AL-Qadisiyha Journal For Science Vol.19 No. 2 Year 2014
ISSN 1997-2490 Nibras S. \ Saad Sh.

Demographical Study of Individuals with Allergy to Dust Storms in Basra

Rcevied : 4\5\2013 Accpted : 27\7\2013

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Abstract

This study was carried out in College of Medicine, University of Basra during the period between (June –September) 2011 to know the distribution of individuals in Basra with allergy to dust storms according to gender, age groups, symptoms, and family history of allergy to dust storms. 314 individuals were included in this study,238 individuals have allergy to dust storms and 76 have no allergy to dust storms and considered as controls. There was no significant difference between allergic individuals and controls according to gender and age groups. There was a significant association between allergy to dust storms and presence of symptoms of nasal secretions, eye irritation, breathing difficulties; P-value< 0.05; odds ratio (OR)=16.5 ; 95% Confidence Interval (CI)= (8.02-33.97), P-value< 0.05; odds ratio (OR)=4.22; 95% Confidence Interval (CI)= (2.30-7.74) and P-value=0.00; odds ratio (OR)=16.17; 95% Confidence Interval (CI)= (7.41-35.27) respectively. Also there was a significant association between allergy to dust storms and presence of allergy to perfume, smoke, food and drug; P-value=0.001; odds ratio (OR)= 3.93; 95% Confidence Interval (CI)= (1.63-9.52), P-value=0.01; odds ratio (OR)=2.19; 95% Confidence Interval (CI)= (1.20-3.98), P-value=0.004; odds ratio (OR)=2.43; 95% Confidence Interval (CI)= (1.34-4.42) and P-value=0.005; odds ratio (OR)=3.97; 95% Confidence Interval (CI)= (1.38-11.45) respectively. Results showed no significant association with family history of allergy to dust storms and duration of outdoors period.

Introduction

Allergy is one of four forms of hypersensitivity and is formally called *type I* (or *immediate*) hypersensitivity. This reaction results in an inflammatory response which can range from uncomfortable to dangerous. Mild allergies like hay fever are very common in the human population and cause symptoms such as red eyes, itchiness, and runny nose, eczema, hives, or an asthma attack. Allergies can play a major role in conditions such as asthma. In some people, severe allergies to environmental or dietary allergens or to medication may result in life-threatening reactions called anaphylaxis (1). Dust storms are one of the meteorological phenomena that have some differences with each other terminologically. These kinds of storms are usually occurred in arid and semi arid areas in circumstances which the blowing speed of a gale is higher than erosion threshold (2), (3). Dust storms are usually formed from smaller particles (0.05 to 0.1 mm and less) and are moving at a height far above ground level. They can be able to pass long distances and affect on several cities from one or more counties or even a continent (4). These particles in addition of some negative effects, are moving pollutant particles along with them (5), (6). It is worth mentioning that, this type of particles causes respiratory and gastrointestinal diseases in the long term (7), (8). Dust storm cause the climate change (9). Though, dust storms and particles may reduce harmful effects of ultraviolet radiation from the sun (10). Many organic dusts may account for most common exposure leading to respiratory diseases that come from dusty roads, in mining of minerals, agriculture, whether in bush burning involving farm machinery, or in confinement unit containing organic dust rich in endotoxins such as in a terminal grain elevator and silos. In addition, flaring of petroleum gases and other gases released in industries at potentially lethal concentrations (e.g. chlorine, hydrogen sulfide, ammonia etc) diesel exhausts, chemical solvents, welding fumes, infectious agents and viral diseases from animals, organic and inorganic dusts which can intensify any of the other (11). The Aim of the present study is to know the distribution of individuals with allergy to dust storms according to gender, age groups, symptoms of nasal secretions, breathing difficulties, eye irritation, allergy to other factors, family history of allergy to dust storms and duration of outdoors.

Materials and Methods:

A total of 314 individuals were included in this study (128 males and 186 females) with age groups from (15-55) years. Most of them were students and staff from different colleges in Basrah University. They were chosen randomly and each one asked to fill a special standardized questionnaire form stating all the information needed for the study; age, sex, presence of symptoms of allergy, family history of allergy. The diagnosis of allergy to dust storms and other kind of allergies in those individuals was according to the clinical diagnosis. This study was carried out during the period between (June-September) 2011.

Statistical Analysis

For qualitative variables, frequency data were summarized as percentage. Statistical significant of differences between two groups was tested by Pearson Chi-square (χ^2) with Yates' continuity correction. Risk was estimated using Odds ratio (OR) and 95% confidence interval (95% CI). P-value was determined by Fisher's exact test, P- value (P) of (< 0.05) was considered statistically significant. While P-value (> 0.05) was considered not significant (NS). Data were analyzed using SPSS program for window (Version 10).

Results:

Distribution of allergic patients & controls according to Gender:

Table .1 showed that out of 238 individuals with allergy to dust storms, 93(72.66%) were males and 145(77.96%) were females. For control group, out of 76 individuals without allergy to dust storms, 35(27.34%) were males and 41(22.04%) were females. The results showed no significant differences between males and females when compared with control groups χ^2 =1.16 ; P=NS; OR= 0.75; 95% CI= (0.45-1.27).

