CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187

Available online at: http://www.iajps.com *ResearchArticle*

IS A POSITIVE HISTORY OF FOOD ALLERGY CONSIDERED AS RISK FACTORS FOR BRONCHIAL ASTHMA?

Dr Hassan Aljabri [1], Dr shahad Alhujaili [2], and Dr Waleed Alharbi [2]
[1]Allergy and Immunology Consultant
[2]Pediatric Specialists

Abstract:
Background: *Food allergy and asthma are serious health problems affecting people at all ages around the world, they are two common childhood conditions. This study aimed to find the association between family history of bronchial asthma and the risk of developing food allergy .*
Methodology: *A cross-sectional study was done among parents of children (1-14 years) with asthma and developed food allergy later on, at Al-Madinah region, Saudi Arabia. Using an electronic questionnaire consisting of 29 questions divided in 3 sections. The first section contains general and personal information. The second section contains diagnostic questions that help to obtain information from the parents about the medical history, the third section contains questions about family history.*
Results: *22.5% of the children had asthma, about 75% of asthmatic children had food allergy. The majority of asthmatic children 75% needed an emergency visit in the last 12 months due to an asthma attack. This study found that sensitization to egg is one of the most common food allergens in children, followed by sensitization to nuts and peanuts. This study also showed underuse of food allergy testing.*
Conclusion: *There is a relatively high prevalence of asthma among the children, and the majority of asthmatic children had food allergy*
Keywords: *Bronchial asthma, Food allergy, Allergic reaction, Medical history, Family history.*

Corresponding author:
Hassan Aljabri ,
Allergy and Immunology Consultant

QR code

Please cite this article in press : Hassan Aljabri ***et al*****, Is A *Positive History Of Food Allergy Considered as Risk Factors For Bronchial Asthma?.,*** *Indo Am. J. P. Sci, 2023; 10 (07).*

INTRODUCTION:

Asthma and food allergy are two common childhood conditions [1], their prevalence is high even if variable among heterogeneous studies and among populations, in general, asthma and food allergy are higher in Western countries [2]. Asthma is a chronic respiratory disease characterized by recurrent attacks of breathlessness and wheeze. These symptoms happen due to irritation that happens in the airways resulting in swelling and inflammation leading to reduced lung airflow [3]. While, food allergy an adverse immunological reaction that happens due to exposure to a food that re-occurs on repeat exposure [3].

Food allergy and asthma are closely linked. Studies found that food allergy a potential risk factor for asthma. Food allergy often gets along with asthma, and this adversely influences their course, resulting in increased morbidity/mortality among children and adults who have these conditions. Patients who have asthma and food allergy are at a higher risk of fatal anaphylaxis (severe allergic reaction) particularly if the asthma is uncontrolled [1, 4,5].

Asthma and food allergy can share the same risk factors, such as; allergen sensitization, parental allergy, and atopic eczema. Previous studies have shown that the food allergy in the first year of life leads to the development of asthma and atopic diseases, such as; allergic rhinitis, atopic dermatitis, and allergic conjunctivitis, as well as allergy to other foods (food allergen march) at school age [2]. But the way in which asthma and food allergy interact and influence each other is yet to be fully understood [3]. In young children, the most common food allergens are; fish (0.1%), and shellfish (0.1%), tree nuts (0.2%), soy (0.4%), wheat (0.4%), peanut (0.8%), egg (1.3%), and milk (2.5%). While in adults, the most common food allergens are; scaled fish (0.4%), tree nuts (0.5%), peanut (0.6%), and shellfish (2%) which usually persist throughout life [2,6].

Understanding the relationship between asthma and food allergy in order to treat and manage these children safely is crucial to clinicians. Therefore, this study aimed to find the association between family history of bronchial asthma and the risk of developing food allergy.

