



Childhood Asthma and Risk Factors in KSA (Cross Sectional Study)

**Najya Abdullah Attia^{a#†}, Hoda Jehad Abousada^{b*‡},
Samirah Saeed Almasoudi^{cω†}, Abdulaziz Abdullallah AlHarbi^{d†},
Omniah Dakiel Alghanmi^{d††}, Abdullah Jamaan Alghamdi^{d†},
Fahad Ahmed Almarshud^{d†}, Reema Khaled Alhazmi^{d†},
Abdulaziz Hisham Haddad^{d†}, Abdullah Saeed Alzahrani^{d†},
Ammar Yasir Aljahdali^{d†}, Shuaa Adel Mahmoud^{d†}, Refal Ghassan Ajjaj^{d†},
Sara Mohammed Mannan^{d†} and Aeshah Ali ALnashri^{d‡}**

^a Department of Pediatrics, King Abdulaziz Medical City, Jeddah, KSA.

^b KAMC, Jeddah, KSA.

^c Alqunfuda General Hospital, Alqunfuda, KSA.

^d MOH, KSA.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The goal of this study is to see if there's a link between age, gender, and risk factors including having a smoking parent, allergic rhinitis, skin allergies, food allergies, and a family history of atopy with the diagnosis of childhood asthma. The goal is also to evaluate the prevalence of asthma in the study's pediatric sample, as well as the prevalence of other symptoms and complications in this group.

Assistant Professor & Consultant Of Pediatric;

≡ Obstetrics & Gynecology Physician;

ω Resident Doctor;

† General Practitioners' Doctor;

‡ Medical intern;

¥ Senior Medical Students;

† Dr.;

*Corresponding author: E-mail: Dr.huda1992@outlook.com;

A link was discovered between childhood asthma and age, allergic rhinitis, skin allergies, food allergies, and atopy in the family. In most areas of this investigation, the findings are consistent with earlier studies conducted at various periods and in other places for almost identical aims.

Keywords: Childhood asthma; allergic rhinitis; risk factors; food allergy.

1. INTRODUCTION

Asthma is a chronic inflammatory condition of the airways that causes a restriction in airflow. Asthma causes 10 million school days to be missed each year among children aged 5 to 17 years, costing caregivers \$726.1 million per year in lost wages [1].

Asthma has a wide range of signs and symptoms. Regardless, they are frequently seen in the following categories:

Wheezing is a melodic, high-pitched whistling sound produced by airflow turbulence. One of the most prevalent asthma symptoms is wheezing. It generally happens during exhalation [2].

Cough: a nonproductive and non-paroxysmal cough. It's possible that it'll coexist with wheezing. Coughing at night or during activity may be the only symptom of asthma, particularly in exercise-induced or nocturnal asthma patients. Coughing is more common after midnight or in the early morning hours in such circumstances [2].

Shortness of breath is another typical asthma symptom, particularly during an asthmatic episode [2].

Chest tightness can occur with or without other asthma symptoms. This is especially true in asthma caused by activity or asthma that occurs at night [2].

Symptoms of an acute asthma attack vary depending on the intensity of the attack. The following traits are seen in infants and young children who have experienced a severe episode: Breathlessness when sleeping, no desire to eat, sitting erect, speaking in words, and anxiety [2].

The youngster exhibits the aforementioned symptoms as well as being tired and disoriented as a result of impending respiratory arrest. Adolescents, on the other hand, may not show these signs until they are in full-fledged respiratory failure [2].

1.1 Physical Examination

Tachypnea (RR > 30 breaths per minute), use of auxiliary muscles of respiration, suprasternal retractions, tachycardia > 120 bpm, loud biphasic (expiratory and inspiratory) wheezing, pulsus paradoxus, and O₂ saturation > 91 percent on room air are all signs of a severe episode [3].

The following are some of the findings in status asthmaticus with impending respiratory arrest:

Thoracoabdominal movement that is paradoxical, no wheezing, significant hypoxemia, bradycardia, and no pulsus paradoxus.

1.2 Diagnosis

Asthma diagnostic tests include the following:

PFTs (pulmonary function tests): Spirometry and plethysmography are two methods for determining lung capacity.

Activity challenge: Includes baseline spirometry, followed by treadmill or bicycle exercise at a heart rate higher than 60% of projected maximum, with ECG and oxyhemoglobin saturation monitoring [3].

Exhaled nitric oxide fraction (FeNO) testing: Marker of airway inflammation that is noninvasive.

Radiography can reveal hyperinflation and enlarged bronchial markings, as well as signs of parenchymal illness, atelectasis, pneumonia, a congenital defect, or a foreign substance [3].

Allergy testing can help to detect allergic variables that may play a role in asthma.

The airways were examined histologically. Inflammatory cell infiltration, constriction of airway lumina, bronchial and bronchiolar epithelial denudation, and mucus plugs are all common findings [3].

1.3 Management

The National Asthma Education and Prevention Program's guidelines stress the following aspects of asthma treatment:

Monitoring and evaluation: Impairment and risk must be measured in order to monitor asthma control and alter medication; because asthma fluctuates over time, follow-up every 2-6 weeks is first required (after achieving control of the condition), and then every 1-6 months thereafter [4].

