care utilization. *J Asthma*. 2005;42(5):379-83. doi: [10.1081/JAS-62999](https://doi.org/10.1081/JAS-62999). [PubMed: [16036413](https://pubmed.ncbi.nlm.nih.gov/16036413/)].
14. Zhou T, Yi C, Zhang X, Wang Y. Factors impacting the mental health of the caregivers of children with asthma in China: effects of family socioeconomic status, symptoms control, proneness to shame, and family functioning. *Fam process*. 2014;53(4):717-30.
15. Brown ES, Gan V, Jeffress J, Mullen-Gingrich K, Khan DA, Wood BL, et al. Psychiatric symptomatology and disorders in caregivers of children with asthma. *Pediatrics*. 2006;118(6):e1715-20.
16. Steer RA, Beck AT. *Evaluating stress: A book of resources*. Beck Anxiety Inventory. Lanham, MD, US: Scarecrow Education; 1997. p. 23-40.
17. Kaviani H, Mousavi A. Psychometric properties of the Persian version of Beck Anxiety Inventory (BAI). *Tehran Univ Med J*. 2008;66(2):136-40.
18. Bateman ED, Hurd SS, Barnes PJ, Bousquet J, Drazen JM, FitzGerald M, et al. Global strategy for asthma management and prevention: GINA executive summary. *Eur Respir J*. 2008;31(1):143-78. doi: [10.1183/09031936.00138707](https://doi.org/10.1183/09031936.00138707). [PubMed: [18166595](https://pubmed.ncbi.nlm.nih.gov/18166595/)].