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Research Paper

Evaluation of Allergic Asthma Caused by Pollen in a Group Population of Tirana

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Abstract: An allergic response occurs when immune system proteins (antibodies) mistakenly identify a harmless substance, such as tree pollen, as an invader. In an attempt to protect your body from the substance, antibodies bind to the allergen. The chemicals released by your immune system led to allergy signs and symptoms, such as nasal congestion, runny nose, itchy eyes or skin reactions. For some people, this same reaction also affects the lungs and airways, leading to asthma symptoms. The study of allergic asthma by immunological methods, and the determination of pollens as allergens is important in determining the diagnosis and avoiding, or treating, asthma. These allergens contact our body through the skin, airways and food. Pollen enters the lungs through the air and comes in contact with the mucous membranes of the nose, throat and bronchi. It has been noticed that the presence of allergens such as pollen in our country is very high, especially in Tirana. In the city of Tirana, there has been an increase in people with respiratory and food allergies, being very polluted by increased traffic, by malnutrition with fast and canned food, etc. Pollen determination methods have been applied in the city of Tirana. Individuals underwent the Alleisascreen test. It has been observed that in general the age group up to 10 years is always the most affected to any type of allergy. This test is very sensitive and determines the presence of pollen as an allergen, with a single test with a very high degree of sensitivity and the presence of the allergen. The group of individuals taken in the analysis were 100 of which 34 came out negative from the Alleisascreen test and 66 positive's cases. What is of interest in this study is that most of the population has a lack of information about allergies and pass it on as something normal. For the first time, pollen as a larynx and its connection with allergic asthma has been studied in the city of Tirana. Through biostatistical analyses we have seen the association of allergic asthma in relation to their age group, gender and place of residence.
Keywords: *Allergic asthma, pollen, pollution, Alleisascreen test, allergies,*

Introduction

Allergy is a disease which is related to immunological reactions, which are carried out in the body and as a result of an inflammation appear clinical signs such as: redness, swelling, itching, etc. It depends on several factors such as age, gender, lifestyle and genetic predispositions (Brehler & Kütting, 2001; Griffiths & Ducharme, 2013). Asthma is a long-term inflammatory disease of the airways of the lungs (Martinez, 2007; Scott & Peters-Golden 2013).

It is characterized by variable and recurring symptoms, reversible airflow obstruction, and easily triggered bronchospasms (Kumar *et al*., 2010; Robbins & Cotran, 2010). Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath (Anandan *et al*., (2010); Manniche, 1999). These may occur a few times a day or a few times per week (Cox *et al.,* 2008; Parsons *et al*., 2013). Depending on the person, asthma symptoms may become worse at night or with exercise (Cox *et al*., 2008).

Asthma is thought to be caused by a combination of genetic and environmental factors (Griffiths & Ducharme, 2013; Lemanske *et al*., 2010). Environmental factors include exposure to air pollution and allergens (Teoh *et al*., 2012; Yawn, 2008). Other potential triggers include medications such as aspirin and beta blockers (Murray & John, 2010). Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry lung function testing (Parsons *et al*.,2013). Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate (Teoh *et al*., 2012). It may also be classified as atopic or non-atopic, where

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atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction (Martinez, 2007; Vézina *et al*., 2014).

In most cases it happens that some people who have skin irritations or redness, classify it as allergy or vice versa. All this comes because of not performing diagnostic tests and not being aware of these diseases (Rusznak *et al*.,1998; Scott &Peters-Golden, 2013).

Figure 1. Skin asthma alergy

Figure 2: Asthma and pollen

Substances that cause allergies are numerous, but some are the most important: Pollen, food; dust; pollen; metals and cosmetic products. Allergies and asthma often occur together. The same substances that trigger your hay fever (allergic rhinitis) symptoms, such as pollen, dust mites and pet dander, may also cause asthma signs and symptoms (Figure1). In some people, skin or food allergies can cause asthma symptoms (Figure 2). This is called allergic asthma or allergy-induced asthma (Parsons *et al*.,2013).