Education: Self-management education should emphasize the importance of patients recognizing their own level of control and signs of progressively worsening asthma symptoms, as well as environmental control and avoidance strategies, as well as medication use and adherence (e.g., correct inhaler techniques and other device use) [4].

1.4 Control of Environmental Factors and Comorbid Conditions

1.4.1 Pharmacologic treatment

The use of medicines for control and agents for alleviation are both part of pharmacologic asthma therapy. Inhaled corticosteroids (ICS), inhaled cromolyn or nedocromil, long-acting bronchodilators, theophylline, leukotriene modifiers, anti-immunoglobulin E (IgE) antibodies (omalizumab), and interleukin inhibitors (eg,

mepolizumab, benralizumab, dupilumab) are examples of control agents.

Short-acting bronchodilators (SABA), systemic corticosteroids, and short-acting muscarinic antagonists (SAMA) like ipratropium are examples of relief drugs [4].

1.5 Literature Review

1.5.1 Age of presentation

According to the most recent evidence, age of diagnosis for most cases of childhood asthma is before 5 years of age, with more than half developing the symptoms of asthma before 3 years of age. This finding could be misleading in some degree because of difficulty of performing diagnostic tests for asthma on pediatric population [5].

1.5.2 Common symptoms of first presentation

Frequent coughing, wheezing, and congestion are among the top common symptoms of presentation of asthma in childhood. Viral infections can be a trigger of asthmatic attacks in children [6].

Table 1. Relationship between asthma and different associations

Study	Year	Result
Asthma and gender: The female lung [2]	2016	Asthma is more prevalent in females than in males
Effects of passive smoking on one's health. 3. The incidence of respiratory problems and asthma in school-aged children as a result of parental smoking. [4]	1997	Exposure to smoke from either parents, increases prevalence and symptoms of asthma in pediatric populations.
The normal course of atopic dermatitis from birth to seven years of age, as well as the link to asthma [5].	2017	Early atopic dermatitis is linked to asthma in school-aged children, although wheezing often occurs before or concurrently with the start of atopic dermatitis in many of these asthmatic children.
Food allergy and asthma— what is the link? [1]	2013	Food allergy is a significant risk factor associated with asthma, and a risk factor for more severe asthmatic attacks and complications.
Allergic rhinobronchitis: The asthma–allergic rhinitis link [7]	1999	Allergic rhinitis has a strong association with asthma, both allergic and non-allergic types, with stronger link with the allergic one, and maybe the same mechanisms involved.
In-depth Analyses of the Impact on Asthma and Wheeze in 7- to 8-Year-Old Children with a Family History of Asthma and Atopy [5]	2017	Family history of asthma and atopy is associated with prevalence of asthma in siblings

2. METHODOLOGY

2.1 Study Design

This is an analytical cross-sectional study.

2.2 Study Setting and Period

This is an analytical cross-sectional study conducted at universities, hospitals, malls of the KSA from February 2021 until October 2021

2.3 Study Population and Sampling

Study participants:

Inclusion criteria; Parents of children who are less than 13 years of age.

Exclusion criteria; none.

2.4 Sampling Method and Size

The study is carried out by questionnaire. Randomly selected sample is sized 640 cases.

2.4.1 Measurements

Explanatory variables:

1. Sociodemographic characteristics: Child's age category, gender, and child housing.
2. Disease-related information: risk factors including passive smoking, co-existent or history of atopy, family history of atopy. Other variables include diagnosis of asthma in childhood, age at diagnosis, First presentation symptom, and different complications of asthma.

Outcome measures:

The outcome measure is by counting the ratio of the number of patients suffering from childhood asthma, and associated risk factors, symptoms of presentation, and complications of asthma.

Prevalence study: was carried out to test the questionnaire if easily understood and well-responded by the participants. Data from the cross-sectional study was used to calculate the sample size.

Data Management and Analysis plan:

SPSS version 25.0 is used to enter and analyze data. Continuous variables are summarized

using measures of central tendency and measures and dispersion, whereas descriptive statistics are used to show categorical data as frequencies and percentages. To study the relationship between depression, risk factors, and related disorders, researchers use both univariate and multivariate analyses. A P value of 0.05 or less is considered statistically significant.

3. RESULTS

3.1 Descriptive Data

Sample size is 640 cases. Age categories are as follows: <1 year: 49 (7.7%), 1-3 years: 138 (21.6%), 4-6 years: 136 (21.3%), 7-10 years: 155 (24.2%), 11-12 years: 162 (25.2%). Sex distribution is as follows: 333 (52%) males, and 307 (48%) females. 587 (91.7%) are living in the same house with their parents.

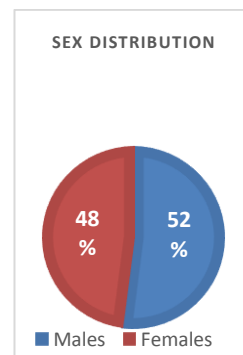


Fig. 1. Sex distribution

As for risk factors, 217 (33.9%) have at least one smoking parent, 164 (25.6%) have a history of food allergy, 177 (27.7%) have a history of allergic rhinitis, and 334 (52.2%) have a family history of atopy. 80 (9.4%) have an established diagnosis of childhood asthma. The number of children diagnosed with asthma was 60 cases as described in Fig. 2.

