

## Relation between asthma and food allergy

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### Abstract

Asthma is closely linked with severe reactions to food allergies; both are allergic disorders, and one study of food allergy fatalities found that the vast majority of patients who died from anaphylactic shock caused by food also had asthma. The bottom line is that if the patient have both food allergies and asthma symptoms, you should be aware of how asthma might affect allergies and vice versa. Asthma is an inflammatory condition of the airways that affects breathing. In an asthma attack, the bronchial tubes that draw air into lungs are constricted due to spasms of the muscles surrounding them. People with asthma vary greatly in the frequency and severity of their symptoms. Common asthma triggers include allergens, particulate matter and irritants (eggs,milk,banana,citrus food peanut and others).

### Aims

To study the prevalence of food allergy in asthmatic patients in relation with obesity.

### Patients and method

Across-sectional study carried out to the randomly selected patient attending to the center of asthma and allergy in Babylon city within the period from February2013 to august and data obtained include questionnaires and anthropometric measurement(body mass index, waist circumference and waist to hip ratio) .

### Result

This study shows The overall mean age of asthmatic patients was  $(41.80 \pm 13.54)$  years), majority (42.0%) of them were aged between 20-40 years. There was no significant difference between the mean age of male  $(43.60 \pm 13.15)$  years) and female  $(41.03 \pm 13.68)$  years) ( $t= 1.067$ ,  $df= 148$ ,  $p= 0.288$ ). Majority of the asthmatic patients were female (70.0%) and majority (53.3%) of the asthmatic patients were from urban area. Only (28.7%) of the asthmatic patients were employed. the distribution of patients with food allergy according to food types, allergy to spicy was the most common type of food allergy (71.9%), followed by citrus fruit (54.5%) and banana (24.8%). There were significant association between food allergy with residence and occupational categories There was significant association between food allergy with onset age of asthma(16-30)years.

### Conclusion

Patient with asthma and asthma and food allergy consider as complicated condition so early detection of this problem in order to control the symptom and avoiding any risk aggravated the condition as obesity .

**Keywords:** key words, orkforce sizing, job-shop production, holonic model

### Introduction

Asthma (from the Greek ἄσθμα, *ásthma*, "panting") is a common chronic inflammatory disease of the airways characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm.(International heart,lung,and blood institute2007) Common symptoms include wheezing, coughing, chest tightness, and shortness of breath.

Asthma is thought to be caused by a combination of genetic and environmental factors[3]Its diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry( Lemanske RF, et al 2010) It is clinically classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate.( Yawn BP 2008).

The prevalence of asthma has increased significantly since the 1970s. As of 2011, 235–300 million people were affected globally,( Asher MI, , et al2006.) including about 250,000 deaths(. Pearce N, et al. 2007)

There are many causes for asthma one of them is food allergy which mean is an adverse immune response to a food protein(Bjorksten B, et al2008) &(Shreffler WG, , et al2009) . They are distinct from other adverse responses to food, such as food intolerance, armacological reactions, and toxin-mediated reactions.

Asthma is closely linked with severe reactions to food allergies; both are allergic disorders, and one study of food allergy fatalities found that the vast majority of patients who died from anaphylactic shock caused by food also had asthma. (Bock SA, et al, 2001) The most common foods responsible for allergic reactions are eggs, cow's milk, peanuts, soya, fish and shellfish in children and peanuts, tree nuts, shellfish and fish in adults. Individuals can also be affected by substances that are used as food additives and preservatives. In one of our studies (Kanny G, et al 2001) which covered 125 asthmatic patients, we found that the incidence of food allergy was 7.2%. Berns et al. (Berns SH, Halm EA, et al 2007) found that the prevalences of fish, peanut, tree-nut, shellfish and seed allergies 1% in adult asthmatics. There is a perception among patients attending asthma clinics in both Europe and Australia; over two-thirds believed that food induced their asthma. (Robert G, et al 2003) This rate is very high as patients considered that ice cream, cold water and carbonated drinks are bad for their asthma. However, the underlying mechanism responsible for generating bronchospasm with those foods is more likely to be cold or acid than an allergic reaction.

