

# Identification Of Specific IgE In Asthmatic Patients In Iraq

Ola Kamal Prof<sup>1</sup>, Zuhair Ibraheem ALmashhadani<sup>2</sup>, Mohammed Abed Jawad\*<sup>3</sup>

1, 2, 3 Al-Nisour University College/Iraq

Corresponding Author: Mohammed Abed Jawad E-mail: [mohammed.a.medical.lab@nuc.edu.iq](mailto:mohammed.a.medical.lab@nuc.edu.iq)

## ABSTRACT

A sample of 52 patients were studied to measure IgE level by ELISA. The allergen's diagnosis is sometimes carried out by going through the medical history of people & discovering the positive results for allergen's presence. The goal is to decrease Bronchial hyper responsiveness and initiate a program of preventive therapy with education of patients to what to avoid (i.e. according to the test performed [specific IgE]).

Specific IgE while carrying out blood test or skin test, and specific IgE testing is considered a confirmed test for the detection of allergy. All patients in the current sample are asthmatic attending Al-Zahraa Allergic Center in Al-Karkh Hospital. The level of IgE of 20 different allergens was measured in those patients. The result was positive for Dermatophagoides farinae in 25 patients and Birch pollen was positive in 22 patients while Alder pollen was positive in 22 patients so as for Plantain pollen. This result was comparable to USA and Canada studies.

**Keywords:** Specific IgE , Asthma , Allergic rhinitis .

## Correspondence:

Mohammed Abed Jawad  
Al-Nisour University College/Iraq

\*Corresponding author: Mohammed Abed Jawad email-address:  
[mohammed.a.medical.lab@nuc.edu.iq](mailto:mohammed.a.medical.lab@nuc.edu.iq)

## INTRODUCTION

Asthma is a longstanding common chronic inflammatory ailment of the lung's airways; hence, categorized by inconstant & repeated symptoms, which comprise breath shortness, chest tightness, coughing and episodes of wheezing [1].

Asthma occurs by an amalgamation of environmental and genetic factors which involve exposures to allergens and air pollution. This might be categorized as non-atopic and atopic. Here atopy is denotes to a susceptibility to the type 1 hypersensitivity reaction's development [2].

Moreover, nor treatment is available for the symptoms of asthma, however, could be avoided by escaping triggers like irritant and allergens, or by using the inhaled long-acting beta agonists (LABA), anti-leukotriene agents and corticosteroids [3].

Asthma occurs through a mixture of intricate & partly assumed genetic & environmental communications. Such factors effect both its responsiveness & rigorousness to cure [4]. This is assumed that escalated asthma rates are because of altering epigenetics & fluctuating factors of environment [5].

Beginning afore the age of 12 is possibly because of the genetic influence, whereas, onset subsequent to 12 is perhaps because of environmental influence [5].

Numerous factors of environment are connected to the exacerbation & development of asthma involving allergens & pollution of air along with allergens [6].

Further, Asthma is connected to the indoor allergen's exposure that comprise of mold, animal dander, cockroaches and dust mites [?].

Thus, the Spirometry is thought to be superlative test which helps in Asthma management and diagnosis [7].

There are several kinds of asthma: non-allergic Asthma, Alcohol-induced Asthma, Aspirin induced, occupational and Exercise-induced Asthma [8]. Moreover, the non-allergic Asthma is termed as non-atopic or intrinsic Asthma as well; make up amongst the cases of 10%-33% indicated negative skin test against mutual allergens & normal blood IgE level. Frequently, it initiates late in life & as compared to males, females are more common [9].

IgE is essential factor in type 1 hypersensitivity which leads to several allergic ailments like atopic dermatitis,

chronic urticarial, food allergies, allergic rhinitis, and allergic asthma. Moreover, IgE performs an essential function in reactions to allergens for instance, allergy caused by anaphylactic drug [10].