An allergic response occurs when immune system proteins (antibodies) mistakenly identify a harmless substance, such as tree pollen, as an invader. To protect your body from the substance, antibodies bind to the allergen (Holgate, 1998; Janeway *et al*., 2001).

The chemicals released by your immune system led to allergy signs and symptoms, such as nasal congestion, runny nose, itchy eyes or skin reactions (Fig, 3). For some people, this same reaction also affects the lungs and airways, leading to asthma symptoms (Vézina *et al*., 2014; Yawn, 2008).

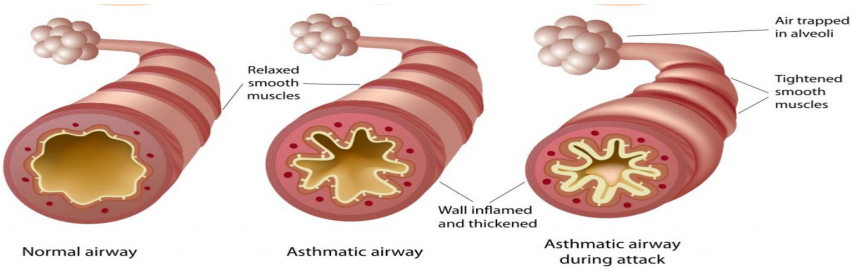

Figure 3. The influence of pollen in the respiratory airway in alergic asthma.

Materials and Methods

This work was carried out in the period January -November 2019. For the realization of this study, biological samples were collected and taken, which were collected according to the relevant procedures and stored according to appropriate conditions. During the period January -November 2019, 100 blood samples suspected of the presence of allergens were analyzed, where 59 came out positive and they received the appropriate treatment.

Two methods were used to achieve the objectives of our study:

(1) Alleisascreen Technique (MEDWISS Analytic GmbH); (2) Surveys.

The AlleisaScreen test is a very simple test to use. It is a test that analyzes blood serum and is not applied directly to the skin thus avoiding side effects (Figure 4). This test measures the amount of IgE antibodies formed as a result of a suspected allergen using a series of allergens in its composition. There are 30 types of allergens on the panel, so with a single analysis we can detect a series of allergens, which affect us in different seasons and at different times of the year. It measures the amount of IgE with the unit of measurement iU/ml; as well as measuring food and inhaler allergens. The first step is to take the blood of a person who is suspected of having allergies. Once the blood is taken, the normal procedure for obtaining blood serum is performed. The procedure for assessing the present allergens is done by several methods: Improvio scanners, CubeScreen Reader or RapidReader. Concentration of Immunoglobulin IgE in our sample is done by dividing into several classes or ranks.

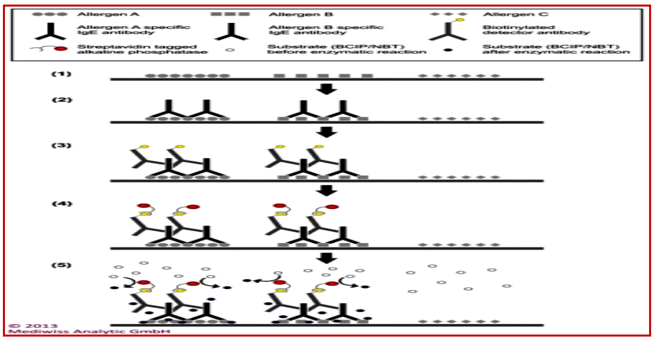

Figure 4. The scheme of action of pollen with IgE antibodies in a Allesiascreen test

Realization and discussion

The observed data were presented in mean value and in standard deviation. Discrete data were presented in absolute value and in percentage. The data were presented by means of tables and graphs of different types, type diagrams and surface diagrams. SPSS statistical package is used for data analysis. After application of the Alleisascreen test, most patients tested positive for one or more pollens, with varying degrees of positivity.