Also there is association between asthma and obesity. Asthma is considered to be more prevalent in obese subjects, and a possible causal link between these two entities has been suggested. In the present study, various observations on this relationship were reviewed. Mean body mass index was higher in the asthmatic population compared with the nonasthmatic population. Self-reported nonfood-related allergies were higher in the more obese subjects in the general population, but the prevalence of allergy was not different in obese asthmatic subjects compared with nonobese asthmatic subjects. Smoking did not seem to influence the relationship between asthma and body mass index. (Louis-P B, and Annick D C, BSc 2007)

Overweight and obese individuals are at 38% and 92% higher risk, respectively, for developing asthma than people of normal weight (Beuther DA, et al. 2007). Unfortunately, increased weight also raises the risk for poorly controlled asthma symptoms with medication use. Both fluticasone and the combination of fluticasone and salmeterol were significantly less likely to control asthma in those with a BMI >40 than in less heavy individuals. (Boulet LP, et al. 2007). About the role of asthma in food allergy: Although it is known that food allergic reactions can trigger lower respiratory symptoms and occupational asthma, food allergy generally does not present with chronic or isolated respiratory symptoms. (Bock et al 1992) reported on 279 asthmatics with a history of food-induced wheezing who underwent double-blind, placebo-controlled food challenge (DBPCFC); 60% had a positive challenge and, of these, 40% had wheezing as one of several symptoms, but only 5 subjects had isolated wheezing. Similarly, (James et al. 1994).

#### Patients and methods

study design, setting, and data collection time:

Across sectional study was conducted in Hilla city. Our study was done in the center of asthma and allergy. Data collection was carried out during the period from 1st of February to August 2013

Study population:

The total patients collected were 150 patients (105 females and 45 males) with age  $\geq$  of eighteen years old. About 30 patients refused to participate in the study. The main reasons for a non-participant were fatigue or being too ill. So, a total of 150 out of 180

Inclusion criteria for patient:

1. All the patients are randomly selected when attending the center of asthma and food allergy during the time of study who accepted to participate in the study.
2. Those patients with age  $\geq$  18 years old.

Exclusion criteria for the patients:

1. Any patient age less than 18 years
2. The patients who refuse to participate in the study.
3. The pregnant women.

Data collection tools:

A specially designed data sheet was used; to assess the relation between asthma and food allergy of randomly selected patients from the center of asthma and food allergy and this sheet contains:

\*Questionnaires.

\*anthropometric measurements (weight, height, BMI, WC, WHR).

Questionnaires;

Divided into two sections:

Section 1: include socio demographic factors :- name, age (divided into four age groups 18-20, 20-40, 40-60, more than 60 years old), gender, residence (rural and urban), occupation (employed, and un employed), type of diet (if rich with CHO and fat or not,) and smoking [10].

Section 2: medical condition including allergic rhinitis family history of asthma and food allergy type of food allergy (spice, citrus food, peanut, peach, tomato, ...) symptom of allergy (skin, respiratory, gastro intestinal).

\* Measurements:

1. Body mass index (BMI):

Measured according to the formula of (Weight kg / Height m<sup>2</sup>) in which the weight was measured in (kilogram) using the balanced digital

scale for all subject (wearing light clothing) with an accepted error of 0.1 kg. Height was measured (in meter) using a flexible tape measures to the nearest 0.5 cm with the patient standing without shoes, heels together and the head in the horizontal plane. BMI classification show in subject of obesity and asthma.

2. Waist circumference (WC) and waist to hip ratio (WHR):

A questionnaire form was prepared by researchers following a review of related literature and our reference about risk assessment of food allergy and asthma in adults.

Data Analysis:

Recording information was checked for missing values and data entry errors. Statistical analysis was performed using Statistical Package for Social Science software (SPSS, version 17) and Microsoft office word 2010 was used for data processing and statistical analysis. Variables were described using frequency distribution and percentage for the patients according to their characteristics and mean ( $\bar{x}$ ); standard deviation (SD) for continuous variable. The chi-squared test was used for the assessment of association between the variables studied. The p-value of less than 0.05 was significant statistically.

## RESULTS

This study has been done at the center of asthma and food allergy in Babylon province. The overall mean age of asthmatic patients was  $(41.80 \pm 13.54)$  years, majority (42.0%) of them were aged between 20-40 years (Figure 1). There was no significant difference between the mean age of male  $(43.60 \pm 13.15)$  years and female  $(41.03 \pm 13.68)$  years ( $t = 1.067$ ,  $df = 148$ ,  $p = 0.288$ ).