IgE-mediated allergic response are primed by IgE through the binding to receptors of Fc set up on basophils and mast cell's surface. Likewise, Fc receptors can also be seen on the human platelets, macrophages, monocytes and eosinophils [11]. The blood of Atopic patients can contains the IgEs up to ten times than that of normal level. Precisely, the IgE can identify an allergen (for example, protein like dust mite), ragweed and grass pollen, etc. consists of an exclusive long-lived contact with its high-affinity receptor Fc $\epsilon$ RI [12]. Hence, mast cells and basophils have ability to mediate the inflammatory responses, are prepared to discharge the chemicals such as some interleukins, leukotrienes and histamines [13]. Such chemicals linked to the allergic symptoms for instance, in asthma, the constriction of airways. Moreover, due to the eczema's local inflammation, improved secretion of mucus in allergic rhinitis, as well as the escalated vascular permeability, this is supposed to permit other immune cells to attain the approach to cell tissues [14]. Hence, total IgE test calculates the complete IgE number in blood, rather than the quantity of a precise category. This could be utilized to identify body's allergic response as compared to the precise allergy. Furthermore, this test might match the provided information by tests which discover the allergen-specific IgE [15].

Pollen is known as a fine to abrasive powdery substance which consists of pollen grains that are the seed plant's male micro gametophytes producing sperm cells (or male gametes). As the pollen grains consists of hard coat composed of sporopollenin, it guards the gametophytes in the procedure of their movement in flowering plants from stamens to pistil, or in coniferous plant's from male cone to female cone [16]. There are many types of pollen such as: Tree pollen like elder ash, beech, cedar, eucalyptus; Grass Pollen-Like such as Sudan, salt, conary; Weed Pollen e.g. Cockle weed, goose foot, marsh elder [17].

## MATERIALS & METHODS

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Fifty two blood sample had been collected from patients visiting Alzahraa Allergic Centers in Alkarkh Hospital and Specific IgE was measured in those samples using ELISA technique for 20 different allergens.

### **Materials**

1. Start solution (buffered protein solution)
2. Anti-IgE antibody (monoclonal antibody labeled with ligand)
3. Enzyme-labelled anti ligand (ligand conjugated to alkaline phosphatase)
4. Substrate solution (5 bromo-4chloro-3indolylphosphate and 4nitroblue tetrazolium)
5. Washing buffer (phosphate buffer, pH 7.4).

### **Procedure**

1. The membrane was washed with 1ml wash buffer
2. Two hundred & fifty  $\mu$ l of start solution was added and mixed for 1min on 30 rpm
3. Two hundred  $\mu$ l of serum was added into membrane from one end and mixed for 60min on 30rpm

4. The membrane was washed with 250  $\mu$ l of wash buffer and mixed for 5min on 30rpm
5. Two hundred & fifty  $\mu$ l of anti-IgE antibody was added and mixed for 45min on 30rpm
6. Two hundred & fifty  $\mu$ l of enzyme ligand-anti ligand was added and mixed for 20min on 30 rpm
7. Two hundred & fifty  $\mu$ l of substrate solution was added and mixed for 20 min on 30rpm and wait to dry before reading IgE level in the device

### **RESULTS & DISCUSSION**

#### **Distribution of Allergen among Asthmatic Patients**

In this research, we have collected blood sample of 52 asthmatic patients suffering from asthma and through the case our statistical work for the most allergen and how many patients who are allergic to this allergen and what is their rigorousness.

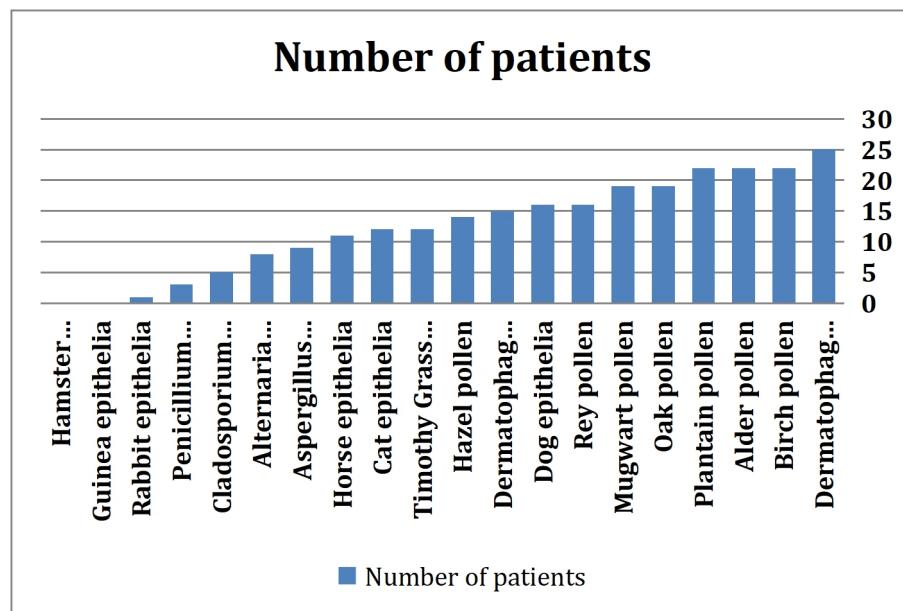
**Table 1: Type and percentage of Allergen among the suited patients**