Table (1) Distribution of allergic patients & controls according to Gender

Gender	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
Male	93 (72.66)	35 (27.34)	128
Female	142 (77.96)	41 (22.04)	186

χ^2 =1.16 ; P=NS; OR= 0.75; 95% CI= (0.45-1.27)

Distribution of allergic patients & controls according to Age group:

Table.2 showed that out of 238 individuals with allergy to dust storms, 102(77.27%) were from age group (≤ 20) and 136(74.73%) were from age group (>20). For controls group, out of 76, 30(22.73%) were from age group (≤ 20) and 46(25.27%) were from age group (>20). These results showed no significant association between age groups when compared with controls χ^2= 0.27; P=NS; OR= 1.15; 95% CI= (0.68-1.95).

Table (2) Distribution of allergic patients & controls according to Age group

Age group	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
≤ 20	102 (77.27)	30 (22.73)	132
>20	136 (74.73)	46 (25.27)	182

χ^2 = 0.27; P=NS; OR= 1.15; 95% CI= (0.68-1.95)

Distribution of allergic patients & controls according to presence of symptoms of nasal secretions:

Table.3 showed that out of 238 individuals with allergy to dust storms, 170 (94.44%) have nasal secretion during exposure to dust storms and 68 (50.75%) have no nasal secretion during exposure to dust storms. For controls group, out of 76, 10 (5.56%) have nasal secretion and 66 (49.25%) have no nasal secretion. The frequency of individuals have nasal secretion during exposure to dust storms when compared with controls, showed significant association between nasal secretion and allergy to dust storms χ^2 =79.96 ; P< 0.05; OR=16.5 ; 95% CI= (8.02-33.97).

Table (3) Distribution of allergic patients & controls according to presence of symptoms of nasal secretions.

Symptoms of nasal secretions	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with nasal secretions	170 (94.44)	10 (5.56)	180
without nasal secretions	68 (50.75)	66 (49.25)	134

χ^2 =79.96 ; **P< 0.05**; OR=16.5 ; 95% CI= (8.02-33.97)

Distribution of allergic patients & controls according to symptoms of eye irritation:

Table.4 showed that out of 238 individuals with allergy to dust storms, 126 (88.73%) have eye irritation during exposure to dust storms and 112 (65.12%) have no eye irritation during exposure to dust storms. For controls group, out of 76, 16 (11.267%) have eye irritation and 60 (34.88%) have no eye irritation. The frequency of individuals have eye irritation during exposure to dust storms when compared with controls, showed significant association between eye irritation and allergy to dust storms χ^2 =23.65; P< 0.05; OR=4.22; 95% CI= (2.30-7.74).

Table (4) Distribution of allergic patients & controls according to symptoms of eye irritation

Symptoms of eye irritation	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with eye irritation	126 (88.73)	16 (11.267)	142
without eye irritation	112 (65.12)	60 (34.88)	172

χ^2 =23.65; **P< 0.05**; OR=4.22; 95% CI= (2.30-7.74)

Distribution of allergic patients & controls according to symptoms of breathing difficulties:

Table.5 showed that out of 238 individuals with allergy to dust storms, 156 (95.12%) have breathing difficulties during exposure to dust storms and 82 (54.67%) have no breathing difficulties during exposure to dust storms. For controls group, out of 76, 8 (4.88%) have breathing difficulties and 68(45.33%) have no breathing difficulties. The frequency of individuals have breathing difficulties during exposure to dust storms when compared with controls, showed significant association between breathing difficulties and allergy to dust storms χ^2 =69.89; P=0.00; OR=16.17; 95% CI= (7.41-35.27).

Table (5) Distribution of allergic patients & controls according to symptoms of breathing difficulties

symptoms of breathing difficulties	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with breathing difficulties	156 (95.12)	8 (4.88)	164
without breathing difficulties	82 (54.67)	68(45.33)	150

χ^2 =69.89; **P=0.00**; OR=16.17; 95% CI= (7.41-35.27)

Distribution of allergic patients & controls according to perfume allergy:

Table.6 showed that out of 238 individuals with allergy to dust storms, 60 (90.91%) have perfume allergy and 178 (71.77%) have no perfume allergy. For controls group, out of 76, 8 (4.88%) have perfume allergy and 70 (28.23%) have no perfume allergy. The frequency of individuals allergic to dust storms and have perfume allergy when compared with controls, showed significant association between perfume allergy and allergy to dust storms χ^2=69.89; P=0.00; OR=16.17; 95% CI= (7.41-35.27).

Table (6) Distribution of allergic patients & controls according to perfume allergy

Perfume allergy	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with perfume allergy	60 (90.91)	6 (9.09)	66
without perfume allergy	178 (71.77)	70 (28.23)	248

χ^2 10.40; P=0.001; OR= 3.93; 95% CI= (1.63-9.52)

Distribution of allergic patients & controls according to allergy to smoke:

Table.7 showed that out of 238 individuals with allergy to dust storms, 92 (84.40%) have allergy to smoke and 146 (71.22%) have no allergy to smoke. For controls group, out of 76, 17 (15.60%) have allergy to smoke and 59 (28.78%) have no allergy to smoke. The frequency of individuals allergic to dust storms and have allergy to smoke when compared with controls, showed significant association between allergy to smoke and allergy to dust χ^2 =6.74; P=0.01; OR=2.19; 95% CI= (1.20-3.98).