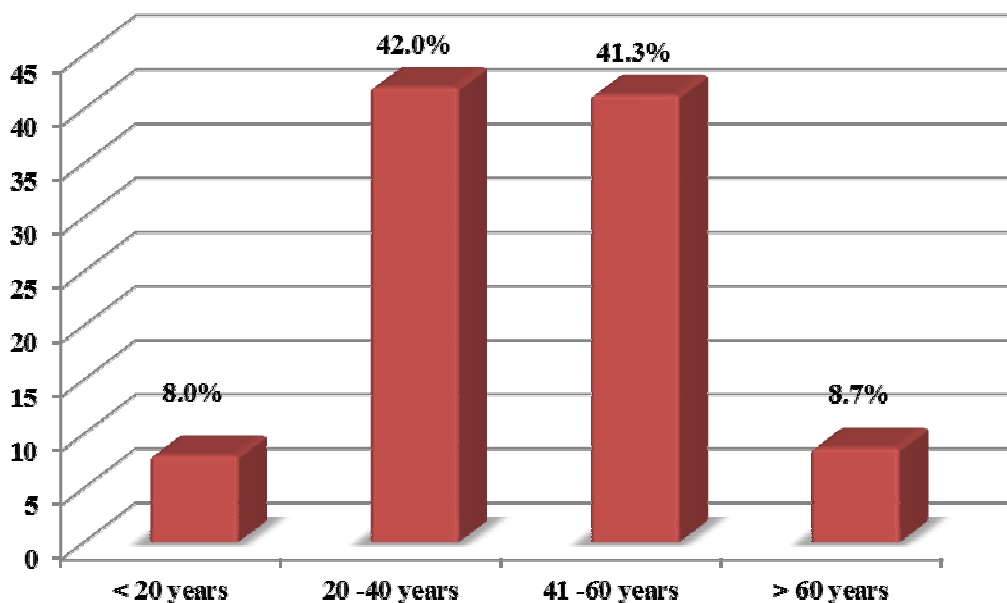


Figure 1: Distribution of asthmatic patients by age groups

Table 1 shows the distribution of asthmatic patients by socio-demographic characteristics. Majority of the asthmatic patients were female (70.0%) and majority (53.3%) of the asthmatic patients were from urban area. Only (28.7%) of the asthmatic patients were employed.

Table 1 : Distribution of asthmatic patients by socio-demographic characteristics (n=150)

Variable	Frequency	Percent (%)
<b>Sex</b>		
Male	45	30.0%
Female	105	70.0%
<b>Residence</b>		
Urban	80	53.3%
Rural	70	46.7%
<b>Occupational Categories</b>		
Employed	43	28.7%
Not-Employed	107	71.2%

Table 2 shows the distribution of asthmatic patients by medical history. Majority (58.0%) of asthmatic patients had family history of asthma, meanwhile, only (22.7%) of asthmatic patients had family history of food allergy. only (48.7%) of asthmatic patients had history of allergic rhinitis. Majority (72.0%) of asthmatic patients had asthma from 10 years ago, meanwhile, majority (52.7%) of asthmatic patients developed asthma when they aged more than 30 years. Only (8.0%) of asthmatic patients were smokers.

Table 2: Distribution of asthmatic patients by medical history (n=150)

Variable	Frequency	Percent (%)
<b>Family History of Asthma</b>		
Yes	87	58%
No	63	42%
<b>Family History of Food Allergy</b>		
Yes	34	22.7%
No	116	77.3%
<b>History of Allergic Rhinitis</b>		
Yes	73	48.7%
No	77	51.3%
<b>Duration of Asthma</b>		
< 10 years ago	108	72.0%
≥ 10 years ago	42	28.0%
<b>Onset of Asthma</b>		
< 5 years	13	8.7%
5-15 years	12	8.0%
16-30 years	46	30.7%
> 30 years	79	52.6%
<b>Smokers</b>		
Yes	12	8.0%
No	138	92.0%
<b>Skin Manifestation</b>		
Yes	53	35.3%
No	97	64.7%
<b>GIT Manifestation</b>		
Yes	25	16.7%
No	125	83.3%
<b>Respiratory Manifestation</b>		
Yes	119	79.3%
No	31	20.7%

Table 3 shows the distribution of asthmatic patients by anthropometric measures. The overall BMI was  $27.85 \pm 5.87$  kg/ m<sup>2</sup>, only (30.6%) of the asthmatic patients were obese. Majority (51.3%) of the asthmatic patients were highly risk for their waist/ hip ratio.

Table 3 shows the distribution of asthmatic patients by anthropometric measures. The overall BMI was  $27.85 \pm 5.87$  kg/ m<sup>2</sup>, only (30.6%) of the asthmatic patients were obese. Majority (51.3%) of the asthmatic patients were highly risk for their waist/ hip ratio

Table 3: Distribution of asthmatic patients by anthropometric measures (n=150)

Variable	Frequency	Percent (%)
<b>BMI</b>		
< 18.5 kg/ m <sup>2</sup>	4	2.7%
18.5- 24.9 kg/ m <sup>2</sup>	46	30.7%
25- 29.9 kg/ m <sup>2</sup>	54	36.0%
≥ 30 kg/ m <sup>2</sup>	46	30.6%
<b>Waist/ Hip Ratio</b>		
High Risk	77	51.3%
Moderate Risk	43	28.7%
Low Risk	30	20.0%

Figure 2 shows that, out of 150 asthmatic patients 121 (80.7%) had food allergy (Figure 2).