Allergens	Number of patients
Dermatophagoides farina	25
Birch pollen	22
Alder pollen	22
Plantain pollen	22
Oak pollen	19
Mug wart pollen	19
Rey pollen	16
Dog epithelia	16
Dermatophagoides Pteronyssinus	15
Hazel pollen	14
Timothy Grass pollen	12
Cat epithelia	12
Horse epithelia	11
Aspergillus fumigatus	9
Alternaria alternata	8
Cladosporium herbarum	5
Penicillium notatum	3
Rabbit epithelia	1
Guinea epithelia	0
Hamster epithelia	0

The most allergen which noticed was Dermatophagoides farina so as birch pollen and alder pollen. These results are listed in Table 1.

The current results showed that no sensitization was noticed among the asthmatic patients; against both Guinea pig a Hamster epithelia since the Iraqi people don't breed and care for these two animals as domestic

pets. On the other hand, it was noticed that there were some types of pollen in Iraq similar to that in Canada and USA that people are allergic to like Brich, Platain, Alder, Rey and Timothy grass pollen. However, in USA the common Ragweed is the main cause of weed allergy.



**Figure 1:** A diagram shows number of asthmatic patients in Iraq for each allergen

#### Classification of IgE Levels

Concentration of IgE was distributed into classes as shown in Table 2 below. In the table the classes are

ranged from (0-6) [i.e. from <0.35 up to more than 100 Pg. / ml?]

**Table 2: Classification of IgE concentration**

Class	Conc. of IgE	Explanation
0	<0.35	No specific antibody detection
1	0.35 - <07	Very weak antibody concentration
2	0.7 - <3.5	weak antibody concentration
3	3.5 - <17.5	clear antibody concentration
4	17.5 - <50	strong antibody concentration
5	50 - <100	very strong antibody concentration
6	≥100	Extremely high antibody concentration

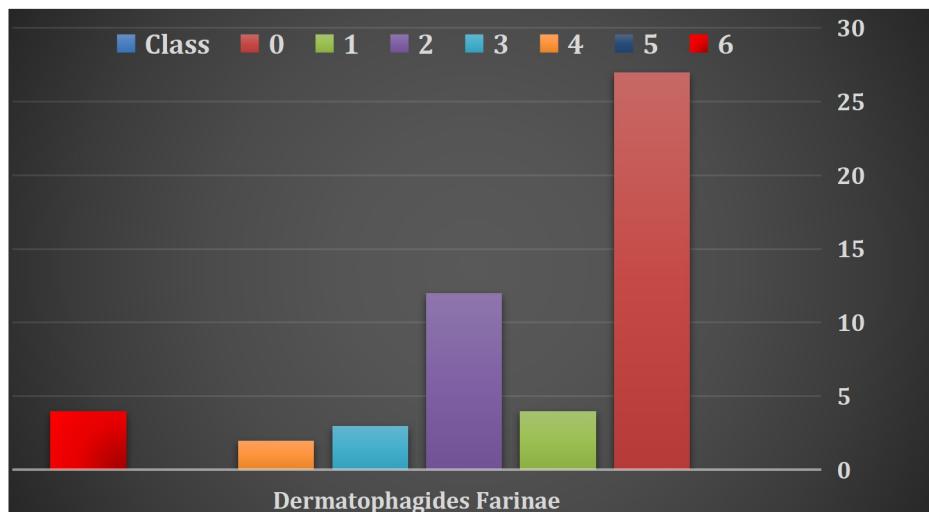
#### Distribution of Highest Allergens cases according to IgE Classes

Table 3 and figure 2 showed the frequency of IgE classes among Dermatophagoides farina allergen cases. These data illustrated that class 0 is dominant one (27 cases)

while class 2 recorded in 12 cases. The highest IgE level (i.e. ≥ 100 Pg. / ml) was recorded in 4 cases only.

