

Anxiety Disorder Among Adolescents with Asthma in Zanjan

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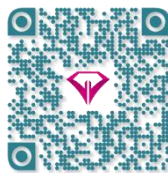
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ABSTRACT

Background & Objective: Asthma is the most common inflammatory disorder of respiratory system. The aim of this study was to investigate the prevalence of asthma and association of asthma with anxiety among 13-14-year-old students in Zanjan.

Materials & Methods: In this cross-sectional study 1500 students were randomly selected by cluster random sampling; ISSAC questionnaire was filled by face to face interview and patients with asthma were recognized and their anxiety status was also measured using Zung questionnaire.

Results: A total of 225 students (15%) had symptoms of mild to moderate asthma. The frequency of anxiety among students with and without asthma was 38.7% and 26.7% respectively. There was a significant correlation between asthma with anxiety ($P=0.0001$). The odds ratio for anxiety in asthmatic group was 1.73, CI95% (1.16-2.58).

Conclusion: These results showed higher prevalence of asthma and anxiety in adolescents and significant correlation between asthma and anxiety.

Keywords: Adolescents, Anxiety, Asthma

Introduction

Asthma is one of the most chronic inflammatory disorders in adolescence, with several impacts such as negative and poor school performance, impaired social work and family functioning. Thus, it could be a major health problem (1,2). Genetic and environmental factors have important role in the occurrence and exacerbation of asthma (3). Similar to other chronic diseases, patients with asthma usually encountered to stressful condition and could suffer from several mood disorders. Moreover, there are convincing evidence that psychological dysfunction is common in people with asthma and its correlation with poor asthma outcomes, such as poor adherence to controller therapy, poor relationships with health professionals and poor self-management behavior (4,5).

The prevalence of child and adolescent mental and behavioral health problems in Iran were reported as high estimating that 16.7% -36.4% of children and

adolescents suffer from one or more mental health problems (6). A study in a large population of adolescents showed that the prevalence of depression was 28% and 14% had anxiety disorder (7). The prevalence of anxiety is difficult to determine because of discrepancy in diagnostic criteria, tools and methodology can affect results. In addition, anxiety can be very disabling, tends to follow a chronic course and imposes high individual and social burden (7,8).

It seems that in patient with psychiatric or behavioral disorders, abnormal breathing patterns can cause symptoms such as chest tightness and asthma-like symptoms (5,9).

Several studies have shown a link between asthma and anxiety disorders among youth and adults (10-12). One study revealed close correlation between anxiety, depression and poor asthma control. However, another study showed that Children with well-controlled

asthma do not have an increased risk of anxiety, depression and poor self-esteem (13).

In a parallel synchronous study we found high prevalence of asthma and depression among adolescents of Zanjan (14). Several studies also indicated the high prevalence of asthma and mood disorders in adolescents (7,15-17). However, the association between asthma and anxiety was not investigated. In this study the anxiety in asthmatics was compared with students without asthma in mid school students of Zanjan city.

Materials and Methods

In this cross sectional study, 1500 children aged 13-14 years were randomly selected by multivariate cluster sampling from 20 guidance schools of Zanjan city from March to January 2013. Written informed consents were signed by participants and their parents. The International Study of Asthma and Allergies in Childhood (ISAAC) (18) questionnaire was filled by face to face interview and asthmatic patients were identified. Asthma was defined as having any symptoms of dry cough longer than two weeks with night problem apart from cold or having wheezing or whistling in the chest. The severity of asthma was assessed and classified into mild; "as waking up at night less than one night per week and no limitation in activity" and moderate to severe asthma; "as having wheezing attack in the last 12 months, sleep disturbance more than one night per week and limitation in speaking and activity". The control group consisted of randomly selected classmates who didn't suffer from atopy and asthma. Furthermore, the anxiety status and its severity in asthmatic students and controls were measured using Zung Inventory questionnaire. The Zung Self-Rating Anxiety Scale (SAS) is a questionnaire with 20 items for self-report assessment of anxiety severity, based on rating of 4 groups of manifestations: autonomic, motor, cognitive and central nervous system symptoms. The questions are scored on a Likert-type scale of 1-4, the total raw scores range from 20-80. The "anxiety index" was scored as the following scale to determine a person's level of anxiety in clinical interpretation. The score 20-44 was considered Normal Range, 45-59 mild to moderate level of anxiety, 60-74 Marked to Severe

Anxiety Levels, 75-80 Extreme Anxiety Levels (19). Data were analyzed by SPSS software 16 (version 16; SPSS Inc., Chicago, IL US) and comparisons were performed by Chi-square test. The 95% confidence interval for the odds ratio was used for measurement of the strength of relationship between two variables. The Ethics Review Board of Zanjan University of Medical Sciences approved the study (ZUMS.REC.1391.40).