Study objectives

1. To found if there are any association between bronchial asthma and food allergy.

2. Early identification of symptomatic food allergy and management.

METHODOLOGY:

This study is a cross-sectional study was done among parents of children (1-14 years) with asthma and developed food allergy later on, at Al-Madinah region, Saudi Arabia. The study was performed at period from December 2020 to December 2021.

This study was performed using an electronic questionnaire consisting of 29 multiple choice questions, in Arabic language, divided in 3 sections. The first section contains questions related to general and personal information. The second section contains diagnostic questions that help to obtain information from the parents about the medical history of their children. The third section contains questions about family history of children.

Participation in the study was voluntary, and did not involve financial or any other compensation.

The collected data were analyzed using statistical analysis software SPSS23.0. Descriptive data were expressed as frequencies and percentages.

RESULTS:

Section 1: general and personal information

The number of participants who participated to answer the questionnaire are (89) including (48) females which are 53.9%, and (41) males which are 46.2%.

Regarding the child age, about 22.5% of the participant's children were from 1 year to 3 years old, and about 32.6% were more than 3 years to 6 years old, also, about 11.2% of the participant's children were more than 6 years to 9 years old, about 14.6% of the participant's children were more than 9 years to 12 years old, and about 19.1% were more than 12 to 14 years old.

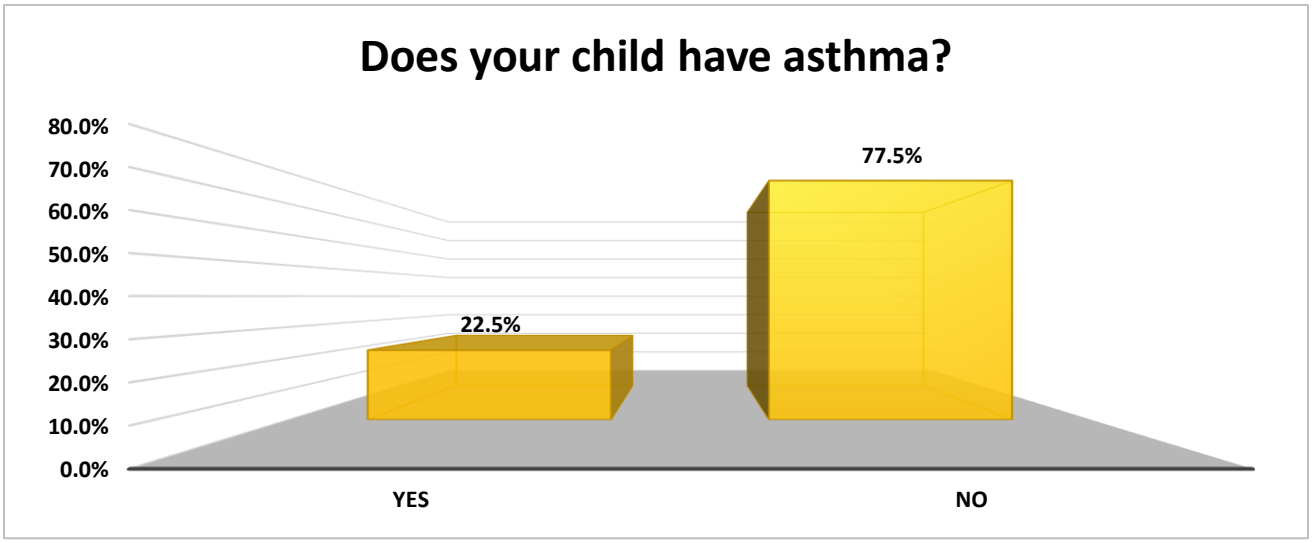
Regarding the number of brothers of the child, about 51.7% of the participant children have less than 3 brothers, about 28.1% of them have 3-5 brothers, and about 20.2% of the participant children have more than 5 brothers.

