

## Risk Factors for childhood Asthma Development

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**Abstract:** Asthma is a chronic inflammation of the airways that causes narrowing of it with reversible episodes of obstruction due to mucous, cellular and debris accumulation. The aim of this study was to detect any risk factor for pediatric asthma development. Thirty five Iraqi asthmatic children patients enrolled in this study who diagnosed under the supervision of consultant physician. The results of this investigation were compared with 40 apparently healthy control children who matched the patients in their age range & gender. According to a questionnaire which designed & arranged to facilitate the detection of the supposed etiological, and risk factors. The results revealed that boys were predominant among the patients in high males to females ration (2.5:1). Additionally, most asthmatic children (80.0%) were with previous positive family history for asthma. The current study showed that previous allergic rhinitis (17.5%) and aspirin sensitivity (22.5%) may enhance the disease development. Moreover, pneumonia (14.29%) and sinusitis (8.57%) were highly prevalent among the asthmatic patients in comparison with control individuals. Obesity (22.86%) and overweighing (28.57%) was noticed among asthmatic children. Furthermore, severity of asthma which is reckoned as frequencies of hospitalization was decline among old children (i.e. above 10 years) while it inversely proportionate with age of small asthmatic kids beside the under-weighted ones. Exposure to house dust and presence of food allergy particularly the peanut may be the most risk and trigger factors for asthma.

**Key words:** asthma, family history, Obesity, overweighing.

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### I. Introduction

Asthma is a medical condition that causes narrowing of the small airways in the lungs. Typically, asthma patients develop wheezing and have increased mucous production in their lungs. Asthma patients can have episodes of increased shortness of breath, often triggered by allergic reactions. Asthma sufferers often have the disease for many years, and the episodes of shortness of breath can be life-threatening [1].

Asthma is triggered by allergens (e.g. animal, dust, mites), irritants (e.g. tobacco smoke, chemical fumes), exercise and chest infection [2,3].

The symptoms of asthma can include coughing wheezing, a tight feeling in chest and difficult breathing.

Asthma can develop at any age, some children get asthma but then symptoms may disappear when they get old and other people develop the disease much later in life [2,4].

Asthma attacks all age groups but often starts in childhood [4]. It is a disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. In an individual, they may occur from hour to hour and day to day [5,6]. This condition is due to inflammation of the air passages in the lungs and affects the sensitivity of the nerve endings in the airways so they become easily irritated. In an attack, the lining of the passages swell causing the airways to narrow and reducing the flow of air in and out of the lungs [7,8,9]. It was denoted that obesity and asthma are common disorder, and their prevalence rates continue to rise [9,10]. Increasing body mass index (BMI) is a key factor predicting prevalence of asthma and considers as a potentially modifiable risk factor for the disease. Furthermore it was observed that a decrease in weight would decrease in asthma symptoms for overweight asthmatic patients [11]. Regarding gender effect, males were observed to be at risk of asthma during childhood [12]. On the contrary adult females at more risk of asthma after menopause [13]. Additionally it was declared that children activities may enhance the severity of asthmatic episodes [14].

**Aims of Study:** This study is planned to detect factors affect asthma development among children and its relation with body weight.

### II. Materials & Methods

During the period between December/2013 to May/2014, 35 Iraqi asthmatic children patients were enrolled in this study who attending Al-Zahra'a Center for Allergy & Asthma and the results of the investigations were compared with 40 apparently healthy control children who match the patients group in their age range (1-16) years. Patients' group includes (25) males and (10) females, while the control group consists of (28) males and (12) females.

The diagnosis based upon the patient medical history, a questionnaire containing personal details with type and duration of disease has been dependent for each patient's information aspects, which documented by the physician and history of asthma, weight, number of episodes, negative smoking, other diseases and allergies, treatment. Additionally, Body Mass Index (BMI) was calculated by dividing weight in kilograms by height in meters square, using the formula:

$$\text{BMI} = \text{Weight [in Kg]} / \text{Height}^2 \text{ [in meters]} = \text{Kg} / \text{m}^2$$

### Statistical Analysis

All the data were analyzed using t-Test and F test by application of SPSS program version 18 [15].

## III. Results

### 1. Demographical picture of the studied groups

The demographical picture of the studied groups showed that asthma is more predominant among males rather than females and in 2.5:1 ration. The mean of patients' ages was (8.9 ± 3.6) years while the age of disease initiation was observed to be (3.8 ± 0.9) years. It seems to be that the mean of Body Mass Index (BMI) pointed to normal weight of patients. However, (80%) of patients were with a positive family history for asthma, and majority of them their parents were smoker (54.29%). These data are listed in Table 1.

**Table 1: Demographical picture for the studied groups**

Characteristics	Patients Group	Control Group	P Value
Male : Female Ration	25 : 10 = 2.5	28 : 12 = 2.333	
Age (Mean ± SE)	8.9 ± 3.6	7.9 ± 4.6	
Age of disease onset (Mean ± SE)	3.8 ± 0.9	-	< 0.001
Disease duration (Mean ± SE)	5 ± 4.5	-	< 0.001
BMI (Mean ± SE)	24.8 ± 4.44	23 ± 2.53	< 0.001
Frequency of family history Positivity for Asthma (%)	28(80)	0(0.0)	
Frequency of Parent Smoking (%)	19 (54.29)	2(5.0)	
Total Number	35   100	40   100	

### 2. Distribution of the studied Groups According to the Age Groups

The distribution of patients according to their age groups showed that both age groups (5-10) and ≥ 11 years were constitute the majority of asthmatic children (40% for each) (i.e. most asthmatic children were above the age of five years) (80%). These data are listed in Table 2 below.