Results

In this study 1500 students aged 13-14 years (750 boys and 750 girls) were investigated (Table 1).

A total of 225 (15%) students had asthma symptoms with a prevalence of 13.7% and 16.2% in boys and girls respectively (Table 1).

Of patients, 194 (86%) had mild and 31 (13.7%) patients had moderate asthma (Table 1).

About 48.7% of students had moderate family income (Table 2). We didn't find any association between asthma and family income in comparison.

The positive history of depression and anxiety was found in 18.6% and 13.1% of first-degree relatives of students respectively (Table 2).

The frequency of anxiety among students with asthma and students without asthma was 38.6% and 26.6% respectively. Severe anxiety was found in 9.9% and 1.3% of asthmatics and controls ($P=0.0001$) (Table 3). There was significant difference between severity of asthma and anxiety (Table 4).

The odds ratio for depression among asthmatic students was 1.73 CI 95% (1.16-2.58), which was higher in girls (Table 5).

The odds ratio for asthma among adolescents with positive family history of depression was 1.81 (95% CI 1.11-2.94) and among adolescents with positive family history of anxiety was 2.8 (95% CI 1.54-5.1).

Table 1. The prevalence of mild and moderate asthma and its sex distribution among students.

Study population	Boys	Girls	Total	P-value
Without asthma (%)	647 (86.3)	624 (83.8)	1275 (85)	0.82
Asthmatic	103 (13.7)	122 (16.2)	225 (15)	
Mild	83 (11.06)	111 (14.8)	194 (12.9)	0.06
Moderate	20 (2.6)	11 (1.4)	31 (2.06)	
All	750 (100)	750 (100)	1500 (100)	

Table 2. Characteristics of students that participate in the study.

Varieties	†Number	Percent
Male	204	45.3
female	246	54.7
Age(year)		
13	162	36
14	283	64
Family history of depression		
Yes	84	18.6
No	366	81.3
Family history of anxiety		
Yes	59	13.1
No	391	86.9
Family income/month (Rials)		
<5000000	121	26.9
5000000-10000000	219	48.7
>10000000	110	24.4
All	450	100

†225 students with asthma and 225 students without asthma as control group.

∞30000 Rials ≈ 1\$

Table 3. The frequency of mild to moderate and severe anxiety in asthmatic adolescents and control.

Groups	Without anxiety	Mild & Moderate anxiety	Severe anxiety	Total	P-value
Asthma (%)	138 (61.3)	65(28.9)	22 (9.9)	225 (100)	0.0001
Control (%)	165(73.3)	57 (25.3)	3 (1.3)	225 (100)	

Table 4. The frequency and severity of anxiety in adolescents with mild and moderate asthma.

Asthma	Without anxiety	Mild to Moderate anxiety	Severe anxiety	Total	P-value
Mild (%)	125 (64.4)	54 (27.8)	15 (7.7)	194 (100)	0.0001
Moderate (%)	13(41.9)	11(35.5)	7 (22.6)	31(100)	

Table 5. Odd ratio of Anxiety among adolescents with asthma.

Anxiety	Odd ratio	95% Confidence interval
Girls	2.06	1.22-3.46
Boys	1.35	0.7-2.6
Total	1.73	1.16-2.58

Discussion

This study showed that 15% of adolescents had asthma symptoms which is higher than similar studies conducted on middle school students in Iran and even higher than our previous study in Zanjan city (15,17). This result was compatible with Entezari *et al.*'s study reporting the prevalence of 13.14% (95% CI: 9.97-16.30%) investigating all studies on basis of ISSAC protocols (16). It seems that studies consisting of patients with night cough or having wheezing in the last year show higher prevalence of asthma, in comparison to studies that only consider physician diagnosed asthma or asthma ever.