Table 1. Comparison of age groups in relation to cases of allergies

Age Groups	No. of cases	Percentage	Cum.
1-10 years old	47	91%	91%
11-20 years old	12	7.5%	98.5%
< 20 years old	7	1.5%	100.00%
Total	66	100.00%	

In Table 1, in the three groups of age 1-10 years, 11-20 years and 21-30 years, an unequal number of patients with allergies is observed. The largest number of cases is observed in the first age group from 1-10 years, with 91% of cases, the second age group with 7.5% and the third age group with 1.5% of the sample.

Table 2. Allergic plants in the area of Tirana

No.	Types of plants that cause allergies	Flowering period
	GYMNOSPERMAE	
	F. Pinaceae	
1.	*Pinus pinea* L.	April -May
2.	*Pinus sylvestris* L.	May-June
	ANGIOSPERMAE	
	F. Aceraceae	
3.	*Acer obtusatum* Kit.	April -May
	F. Amaranthaceae	
4.	*Amaranthus retroflexus* L.	August - October
	F. Araliaceae	
5.	*Hedera helix* L.	Septemeber- October
	F. Campanulaceae	
6.	*Campanula rapunculus* L.	May - Septemeber
	F. Caprifoliaceae	
7.	*Sambucus ebulus* L.	June - August
	F. Caryophyllaceae	
8.	*Stellaria media* (L.) Vill.	Spring- Autumn
	F. Compositae	
9.	*Artemisia absinthium* L.	June - Septemeber
10.	*Calendula arvensis* L.	March - April
11.	*Centaurea cyanus* L.	May - July
12.	*Chrysanthemum leucanthemum* L. (*Leucanthemum vulgare* Lam.)	May - August
13.	*Dahlia* sp	August - September

In Table 2 are presentet the types of allergic plants and flowering period which are related with the cause of allergy.

Figure 5. *Gender Cupressus L.* ***Cupressus sempervirens L*** Geographical distribution in Europe: Southern Europe

Figure. 6. Family Pinaceae. ***Juniperus communis L subsp. communis.*** Geographical distribution in Europe: throughout Europe, mainly in the mountains to the south

Figure 7. ***Thuja orientalis L.*** *Gender Thuja L* ***(Biota orientalis Endl)*** Geographical spread in Europe

Figure 8. Gender Cedrus. ***Cedrus deodora*** **(D.Don) G. Don fil.** Geographical distribution in Europe: cultivated in Europe.

Figure 9. *Gender Pinus* Geographical distribution in Europe:cultivated in Europe.

In figures from 5 to 9 are presented the main tree which produced pollen, the causer of alergic asthma in Tirana. In our study, the number of women who underwent Allesisascreen surgery was higher than that of men (54% compared to 46% of men).

The age group most affected by any type of allergy is the first one, which includes infants and children. Even from a study the most affected age group is that of children with twice the cases of adults (Lemanske et al., 2010). This is due to the complete failure of the immune system and the signs of the appearance of these symptoms such as irritation, rash to asthma are more frequent and more evident in infants and children.

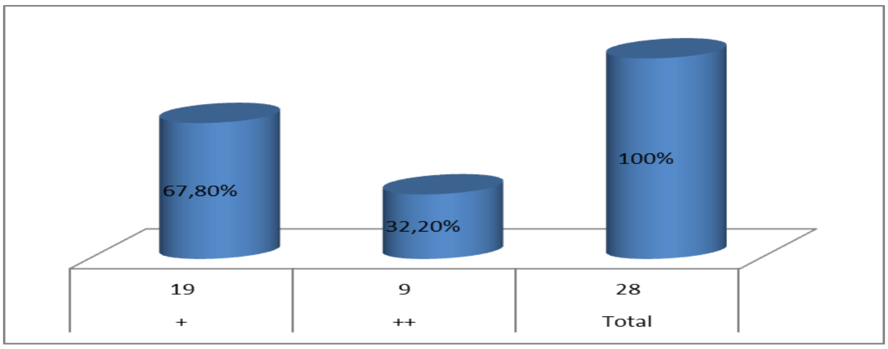

Figure 10. Division of cases according to the degree of presence of the allergen.