Table 1

N=89	Frequency	Percent
Gender		
Male	41	46.1
Female	48	53.9
Child age		
1 to 3 years	20	22.5
More than 3 to 6 years	29	32.6
More than 6 years to 9 years	10	11.2
More than 9 years to 12 years	13	14.6
More than 12 to 14 years old	17	19.1
Number of Brothers		
Less than 3 brothers	46	51.7
From 3-5 brothers	25	28.1
More than 5 brothers	18	20.2

Asthma:

Regarding Asthma, about 22.5% of the participant's children have asthma, as shown in the following figure:



Section 2: diagnostic questions that help to obtain information from the parents about the medical history

Regarding children with asthma, 85% of the children have asthma for more than a year.

Also, about 95% of the children who have asthma were diagnosed with asthma by a hospital doctor.

About 80% of the children with asthma had complained of an asthma attack in the past 12 months, and about 30% of the children needed to be hospitalized due to an asthma attack.

About 75% of the children with asthma went to the hospital for emergency visits in the last 12 months due to an asthma attack ,

For those who went to the hospital, about 40% of them visited the hospital 1-2 times due to an asthma attack, and about 20% visited the hospital 3-4 times, while about 40% visited the hospital more than 4 times.

Table 2

N=20	Frequency	Percent
How long (in years)		
less than one year	3	15.0
More than a year	17	85.0
Was the child diagnosed with asthma by a hospital doctor?		
Yes	19	95.0
No	1	5.0
Has your child complained of an asthma attack in the past 12 months		
Yes	16	80.0
No	4	20.0
During the last 12 months, did your child need to be hospitalized due to an asthma attack		
Yes	6	30.0
No	14	70.0
Emergency visits were there in the last 12 months due to an asthma attack		
didn't go to the hospital	5	25.0
went to the hospital	15	75.0
If answer is yes: How many hospital visits are due to an asthma attack		
1	2	13.3
2	4	26.7
3	2	13.3
4	1	6.7
5	1	6.7
7	1	6.7
Other	4	26.7

Food and drug allergy

About 70% of the children with asthma indicated that their child uses preventive medicine for chest allergies.

About 75% of the children with asthma use spray medicines when necessary for chest allergies.

About 65% of the children with asthma indicated that their child gets better after using allergy chest sprays.

About 75% of the children with asthma have a food allergy.

Regarding if the child has an allergy to one of the following foods, about 35% have an allergy to Egg, 15% have an allergy to Peanuts, 5% has an allergy to Fish, 5% have an allergy to Wheat, 15% have an allergy to Nuts ,

When the children with asthma eat a certain type of food, about 55% of them will have Vomiting and Diarrhea, about 10% of them will have Swollen lips and difficulty breathing, and about 10% of them will have Skin patches and itching.

About 15% of the children with asthma have experienced anaphylactic shock, and they go to the hospital and take an adrenaline syringe.

About 45% of the children with asthma were tested for IgE food allergy.

For about 15% of the children with asthma the food allergy test was done by taking a blood sample, and about 25% of them made the test percutaneously, while about 5% of them made a clinical examination.

About 40% of the children with asthma get better when using Antihistamine, and about 5% only of them get better when using an adrenaline needle ,

About 55% of the children with asthma that asthma attacks reduce when staying away from certain foods.

About 25% only of children with asthma have an asthma attack when exposed to a certain food smell.

About 30% of children with asthma have an asthma attack when exposed to allergens

About 30% of children with asthma suffer from eczema.