In our study approximately more than one quarter of children had mild to severe degrees of anxiety, which

could be considered as a common problem in our area. There was estimated that 16.7% -36.4% of children and adolescents suffer from one or more mental disorders (6), that was similar to our study. One other investigation in Iran also showed that anxiety disorders were the most common category of psychiatric disorders (20).

In comparison, we found higher frequency of anxiety in children with asthma. Several compatible studies showed similar results (11,21-26). Our study also showed the significantly higher severity of anxiety among students with asthma symptoms. We found also higher severity of depression among students with asthma in a parallel study (14). Several studies confirmed these association (17,21,27,28). However

some investigations showed different results and there were not any association between Mental disorders and asthma (13,29). One study showed higher prevalence of anxiety and depression in adolescents with asthma however this association was no significant with regarding to age, gender, and asthma severity (23). It seems that concomitant stress due to respiratory disorder could be a precipitating factor for induction of anxiety or depressive disorders. In accordance with this hypothesis, some studies showed close correlation between anxiety and poor controlled asthma (28,30,31).

In addition, several investigations indicated that adolescents with asthma had the higher risk of developing mood disorders in later life and depression and anxiety could be as an outcome or co morbid factor of asthma and respiratory disorder (9,32). In a cohort study, Goodwin *et al.* showed that severe and persistent asthma among 5 year old children significantly increased odds of mental and conductive problems at ages 5-17; whilst the risk of mental disorder was not increased in children with mild and remitted asthma (33).

Chronic inflammation in asthma and high levels of pro-inflammatory cytokines lead to disturbances in glucocorticoid receptors and corticoid releasing hormone and alternation in hypothalamic-pituitary-adrenal (HPA) axis that could impair the secretion of brain-derived neurotrophic factor that is located in the frontal lobes and limbic system. Finally, these reactions lead to the hippocampus damage and reduction in concentration of monoamines in the brain (34, 35). Panek *et al.* also demonstrated the glucocorticoid receptor gene (NR3C1) haplotypes (ER22/23EK, N363S, BcII) have correlation with mood and anxiety disorders in patients with asthma (35).

Grag *et al.* demonstrated that children with allergic disorders had higher odds of at least one co-morbid psychiatric and behavioral disorder (36). In contrary, in the study by Kohlboeck *et al.* the likelihood of emotional symptoms in children with non-atopic asthma was about 3-fold higher in comparison with children with no asthma and atopic asthma was not associated with emotional symptoms (37). These differences might be the result of different measurement tools or sampling methods. In addition, some contributing factors such as ethnic, environmental and cultural background of study population might explain these different results.

We didn't find any association between asthma and socioeconomic status of adolescents; however, the risk of asthma was increased in students with positive family history of depression or anxiety.

Study of Feldman *et al.* found that among children with asthma who had caregivers with an anxiety or depressive disorder pulmonary function showed lower flow rate in comparison to children of caregivers without mental disorder (26). Depression in the mother can have a negative impact on mental health, growth and development, behavioral and child safety feedback, and proper use of children's health care. On the other hand, mothers of children with chronic disorders such as asthma are more depressed than mothers of children with no chronic disorders. Maternal depression was reported as a potential factor for increasing asthma morbidity. In addition, mothers with depressive symptoms had shown that decreasing individual empowerment reduces the potential for caring for children with asthma, which can affect parents' ability to control their child's asthma with prescribed medication regimens (38). We found higher risk of anxiety among asthmatic girls. Several studies indicated significant association between poor asthma control in females with anxiety or depression (11,30,39). In contrast Wilson *et al.* reported that adult men and women in the asthma population had similar prevalence of psychological morbidity and obesity and they stated that in comparison with non-asthma controls, both co morbidities were significantly higher only in men with asthma (40).

Conclusion

We found a high prevalence of anxiety in adolescents and significantly higher severity of anxiety among children with asthma. The asthmatic females were at higher risk of anxiety. Considering the burden of these disorders on reproductivity, school performance and quality of life in these age groups, special attention for screening and treatment of patients should be considered. Furthermore, any attempts in training and informing parents and teachers about these disorders would be very beneficial for early diagnosis and management of mood disorders and asthma and eventually improvement of the social activity and mental health of them.

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Conflict of Interest

Authors declared no conflict of interest.

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