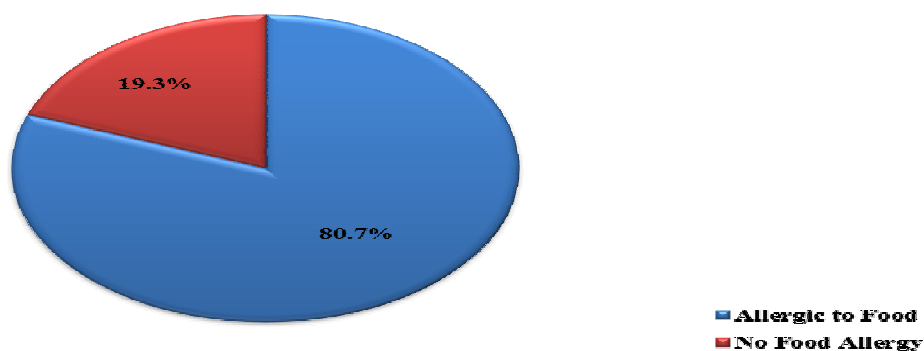


Figure 3 shows the distribution of patients with food allergy according to food types. Allergy to spicy was the most common type of food allergy (71.9%), followed by citrus fruit (54.5%) and banana (24.8%).

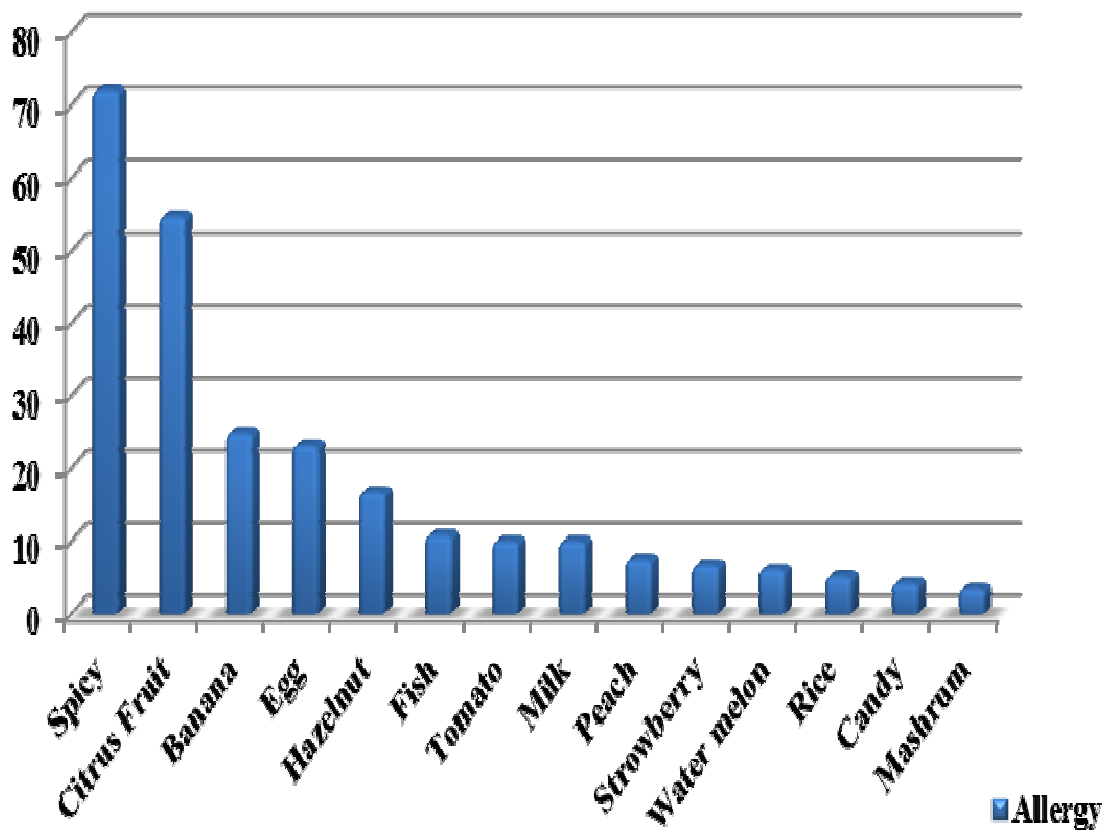


Table 4 shows the association of food allergy with patient's socio-demographic characteristics. There were significant association between food allergy with residence and occupational categories.