Table 3

N=20	Frequency	Percent
Does your child use preventive medicine for chest allergies?		
Yes	14	70.0
No	6	30.0
Does your child use spray medicines when necessary for chest allergies?		
Yes	15	75.0
No	5	25.0
Does your child get better after using allergy chest sprays		
Yes	13	65.0
No	7	35.0
Does your child have a food allergy?		
Yes	15	75.0
No	5	25.0
Does your child have an allergy to one of these foods		
Egg	7	35.0
Fish	1	5.0
Peanuts	3	15.0
Wheat	1	5.0
Nuts	3	15.0
Does not suffer from food allergy	5	25.0
When your child eats a certain type of food, does it happen to your child		
Vomiting and Diarrhea	11	55.0
Swollen lips and difficulty breathing	2	10.0
Skin patches and itching	2	10.0
Does not suffer from food allergy	5	25.0
Has your child experienced anaphylactic shock, and he go to the hospital and take an adrenaline syringe?		
Yes	3	15.0
No	17	85.0
Your child been tested for IgE food allergy		
Yes	9	45.0
No	11	55.0
How was the food allergy test done?		
By taking a blood sample	3	15.0
Percutaneously	5	25.0
Clinical examination	1	5.0
Does your child get better when using		
Antihistamine	8	40.0
Adrenaline needle	1	5.0
Other	11	55.0
Do asthma attacks reduce when your child stays away from certain foods		
Yes	11	55.0
No	7	35.0
I don't know	2	10.0
Does your child have an asthma attack when exposed to a certain food smell		
Yes	5	25.0
No	15	75.0
Does your child have an asthma attack when exposed to allergens		
Yes	6	30.0
No	14	70.0
Does your child suffer from eczema?		
Yes	6	30.0
No	14	70.0

Section 3: questions about family history

About 55% of the children with asthma have at least one of their family has a food allergy, and about 65% of the children with asthma have at least one of their family has asthma.

Table 4

N=20	Frequency	Percent			
Does anyone in the family have a food allergy?					
No	9	45.0	**Who?**	**Freq.**	**Perc.**
Yes	11	55.0	Father or Mother	3	15.0
			Brother or Sister	3	15.0
			Uncle or Aunt	1	5.0
			Grandfather or Grandmother	1	5.0
			Other	3	15.0
Does anyone in the family have asthma?					
No	7	35.0	**Who?**	**Freq.**	**Perc.**
Yes	13	65.0	Father or Mother	5	25.0
			Brother or Sister	2	10.0
			Uncle or Aunt	3	15.0
			Grandfather or Grandmother	1	5.0
			Other	2	10.0

DISCUSSION:

Food allergy and asthma are serious health problems affecting people at all ages around the world [5,7]. Over the past few decades, rising in the prevalence of food allergy and asthma has been observed in the pediatric population [8]. Both of food allergy and asthma are closely linked [5], as 4–8% of asthmatic childhood patients have food allergies, and about and 50% of food allergies childhood patients have allergic reactions that involve acute respiratory symptoms [3]. Asthma prevalence among children in the Arabian Gulf region has been rising recently, hence asthma has become a significant public health concern [5]. Therefore, this study aimed to find the association between family history of bronchial asthma and a risk to developed food allergy.

Our study revealed relatively high prevalence of asthma among the children, as more than one-fifth (22.5%) of our participants had asthma. Our results here consistent with what Alahmadi et al. [9] found in their review for studies that were conducted at different locations in Saudi Arabia between 1986 and 2017, they found that the prevalence rates of asthma diagnosed by physicians among children in Saudi Arabia ranged between 4% and 33.7%, they found the highest prevalence rates in Najran and Al-Hofuf and the lowest in Abha and Jazan [9]. Alahmadi et al. review demonstrated a variation the prevalence of children asthma in the among different areas Saudi Arabia [9], this variation could be attributed to the largeness in Saudi Arabia area, and then variations in the altitude, humidity, and temperature in the different areas [10]. Since, Studies showed inverse relationship between the prevalence of asthma symptoms and the variations in temperature, altitude, and humidity [11]. Our findings here regarding the prevalence of children asthma is lower than that was found in Yemen during 2010 among children aged 13–14 years (14.4%) [12], and that was found in Egypt during 2016 among children aged 6–12 years (6.3%) [13]. The difference between our results and those studies results could be attributed to the difference in studies regions, times, the targeted age groups, and environmental factors.