**Table 3: Distribution of IgE classes within the main allergen Drematophagides farina**

Highest Allergen	Class	0	1	2	3	4	5	6
Dermatophagoides farina		27	4	12	3	2	0	4



**Figure 2:** Distribution of IgE class among Dermatophagoides farina

The confirmation of the measures' efficiency prevention is weak for the development of asthma. Hence, WHO

(World Health Organization) suggested declining risk like perfumes, chemical irritation, air pollution, tobacco smoke & inhibits the infection of lower respiratory tract. Several other promising efforts comprise of

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restrictive smoke contact in breastfeeding, utero, & augmented exposure to huge families or daycare, however, no single one of them are extremely supported to be mentioned for such indication [18-19].

Primary pet exposure might be valuable. Therefore, the outcomes from the exposure to pets are convincing at other times & are just suggested the removal of pets from home, in case if, an individual comprise symptoms of allergies to those pets [20-22].

Dietary restrictions all through pregnancy or while breast feeding is not considered efficient, therefore, not suggested [23-24]. Thus, decreasing or eradicating the compounds might be effective as these are recognized to sensitive people from place of work. Moreover, this is not yet clear that either vaccinations of annual influenza impact the exacerbations' risks. Though, the immunization is recommended by World Health Organization. Likewise, the ban of smoking effective to reduce the asthma exacerbations [25-26].

### **CONCLUSION**

It is essential to perform specific IgE test on patients suffering from Asthma and Allergic rhinitis to avoid the consecutive agent when knowing this the patient can avoid the specific allergen to decrease the Bronchial irritation and mucus over secretion which causes the distressing symptoms in patient.

The allergen differ in each country from the other, in western countries the main allergen can sing allergy are pet epithelia like Guinea , Hamster , Rabbit , Dog ,Cat , Horse

While in our country it is mostly Dermatophago ides Farinac.