Table 4: Association of food allergy with socio-demographic Characteristics (n=150)

Variable	Food Allergy (%)	No Food Allergy (%)	Total	$X^2$	df	P value
<b>Age Groups</b>						
< 20 years	9 (7.4)	3 (10.3)	12 (8.0)			
20- 40 years	51 (42.1)	12 (41.4)	63 (42.0)			
41- 60 years	49 (40.5)	13 (44.8)	62 (41.3)	1.486	3	0.685
> 60 years	12 (9.9)	1 (3.4)	13 (8.7)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Sex</b>						
Male	33 (27.3)	12 (41.4)	45 (30.0)			
Female	88 (72.7)	17 (58.6)	105 (70.0)	2.217	1	0.137
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Residence</b>						
Urban	59 (48.8)	21 (72.4)	80 (53.3)			
Rural	62 (51.2)	8 (27.6)	70 (46.7)	5.259	1	0.022*
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Occupational categories</b>						
Employed	30 (24.8)	13 (44.8)	43 (28.7)			
Not-Employed	91 (75.2)	16 (55.2)	107 (71.3)	4.592	1	0.030*
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			

\*p value  $\leq$  0.05 is significant

Table 5 shows the association of food allergy with patient's medical history. There was significant association between food allergy with onset age of asthma.



Table 5: Association of food allergy with medical history (n=150)

Variable	Food Allergy (%)	No Food Allergy (%)	Total	X <sup>2</sup>	df	P value
<b>Family History of Asthma</b>						
Yes	72 (59.5)	13 (44.8)	62 (41.3)	0.581	1	0.446
No	12 (9.9)	1 (3.4)	13 (8.7)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Family History of Food Allergy</b>						
Yes	29 (24.0)	5 (17.2)	34 (22.7)	0.604	1	0.437
No	92 (76.0)	24 (82.8)	116 (77.3)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>History of Allergic Rhinitis</b>						
Yes	63 (52.1)	10 (34.5)	73 (48.7)	2.895	1	0.089
No	58 (47.9)	19 (65.5)	77 (51.3)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Duration of Asthma</b>						
< 10 years	88 (72.7)	20 (69.0)	108 (72.0)	0.164	1	0.685
≥ 10 years	33 (27.3)	9 (31.0)	42 (28.0)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Onset Age of Asthma</b>						
< 5 years	6 (5.0)	7 (24.1)	13 (8.7)	10.903	2	0.012*
5- 15 years	10 (8.3)	2 (6.9)	12 (8.0)			
16- 30 years	39 (32.2)	7 (24.1)	46 (30.7)			
> 30 years	66 (54.5)	13 (44.8)	79 (52.7)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Smokers</b>						
Yes	8 (6.6)	4 (13.8)	12 (8.0)	1.639	1	0.200
No	113 (93.4)	25 (86.2)	138 (92.0)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Skin Manifestation</b>						
Yes	52 (43.0)	1 (3.4)	53 (35.5)	15.996	1	<0.001*
No	69 (57.0)	28 (96.6)	97 (64.7)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>GIT Manifestation</b>						
Yes	24 (19.8)	1 (3.4)	25 (16.7)	4.523	1	0.033
No	97 (80.2)	28 (96.6)	125 (83.3)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Respiratory Manifestation</b>						
Yes	117 (96.7)	2 (6.9)	119 (79.3)	115.05	1	<0.001*
No	4 (3.3)	27 (93.1)	31 (20.7)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			

\*p value ≤ 0.05 is significant

Table 6 shows the association of food allergy with patient's anthropometric measures. There was significant association between food allergy with BMI groups as well as with waist/ hip ratio risk levels. Only (35.5%) of patients with food allergy were obese, meanwhile, majority (55.4%) of patients with food allergy were at high risk level of waist/ hip ratio.