From the Figure 10 above we see that in 67.8% of cases we have a mild allergy, which appears with slight irritation while in 32% of cases of the tested we have a high presence of allergens. + (low presence), ++ (high presence)

Allergic asthma is very common and out of 100 individuals taken for analysis 70 of them have come to perform a test related to allergic asthma. Out of 70 individuals analyzed, 38 were positive.

Of the 38 individuals analyzed 8 are positive males and 30 are female (Table 3). So, it is obvious that women are more affected by the surveys done. This also comes as a result of the care they have for themselves by not letting an irritation pass as a common symptom.

Table 3. The degree of positivity in allergen-positive patients

Alesiascreen test positivity rate Allergic Asthma	Number of positive cases	Percentage in the group
+	32	84%
++	6	16%
Total	38	

Each analysis performed has a degree of presence of the allergen. With a (+) we will denote the lowest degree of presence of the allergen, with two (+) we will denote the highest degree of the presence of the allergen. From the analyzes performed, our test manages to capture even the lowest degree of allergen, so we have divided them into several categories: not at all or little present [0.00-0.34 IU / ml], minimum limit [0.35-0.69 IU / ml], low presence [0.70-3.49 IU / ml] sensitive presence [3.50-17.49 IU / ml], high [17.5-49.9 IU / ml], very high [50.0-100.0 IU / ml]. But since in the tests performed the low presence and sensitive presence groups were dominant, I divided them into 2 large groups.

From the table above we have marked with (+) the low degree of allergic asthma and with (++) the high degree. 84% of cases are in the low rate, while 16% are in the high rate.

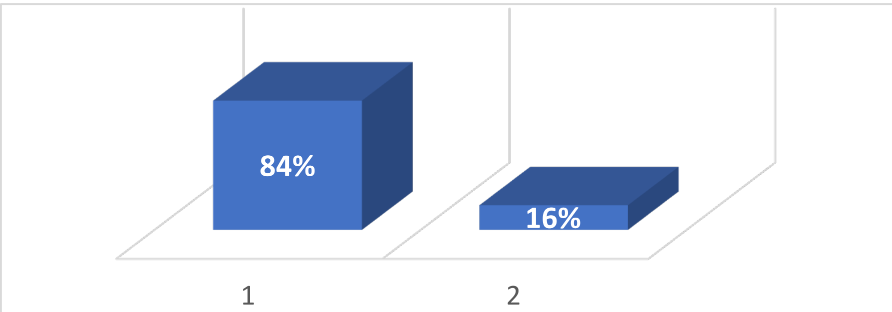

Figure 11. The degree of positivity of cases with allergies.

From the figure 11, we see that the number of cases with a low rate of allergic asthma constitute the largest number with 32 cases (84%) and those with a high rate of allergies account for 6 cases (16%). To observe the relationship that exists between gender and allergic asthma, we will use a statistical test $\chi 2$ since we have qualitative variables presented in Table 4. In this test on Table 5, what is important is the significance value, which indicates the accuracy of the test.

Table 4. The χ^2 link between gender and allergic asthma cases

		Allergic asthma cases		
		Yes	No	Total
Gender	Female	41	13	54
	Male	25	21	46
Total		66	34	100

Table 5. The Signifivance value	**ValueDf**	**Asymp. Sig. (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**
Pearson Chi-Square	5.154[a]1	0.023		
Continuity Correction[b]	4.237 1	0.040		
Likelihood Ratio	5.177 1	0.023		
Fisher's Exact Test			0.034	0.020
Linear-by-Linear Association	5.103 1	0.024		
N of Valid Cases	100			

Test value $X^2_{(1)}=5.154;p=0.023$
Since $p<0.05$, then gender is related to allergic asthma.
In conclusion we can say:

From the analyzed data, the age group most affected by allergic asthma are children in 91% of cases. In our study the gender most affected by allergic asthma is the female, with 62% of cases with allergies. In 78% of cases patients suspected of allergic asthma have not undergone testing or treatment, leading to worsening of the condition and even asthma. The most common symptoms caused by the allergen are irritation, respiratory blockage, sneezing, redness.

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