**Table 2: Distribution of Asthmatic children according to their age**

Age groups in years	Patients Group		Control Group	
	No.	%	No.	%
1 - 4	7	20	12	30
5 - 10	14	40	15	37.5
≥ 11	14	40	13	32.5
Total Number	35	100	40	100

### 3. Distribution of Asthma Patients according to Previous Hypersensitivity History

Patients' previous histories for some hypersensitivity disorders were listed in Table 3. It is clear from this table that 17.5% of those children complained previously from allergic rhinitis, while 22.5% of them were suffering from aspirin sensitivity.

**Table 3: Frequencies of Asthmatic children who complained from previous some allergic cases**

Allergic Cases	Positivity							
	Patients Group				Control Group			
	Yes		No		Yes		No	
	No.	%	No.	%	No.	%	No.	%
Allergic Rhinitis	7	17.5	28	82.5	-	-	40	100
Aspirin sensitivity	9	22.5	26	77.5	-	-	40	100
Total Number	35		100		40		100	

### 4. Distribution of the studied Groups According to Pervious Infectious Cases & sleeping Disorders

Table 4 showed that most children with asthma (77.14%) were

**Table 4: Frequencies of other infectious cases of respiratory tract and sleeping disorders among asthmatic children**

Infection Cases	Positivity							
	Patients Group				Control Group			
	Yes		No		Yes		No	
	No.	%	No.	%	No.	%	No.	%
Pneumonia	5	14.29	30	85.71	-	-	40	100
Sleep disorder	27	77.14	8	22.86	-	-	40	100
Sinusitis	3	8.57	32	91.43	-	-	40	100
<b>Total Number</b>	<b>35</b>		<b>100</b>		<b>40</b>		<b>100</b>	

suffering from sleeping disorder, meanwhile (8.57%) from them had sinusitis and only (14.29 %) complained from previous pneumonia infections.

### 5. Distribution of The Studied Groups According to BMI

Distribution of the asthmatic children according to their BMI was listed in Table 5. It seems to be that 28.57% of asthmatic children were over-weighted (i.e. their BMI range between 25-29 Kg/m<sup>2</sup>) and 22.86% were obese (Theirs BMI was >30 Kg/m<sup>2</sup>), and 20.0% were under weighed and 28.57% appeared to be normal weighed. However, there was highly significant difference in comparison with control group (P< 0.001).

**Table 5: Distribution of the studied groups according to their BMI**

BMI Classes Kg/m <sup>2</sup>	Patients Group			Control Group			P Value
	Mean ± SD	No.	%	Mean ± SD	No.	%	
Under weight < 18.5	16.1 ± 3.4	7	20.00	16.4 ± 1	12	30	< 0.001
Normal weight (18.5-24.9)	22 ± 2.9	10	28.57	20.3 ± 1	22	55	
Over weight (25-29)	27.1 ± 0.4	10	28.57	27.4 ± 0.5	5	12.5	
Obese > 30	34.1 ± 18.6	8	22.86	27.8 ± 27.8	1	2.5	
<b>Total Number</b>	<b>35</b>		<b>100</b>	<b>40</b>		<b>100</b>	

## IV. Discussion

Asthma is a chronic lung disorder that can make breathing difficult. It causes inflammation, swelling, and narrowing of the airways (bronchial tubes). About 25 million people in the U.S have asthma; 7 million of those are children. Asthma involves narrowing of the airways caused by three major factors: inflammation, bronchospasm, and hyper-reactivity. Allergy plays a role in some, but not all, asthma patients, and hence the hereditary factors may play a crucial role in development of asthma. Moreover, the current results clarified that boys are more susceptible for asthma development which agreed with the study of the others [11,16]. On the contrary some studied denoted that females were more affected with asthma [17-18]. This is true among the adults' asthmatic patients in whom female hormones enhance T<sub>H2</sub> activation and subsequently the disease development with IgE elevation and eosinophilia [19]. Meanwhile during childhood males are more prevalent which may be attributed to high males' activities and their chance for catch any disease is higher than females, which perhaps may participate in asthma initiation and then development [20-22]. Most of these infections are pneumonia particularly viral infections. These facts are true and going well and in harmony with the others' findings [23-25]. The explanation for these results may be attributed to the irritant effect of the microbial agents or the side effects of antibiotics or drugs which may attach to the epithelial cells and convert them into newly self-altered antigen which triggered the immune response [26-27]. Furthermore, maternal infection elevates the chance for newly born and childhood asthma development [28-31]. Sharing the same beds in nursery also act to increase the probability for asthma development through microbial (viral or bacterial) contact transmission of the causative agents [29]. On the other hand, and in spite of recoding the current study some pneumonia and sinusitis cases among the studied groups but the high frequency demonstrated in sleeping disorder which might be interpreted as a results for infection sometimes or may be related to the emotional factors such as stress feeling afraid or angry[28-29]. These factors attributed to the security states in Iraq that affect the pregnant and her newborn then.

Regarding BMI, this study indicated to presence high percentage of over-weighted and obese asthmatic children in comparison with normal weighed asthmatic cases beside the healthy control group. Many studies referred to the role of obesity in many diseases and asthma is one these diseases which going well with the present study [32-33]. Severe obesity further impairs airflow due to increased chest wall resistance.

Allergens and irritants such as medications that cause asthma attacks and this explain the association between infection and asthmatic cases in addition to the air pollution [34-35].

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