Table 6: Association of food allergy with anthropometric measures

Variable	Food Allergy (%)	No Food Allergy (%)	Total	$\chi^2$	df	P value
<b>BMI</b>						
< 18.5 kg/ m <sup>2</sup>	4 (3.3)	0 (0.0)	4 (2.7)			
18.5- 24.9 kg/ m <sup>2</sup>	29 (24.0)	17 (58.6)	46 (30.7)			
25- 29.9 kg/ m <sup>2</sup>	45 (37.2)	9 (31.0)	54 (36.0)	<b>13.924</b>	3	<b>0.002*</b>
≥ 30 kg/ m <sup>2</sup>	43 (35.5)	3 (10.3)	46 (30.7)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			
<b>Waist/ Hip Ratio</b>						
<b>High Risk</b>	67 (55.4)	10 (34.5)	77 (51.3)			
<b>Moderate Risk</b>	29 (24.0)	14 (48.3)	43 (28.7)	<b>6.948</b>	2	<b>0.031*</b>
<b>Low Risk</b>	25 (20.7)	5 (17.2)	30 (20.0)			
<b>Total</b>	<b>121 (100.0)</b>	<b>29 (100.0)</b>	<b>150 (100.0)</b>			

\*p value ≤ 0.05 is significant

## Discussion

Food allergy is a potentially serious immune response to eating specific foods or food additives. Eight types of food account for over 90% of allergic reactions in affected individuals: milk, eggs, peanuts, tree nuts, fish, shellfish, soy, and wheat (Sampson HA2004, Sicherer SH2002.)

We carried out our study on 150 asthmatic patient and the result indicated that mean age distribution is(41.80 ± 13.54 years), majority (42.0%) of them at age group (20-40 years) (Figure 1). There was no significant difference between the mean age of male (43.60 ± 13.15 years) and female (41.03 ± 13.68 years) (t= 1.067, df= 148, p= 0.288) .

Table 1 shows the Majority of the asthmatic patients were female (70.0%) while males 30.0% different study show that The relationship of sex to asthma prevalence related to health care, and medications in a large managed care organization.( Michael Schatz, MD et al2003)

sex-related differences in asthma epidemiology and disease expression. Studies show an increased incidence of asthma in women. Data demonstrate that asthmatic women have a poorer quality of life and increased utilization of healthcare compared to their male counterparts despite similar medical treatment and baseline pulmonary function. Research continues to explore hypotheses for these differences including the potential influences of the female sex hormones, altered perception of airflow obstruction, increased bronchial hyper-responsiveness, and medication compliance and technique. However, no single explanation has been able to fully explain the disparities.( Jessica A. et al2011)while other study explain that the

Female participants more function problems and increasing seriousness of activity restrictions than their male counterparts. the differences in mean scores between men and women were not significant. The age is very important in the out com in asthma( table1) other study explain that the outcome is deteriorating progressively with age, with the highest mean scores for the fourth and fifth age groups. Occupation is another variable that

show effect on asthma (table 1) compared with other study that indicated the employment status correlated significantly with functioning. There is a clear difference in mean scores on all scales between those who were employed and those 1problems in their daily functioning. It is worth noting that for index mean score is 17 times higher for the 'unemployed' compared to the 'employed'.. (S Koukouli et al 2005)

about the relation between asthma and residents in this( table1) whether the patient lived in urban or rural area there is many explanations about that one of them explain the relation due to Exposure to outdoor air pollutants, including ozone (O<sub>3</sub>) and hazardous air pollutants (HAPs), are also known risk factors for developing respiratory diseases, and the physical characteristics frequently associated with asthma are include poor housing quality and disproportionate environmental pollution burdens regularly found in low-income, minority urban neighborhoods. (Jason C et al 2004 )

other researchers have shown that neighborhood or area characteristics may be related to health independently of individual.

Other condition that make patients who lived in urban and rural area are, such as persistent poverty, residential segregation, psychosocial stress, unemployment, inadequate transportation, lack of affordable food stores, unsafe recreation spaces, high crime rates, biased policing, concentrated environmental hazards, and social networks, are important for understanding population distributions of disease and wellbeing. However, with a few exceptions, the relationships between the physical characteristics of urban neighbourhoods and asthma have rarely been studied (Jason C et al 2004)

Table 2 shows the distribution of asthmatic patients by medical history. Majority (58.0%) of asthmatic patients had family history of asthma, Family history is another risk factor. People with an asthmatic parent are three to six times more likely to develop the condition, according to the Centers for Disease Control (CDC). also in this study (table 2) only 8.0% are smoker this may due to awareness of patient about them health other study show that' Although cigarette smoking is known to increase the risk of incident asthma [Polosa R et al 2008], the smoking asthma phenotype has not been identified in other cluster analysis studies to date. This is probably due to the fact that smokers and ex-smokers with a smoking history of >5 pack-years were not included in these studies. It would be worthwhile to redo these cluster analyses after inclusion of smoking asthmatics and by taking markers of airway inflammation into account.