According to our results, the majority of our asthmatic children (75%) needed an emergency visit in the last 12 months due to an asthma attack. Moradi-Lakeh et al. also reported that (62 %) of asthmatic adults had an emergency room visit at their study among Saudi adults [14]. This rates are close, and very high, which indicates the need to attention to asthma in Saudi Arabia. This numbers reveals the lack of control of asthma in Saudi Arabia, which causes the high demand for emergency care. So, there is a need to programs to reverse this trend.

However, the Ministry of Health in Saudi Arabia performed many programs to improve asthma awareness, such as the Asthma Insights and Reality in the Kingdom of Saudi Arabia (AIRKSA) to assess the level of asthma control in 2008 and another asthma initiative to promote best practices in asthma management in 2009 [14]. But there is a need to for a comprehensive program for early diagnosis and suitable management of asthma for different ages groups, because quality of life of asthmatics could become better with good management of asthma.

Asthma medicine is advancing with time, asthma management is changing continuously, but asthma treatment firstly focuses on estimating of asthma severity, the use of chronic and acute medications involving; anti-inflammatory medication, bronchodilators, and comorbidities treatment [3]. The majority of asthmatic children in our study are using preventive medicine for chest allergies, and using spray medicines when necessary which make them feeling better after using it.

The epidemiologic studies showed more support for the association between asthma and food allergy as it demonstrated a high rate of food allergies among asthmatic children [1]. But there is no enough fully knowledge about the extent to which they may impact one another, and about the way in which they influence and interact each other [3]. According to our results, about 75% of asthmatic children had food allergy. It was reported that, not always, respiratory symptoms accompany food allergic reactions, however, a synchronous diagnosis of asthma appears to worsen the general prognosis for food allergy [1]. Asthma is a risk factor for fatal food anaphylaxis [15]. González-Pérez et al. found at their study in the UK that in asthmatics there is more than doubled incidence of anaphylaxis comparing to those without asthma, as well as more severe asthmatics are at increased risk to anaphylaxis comparing to those with non-severe asthma [16]. Similar finding were found in another study in northern California, which found that in asthmatics there is five times higher risk of anaphylactic shock due to food allergies comparing to those without asthma [17].

In general, milk, wheat, peanuts, tree nuts, fish, shrimp and shellfish, eggs, and soy represent 90% of food allergens [18]. According to our results, sensitization to egg is one of the most common food allergens, followed by sensitization to nuts and peanuts. Our results here consistent with Wang & Liu who reported that sensitization to egg, one of the most common food allergens [1], And Ali who found at his study among young adult students in Kuwait that allergies to egg, milk, and nuts were the most common food allergens [19].

The major investigations for diagnosing food allergy including; taking a thorough clinical history, serum-specific IgE, the double-blinded oral food challenge, and skin prick testing [3]. In this study, less than half of children with food allergy did the IgE food allergy test. Percutaneously test was the most used procedure for food allergy testing, followed by taking a blood sample. The underuse of diagnostic food allergy testing may cause adverse consequences such as; unnecessary avoidance of particular foods, patient misdiagnosis, and adverse impact on quality of life [19]. So, there is a need to enhance using diagnostic food allergy tests.

CONCLUSION:

This study showed relatively high prevalence of asthma among the children, and the majority of asthmatic children had food allergy. Sensitization to egg is one of the most common food allergens, followed by sensitization to nuts and peanuts. This study also revealed underuse of food allergy testing.

Recommendations

1. Conducting more studies on the same topic, involving a larger number of children, in wider regions of Saudi Arabia.
2. Conducting more studies on the same issue among adults.
3. Conducting awareness campaigns about asthma in children, its risks, examination method, and appropriate management.
4. Conducting awareness campaigns about food allergy, its symptoms and appropriate examination methods.