### **REFERENCES**

1. Dietert RR. Maternal and childhood asthma: risk factors, interactions, and ramifications. *Reproductive toxicology*. 2011 Sep 1; 32(2):198-204.
2. Tan DJ, Walters EH, Perret JL, Lodge CJ, Lowe AJ, Matheson MC, Dharmage SC. Age-of-asthma onset as a determinant of different asthma phenotypes in adults: a systematic review and meta-analysis of the literature. *Expert review of respiratory medicine*. 2015 Jan 2; 9(1):109-23.
3. Kelly FJ, Fussell JC. Air pollution and airway disease. *Clinical & Experimental Allergy*. 2011 Aug; 41(8):1059-71.
4. Lemanske Jr RF, Busse WW. Asthma: clinical expression and molecular mechanisms. *Journal of Allergy and Clinical Immunology*. 2010 Feb 1; 125(2):S95-102.
5. Ahluwalia SK, Matsui EC. The indoor environment and its effects on childhood asthma. *Current opinion in allergy and clinical immunology*. 2011 Apr 1; 11(2):137-43.
6. Bornehag CG, Nanberg E. Phthalate exposure and asthma in children. *International journal of andrology*. 2010 Apr; 33(2):333-45.
7. Elward, Graham Douglas, Kurtis S. (2010). *Asthma*. London: Mansell Pub. pp. 27-29.
8. Ober C, Hoffjan S. Asthma genetics 2006: the long and winding road to gene discovery. *Genes & Immunity*. 2006 Mar; 7(2):95-100.
9. Halapi E, Bjornsdottir US. Overview on the current status of asthma genetics. *The clinical respiratory journal*. 2009 Jan; 3(1):2-7.
10. Martinez FD. Genes, environments, development and asthma: a reappraisal. *European Respiratory Journal*. 2007 Jan 1; 29(1):179-84.
11. Yawn BP. Factors accounting for asthma variability: achieving optimal symptom control for individual patients. *Primary Care Respiratory Journal*. 2008 Sep; 17(3):138-47.
12. Peters SP. Asthma phenotypes: non-allergic (intrinsic) asthma. *The Journal of Allergy and Clinical Immunology: In Practice*. 2014 Nov 1; 2(6):650-2.
13. Mitropoulou AN, Bowen H, Dodev TS, Davies AM, Bax HJ, Beavil RL, Beavil AJ, Gould HJ, James LK, Sutton BJ. Structure of a patient-derived antibody in complex with allergen reveals simultaneous conventional and super antigen-like recognition. *Proceedings of the National Academy of Sciences*. 2018 Sep 11; 115(37):E8707-16.
14. McCloskey N, Beavil AJ, Gould HJ, Fear D, Beavil RL, Sutton RB, Smurthwaite L, Coker RH. The biology of IgE and the basis of allergic disease. *Annual review of immunology*. 2002 Dec 30.
15. Takhar P, Smurthwaite L, Coker HA, Fear DJ, Banfield GK, Carr VA, Durham SR, Gould HJ. Allergen drives class switching to IgE in the nasal mucosa in allergic rhinitis. *The Journal of Immunology*. 2005 Apr 15; 174(8):5024-32.
16. Mamane A, Raherison C, Tessier JF, Baldi I, Bouvier G. Environmental exposure to pesticides and respiratory health. *European Respiratory Review*. 2015 Sep 1; 24(137):462-73.
17. Baur X, Sigsgaard T, Aasen TB, Burge PS, Heederik D, Henneberger P, Maestrelli P, Rooyackers J, Schlünssen V, Vandenplas O, Wilken D. Guidelines for the management of work-related asthma.
18. Lodge CJ, Dharmage SC. Breastfeeding and perinatal exposure, and the risk of asthma and allergies. *Current opinion in allergy and clinical immunology*. 2016 Jun 1; 16(3):231-6.
19. Banderali G, Martelli A, Landi M, Moretti F, Betti F, Radaelli G, Lassandro C, Verduci E. Short and long term health effects of parental tobacco smoking during pregnancy and lactation: a descriptive review. *Journal of translational medicine*. 2015 Dec; 13(1):327.
20. Bufford JD, Gern JE. Early exposure to pets: good or bad? *Current allergy and asthma reports*. 2007 Sep 1; 7(5):375-82.
21. Chen YC, Tsai CH, Lee YL. Early-life indoor environmental exposures increase the risk of childhood asthma. *International journal of hygiene and environmental health*. 2011 Dec 1; 215(1):19-25.
22. Burbank AJ, Sood AK, Kesic MJ, Peden DB, Hernandez ML. Environmental determinants of allergy and asthma in early life. *Journal of Allergy and Clinical Immunology*. 2017 Jul 1; 140(1):1-2.
23. Bunyavanich S, Rifas-Shiman SL, Platts-Mills TA, Workman L, Sordillo JE, Camargo Jr CA, Gillman MW, Gold DR, Litonjua AA. Peanut, milk, and wheat intake during pregnancy is associated with reduced allergy and asthma in children. *Journal of Allergy and Clinical Immunology*. 2014 May 1; 133(5):1373-82.
24. Netting MJ, Middleton PF, Makrides M. Does maternal diet during pregnancy and lactation affect outcomes in offspring? A systematic review of food-based approaches. *Nutrition*. 2014 Nov 1; 30(11-12):1225-41.
25. Kramarz P, DeStefano F, Gargiullo PM, Davis RL, Chen RT, Mullooly JP, Black SB, Shinefield HR, Bohlke

### *Identification Of Specific IgE In Asthmatic Patients In Iraq*

- K, Ward JI, Marcy MS. Does Influenza Vaccination Exacerbate Asthma?: Analysis of a Large Cohort of Children With Asthma. Archives of family medicine. 2000 Jul 1;9(7):617.
26. Pesek R, Lockey R. Vaccination of adults with asthma and COPD. Allergy. 2011 Jan;66(1):25-31.