There is another study in Korean cluster analysis, a separate phenotype of adult-onset smoking-related asthma was identified]. This cluster mainly consisted of male patients with a mean age of asthma onset of 46 years.( Polosa R et al 2008)

also in this table there is a relation between asthma and age of onset and this relation explained by many study one of them indicate that asthma is a heterogeneous disorder, in which age of onset seems to play an important role. Although the vast majority of asthma publications in the literature are about allergic asthma starting in childhood, the incidence among adults is as high as 12 cases per 1,000 person-years [Eagan TM, et al 2005)

A major involvement of airway epithelial cells in the pathogenesis of both about the relation between asthma and allergic rhinitis in this table explain by that rhinitis and asthma are associated and the two disorders interact at various levels. Rhinitis typically precedes the development of asthma and can contribute to unsatisfactory asthma control. The presence and type of asthma is influenced by sensitization, and the duration and severity of allergic rhinitis. Nasal symptoms, airflow and markers of inflammation directly correlate with lower airway involvement. Local tissue factors, such as microbial stimuli and systemic inflammatory mechanisms, play a role in the clinical expression of the allergic airway syndrome. There is increasing evidence that suggests asthma and allergic rhinitis. (Enrico Compalati ET AL 2005 )

Table 3 shows that The overall BMI was  $27.85 \pm 5.87$  kg/ m<sup>2</sup>, only (30.6%) of the asthmatic patients were obese.. Obesity is a risk factor for the development of asthma in adulthood]. there are many study that indicate The incidence of asthma is increased by 50% in overweight and obese patients Recently, two observational studies showed that abdominal obesity, assessed by waist circumference, was independently associated with increased prevalence and incidence of asthma. obesity contributes to asthma development and become complicated and there is no single mechanism that supports this association. However, in the literature, several mechanisms have been implicated (shore SA 2008)

First, asthma in obesity is associated with increased adipokines, such as leptin, in visceral adipose tissue. Leptin and other adipokines may have direct effects on the airway rather than enhancing airway inflammation to induce

asthma in obesity]. Secondly, mechanical factors might be responsible. Obese patients breathe at a lower than normal functional residual capacity which is associated with the risk of both expiratory flow limitation and airway closure and airway hyper responsiveness. Thus obesity has effects on lung function that can reduce respiratory well-being, even in the absence of specific respiratory disease, and may also exaggerate the effects of existing airway disease (132 shore SA 2008).

Also in this study we found that ,out of 150 asthmatic patients 121 (80.7%) had food allergy (Figure 2).this related to that asthma and food allergies co-exist for many and having both worsens the prognosis. Other study confirmed a number of findings Consistent with a prior report(Kulig M, et al 1998)

that found a strong association between symptomatic food allergy and asthma However, there are still unanswered questions regarding the relationship between these entities. It is possible that greater atopy in general is associated with more severe, persistent, and/or earlier-onset asthma and food sensitization, with no direct causal relationship between food ingestion and asthma exacerbations.

Figure 3 shows the distribution of patients with food allergy according to food types. Allergy to spicy was the most common type of food allergy (71.9%), followed by citrus fruit (54.5%) and banana (24.8%). Other study show that There are eight major food allergens in the United States—milk, egg, peanut, tree nuts, soy, wheat, fish and crustacean shellfish

Prevalence rate of food allergy in the United States for some of these food allergens are Peanut: 0.6 percent, Tree nuts: 0.4–0.5 percent, Fish: 0.2 percent in children and 0.5 percent in adults Crustacean shellfish (crab, Cray ,fish ,lobster, shrimp): 0.5 percent in children and 2.5 percent in adults All seafood: 0.6 percent in children and 2.8 percent in adults

Milk and egg: no reliable data available from U.S. studies, but based on data obtained outside the United States, this rate is likely to be 1–2 percent for young children, (National Institutes of Health 2005)

other study indicate that Both egg and milk allergy have been specifically implicated as risk factors for the development of asthma.(Cantani A, et al 2005)

Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology this study corroborated this but also found that other allergens such as peanut and tree nut were also strongly associated with the development of asthma.

Table 4 shows There were significant association between food allergy with residence and occupational categories other study show that few differences in allergy severity by sociodemographic characteristics of food allergy. In addition, we found that associations between allergy severity and use of health related services did not differ significantly by race/ethnicity or poverty status among children with food allergy. Given the importance of food allergy as an emerging public health issue, further research to confirm these findings would be useful.( Rockville Pike,et al 2008)

Also in our study indicate that food allergy more in female than male and there is other study agree with us in al- Saudi (BahaaA.Abd-et al 2007)

that indicate the prevalence being higher in women (30%) than men(28%). Similar prevalence, and comparable differences between women 26% and men 19% were found by Burr and Merrett(Burr ML, et al 2004)

This large variation in prevalence figures the percentage of male is higher than females till adult period the t percentage become higher in females than males(male/female ratio of t 1.80)( DatabaseC et al 2009)

and this agree with our study.