REFERENCES:

1. Wang J, Liu AH. Food allergies and asthma. Current opinion in allergy and clinical immunology, 2011; 11:249-254.

2. Caffarelli C, Garrubba M, Greco C, Mastrorilli C, Povesi Dascola C. Asthma and food allergy in children: is there a connection or interaction?. Frontiers in pediatrics, 2016; 4:34.

3. Foong RX, du Toit G, Fox AT. Asthma, food allergy, and how they relate to each other. Frontiers in pediatrics, 2017; 5:89.

4. Burks AW, Tang M, Sicherer S, Muraro A, Eigenmann PA, Ebisawa M, Fiocchi A, Chiang

W, Beyer K, Wood R, Hourihane J. ICON: food allergy. Journal of Allergy and Clinical Immunology, 2012; 129:906-20.

5. Alsharairi NA. Diet and food allergy as risk factors for asthma in the Arabian Gulf region: current evidence and future research needs. International Journal of Environmental Research and Public Health, 2019; 16:3852.

6. Emons JA, Gerth van Wijk R. Food allergy and asthma: is there a link?. Current treatment options in allergy, 2018; 5:436-44.

7. Warren CM, Jiang J, Gupta RS. Epidemiology and burden of food allergy. Current allergy and asthma reports, 2020; 20:1-9.

8. di Palmo E, Gallucci M, Cipriani F, Bertelli L, Giannetti A, Ricci G. Asthma and food allergy: which risks?. Medicina, 2019; 55:509.

9. Alahmadi TS, Banjari MA, Alharbi AS. The prevalence of childhood asthma in Saudi Arabia. International Journal of Pediatrics and Adolescent Medicine, 2019; 6:74-7.

10. Josh M. What continent is Saudi Arabia in. WorldAtlas. com. 2017.

11. Weiland SK, Hüsing A, Strachan DP, Rzehak P, Pearce N. Climate and the prevalence of symptoms of asthma, allergic rhinitis, and atopic eczema in children. Occupational and environmental medicine, 2004; 61:609-15.

12. Bahaj S, Moharem A, Kaid A. Prevalence of asthma and allergic diseases among high school students in urban and rural communities, Yemen. The Egyptian Journal of Medical Microbiology, 2012; 38:1-5.

13. Ahmad EE, Kamel AS, Amin SA, Hashem AE. Epidemiology of Childhood Asthma in Fayoum City (District) Egypt. Pharmaceutical and Biosciences Journal, 2016; 4:67-75.

14. Moradi-Lakeh M, El Bcheraoui C, Daoud F, Tuffaha M, Kravitz H, Al Saeedi M, Basulaiman M, Memish ZA, AlMazroa MA, Al Rabeeah AA, Mokdad AH. Prevalence of asthma in Saudi adults: findings from a national household survey, 2013. BMC pulmonary medicine, 2015; 15:1-7.

15. Bock SA, Muñoz-Furlong A, Sampson HA. Fatalities due to anaphylactic reactions to foods. Journal of Allergy and Clinical Immunology, 2001; 107:191-3.

16. González-Pérez A, Aponte Z, Vidaurre CF, Rodríguez LA. Anaphylaxis epidemiology in patients with and patients without asthma: a United Kingdom database review. Journal of Allergy and Clinical Immunology, 2010; 125:1098-104.

17. Iribarren C, Tolstykh IV, Miller MK, Eisner MD. Asthma and the prospective risk of anaphylactic shock and other allergy diagnoses in a large integrated health care delivery system. Annals of Allergy, Asthma & Immunology, 2010; 104:371-7.

18. Althumiri NA, Basyouni MH, AlMousa N, AlJuwaysim MF, BinDhim NF, Alqahtani SA. Prevalence of self-reported food allergies and their association with other health conditions among adults in Saudi Arabia. International journal of environmental research and public health, 2021; 18:347.

19. Ali F. A survey of self-reported food allergy and food-related anaphylaxis among young adult students at Kuwait University, Kuwait. Medical Principles and Practice, 2017; 26:229-34.