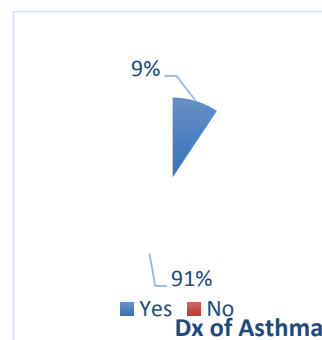


Fig. 2. Diagnosis of asthma

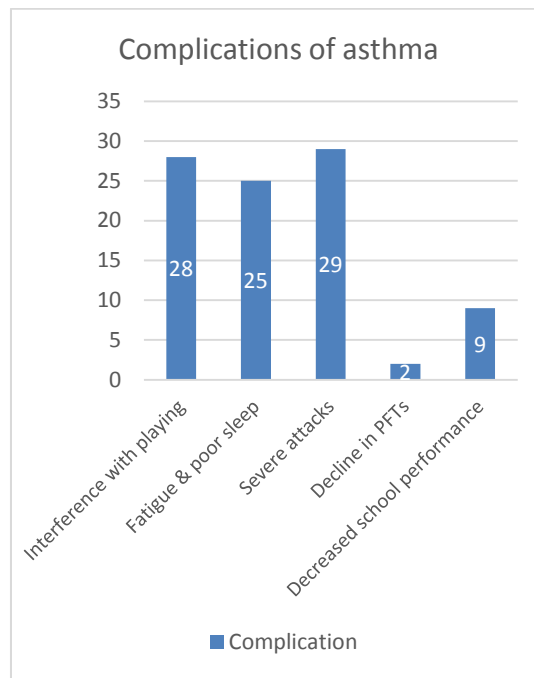


Fig. 3. Complications of asthma

Table 2. Association of Childhood asthma with different variables

Variable	Diagnosed with asthma (Chi-square) (n= 60)	P-value
Age group	< 1 year	3
	1-3 years	8
	4-6 years	12
	7-10 years	10
	11-12 years	27
Gender	Male	32
	Female	28
Smoking parent	Yes	26
	No	34
Skin allergy	Yes	26
	No	34
Food allergy	Yes	27
	No	33
Allergic rhinitis	Yes	48
	No	12
Family history of atopy	Yes	48
	No	12

3.2 Among 60 Cases Diagnosed with Asthma

Age of diagnosis was at: < 1 year in 16 cases (26.7%), 1-5 years in 35 cases (36.7%), 6-10 years in 10 cases (16.7%), and 11-12 years in 12

cases (20%). First presentation of asthma was: wheezing in 12 cases (20%), frequent coughing in 18 cases (30%), bouts of cough or wheezes worsening with flu or cold in 6 cases (10%), trouble sleeping in 6 cases (10%), fatigue due to poor sleep in 5 cases (8.3), delayed recovery of

bronchitis in 1 case (1.7%), shortness of breath in 7 cases (11.7%), chest congestion or tightness in 4 cases (6.7%), and trouble breathing hampering daily activities in 1 case (1.7%). When their parents were asked if they are given regular treatment, 5 cases (8.3%), never received regular treatment, 7 cases (11.7%) receive their treatment seldom, 13 (21.7%) often, and 35 (58.3%) do always. As for complications, they shown in the side-shown figure.

Association is studied between diagnosis of asthma, and age group, gender, and risk factors like having a smoking parent, skin allergy, food allergy and family history of atopy. All of these associations have significant statistical relationship with the diagnosis of asthma except for gender and having a smoking parent.

4. DISCUSSION

The results of this study are concordant, in some parts, with the results of previous different studies discussing the same associations, between childhood asthma and different variables including age, gender, risk factors like having a smoking parent, food or skin allergies, allergic rhinitis and family history of atopy. In some parts of study, there is insignificant statistical relationship, this could be due to unequal distribution of cases, sampling errors and bias [8].

There was a significant association between age group and childhood asthma presence among cases involved in this study. This matches well with the results of other studies stating that significant variance of such variables [7].

Also, in this study, there is a significant relationship between certain risk factors and diagnosis of childhood asthma. Of these variables, "having a smoking parent" didn't show any statistical significance. On the other hand, a significant relationship was found with having allergies (skin, food), or family history of atopy. This was also concordant with the results of previous studies done in the same purpose that is to study the relationship with asthma in childhood period. They have shown significant relationship between such variables, and diagnosis of childhood asthma [9].

5. CONCLUSION

Childhood asthma has an obvious relationship with different variables and conditions,

significantly with age, risk factors like skin allergy, food allergy and allergic rhinitis, and family history of atopy among siblings.

CONSENT AND ETHICAL APPROVAL

Administrative approval is sought from the unit of biomedical ethics research committee. Ethical approval is sought from the ethical committee of the faculty of medicine, King Abdulaziz University. An informed consent is sought from the participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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