Also this study show strong significant between food allergy and residents(rural area)may be due to absent of medical care for early diagnosis of this disease and get treatment or un accessible ways to primary health care, poverty and un education. There is other study not agree with us in SAN FRANCISCO which indicate that The prevalence of food allergy may be lower in rural areas versus more urban areas, according to new research from China presented at the 2011 Annual Meeting of the American Academy of Allergy, Asthma & Immunology (A AAI). Studies have shown that a rural environment is protective against the development of asthma. Food allergy is often the first manifestation of the ‘atopic march’ in individuals who are prone to develop multiple allergies, said first author Gary W. K. Wong, MD. Thus, it would also be important to determine if a rural environment is pr- ojective against food allergy.( Annual Meeting of the American Academy of Allergy 2011)

in(San Francisco) A large number of studies have consistently shown that growing up on a farm in various rural

areas in Europe confers protection from the development of hay fever, atopic sensitization, and less consistently of asthma from childhood into young adulthood. Exposures to livestock as well as consumption of unpasteurized milk are likely to be distinct and relevant sources of protective exposures. In turn, the underlying microbial exposures have not been identified with certainty. Although environmental exposures to bacterial and fungal components have been found to be inversely related to asthma and atopy, they do not explain the “farming effect.” The mechanisms conveying the protection are still poorly understood. (Erika von Mutius 2007)

Also there is a significant between food allergy and occupation that the percentage of no food allergy in un employed patients is (55.2 )while employed one is (44.8) this may due to awareness of asthmatic patient his disease from working. and there is no explanation by other study.

Table 5 shows There was significant association between food allergy with onset age of asthma, and this because both of them are type of atopic disease.

About 58percent of asthmatic patients have positive family history while 24% of patient with positive family history of food allergy and 76% have negative, Other study not agree with us that indicate Proportions of patients with clinical sensitivity to food was greater in patients with positive family history of allergy (55%) compared to those with no family history of allergy (45%), the p value was <0.05. (Bahaa A et al 2007)

other study found a strong association between symptomatic food allergy and asthma. Furthermore, they found this effect was independent of family history, which is corroborated by one other study which also accounted for sensitization to aeroallergens. (American Gastroenterological Association medical position statement: 2001)

Most patients with food allergies have an atopic disorder; however, only 10 percent of patients with atopic disorders have food allergies. (Dreskin SC. 2006)

A family history of food allergy or other atopic disorders increases the risk of developing a food allergy. Genetic predisposition, including specific haplotypes, has been identified for some common food allergies. The oral allergy syndrome is confined to patients who have allergic rhinitis or asthma

also in our study indicate there is strong association between food allergy and age onset of asthma ,there is other study agree with us that indicate Increased age of onset of asthma, and age of asthmatic patients were significantly associated with increased reporting of clinical sensitivity for food allergy (Burr ML, et al 2004)

also in our study there is strong association between food allergy and of asthma because both of them is type of atopic disease

Also in our study there is statistical significance between food allergy and skin manifestation and there is other study agree with us that indicate

The Symptoms of allergic reactions are seen on the skin (hives, tchiness, swelling of the skin). Gastrointestinal symptoms may include vomiting and diarrhea. Respiratory symptoms may accompany skin and gastrointestinal symptoms, but don't usually occur alone. American Academy of Allergy, Asthma & Immunology 2013) there is no comparison with other study.

Table 6 shows There was significant association between food allergy with BMI groups. Only (35.5%) of patients with food allergy were obese. A new study in the May 2009 Journal of Allergy and Clinical Immunology shows a possible correlation between obesity and later development of atopic symptoms like hay fever, eczema, and food allergies. This study found a clear relationship between BMI (body mass index) percentile and the amount of IgE -- the antibodies responsible for allergic reactions -- circulating in the bloodstream. In this study, the effect was strongest among girls.

Researchers considered the possibility that levels of C-Reactive Protein (CRP), a protein associated with inflammation, might be related to atopy. In this study there did seem to be higher levels of CRP in children with higher levels of BMI and higher levels of IgE and food allergies, but it is unknown at this time what the cause-effect relationships between these factors is (Victoria Groce, 2009) Food allergy and asthma may often coexist, though the incidence of a food contributing to a person's asthma control is extremely uncommon. Particular attention should be give patients have been found to have a higher incidence of fatal or near-fatal anaphylaxis.

## 5. Conclusion

Patient with asthma and asthma and food allergy consider as complicated condition so early detection of this problem in order to control the symptom and avoiding any risk aggravated the condition as obesity .

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