Table (7) Distribution of allergic patients & controls according to allergy to smoke

Allergy to smoke	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with allergy to smoke	92 (84.40)	17 (15.60)	109
with allergy to smoke	146 (71.22)	59 (28.78)	205

χ^2 =6.74; **P=0.01**; OR=2.19; 95% CI= (1.20-3.98)

Distribution of allergic patients & controls according to food allergy:

Table.8 showed that out of 238 individuals with allergy to dust storms, 98 (85.22%) have food allergy and 140 (70.35%) have no food allergy. For controls group, out of 76, 17 (14.78%) have food allergy and 59 (29.65%) have no food allergy. The frequency of individuals allergic to dust storms and have food allergy when compared with controls, showed significant association between food allergy and allergy to dust χ^2 =8.78; P=0.004; OR=2.43; 95% CI= (1.34-4.42).

Table (8) Distribution of allergic patients & controls according to food allergy

food allergy	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with food allergy	98 (85.22)	17 (14.78)	115
without food allergy	140 (70.35)	59 (29.65)	199

χ^2 =8.78; P=0.004; OR=2.43; 95% CI= (1.34-4.42)

Distribution of allergic patients & controls according to family history of allergy:

Table.9 showed that out of 238 individuals with allergy to dust storms, 121 (77.07%) have family history of allergy and 117 (74.52%) have no family history of allergy. For controls group, out of 76, 36 (22.93%) have family history of allergy and 40 (25.48%) have no family history of allergy. The frequency of individuals allergic to dust storms and have family history of allergy when compared with controls, showed no significant association between family history of allergy and allergy to dust χ^2 =0.28; P=NS; OR=1.15; 95% CI= (0.69-1.93).

Table (9) Distribution of allergic patients & controls according to family history of allergy

family history of allergy	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with family history of allergy	121 (77.07)	36 (22.93)	157
without family history of allergy	117 (74.52)	40 (25.48)	157

χ^2 =0.28; P=NS; OR=1.15; 95% CI= (0.69-1.93)

Distribution of allergic patients & controls according to drug allergy:

Table.10 showed that out of 238 individuals with allergy to dust storms, 43 (91.49%) have drug allergy and 195 (73.03%) have no drug allergy. For controls group, out of 76, 4 (8.51%) have drug allergy and 72 (26.97%) have no drug allergy. The frequency of individuals allergic to dust storms and have drug allergy when compared with controls, showed significant association between drug allergy and allergy to dust χ^2 =7.42; P=0.005; OR=3.97; 95% CI= (1.38-11.45).

Table (10) Distribution of allergic patients & controls according to drug allergy

drug allergy	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
with drug allergy	43 (91.49)	4 (8.51)	47
without drug allergy	195 (73.03)	72 (26.97)	267

χ^2 =7.42; P=0.005; OR=3.97; 95% CI= (1.38-11.45)

Distribution of allergic patients & controls according to duration of outdoor:

Table.11 showed that out of 238 individuals with allergy to dust storms, 43 (91.49%) with duration of outdoor ≤ 5 hours and 195 (73.03%) with duration of outdoor > 5 hours. For controls group, out of 76, 4 (8.51%) with duration of outdoor ≤ 5 hours and 72 (26.97%) with duration of outdoor > 5 hours. These results showed no significant association between duration of outdoor and allergy to dust χ^2 =0.03; P=NS; OR=1.06; 95% CI= (0.56-2.02).

Table (11) Distribution of allergic patients & controls according to duration of outdoor

duration of outdoor	Allergic patients	Controls	Total
	N (%) 238	N(%) 76	N= 314
≤ 5 hours	193 (75.98)	61 (24.02)	254
> 5 hours	45 (75)	15 (25)	60

χ^2 =0.03; P=NS; OR=1.06; 95% CI= (0.56-2.02)

Discussion

Dust particles vary in size from coarse non-inhalable, to fine inhalable, to very fine. Coarse dust particles generally only reach as far as the inside of the nose, mouth or throat. Smaller or fine particles, however, can get much deeper into the sensitive regions of the respiratory tract and lungs. Inhaled allergens can also lead to asthmatic symptoms, caused by narrowing of the airways (bronchoconstriction) and increased production of mucus in the lungs, shortness of breath, coughing and wheezing (12). In the present study, studying the distribution of allergic patients & controls according to gender, results no significant differences between males and females when compared with control groups χ^2 =1.16 ; P=NS; OR= 0.75; 95% CI= (0.45-1.27). Studying the distribution of allergic patients & controls according to age group, results showed no significant association between age groups when compared with controls χ^2= 0.27; P=NS; OR= 1.15; 95% CI= (0.68-1.95). Studying the distribution of allergic patients & controls according to presence of symptoms of nasal secretions results showed that the frequency of individuals have nasal secretion during exposure to dust storms when compared with controls, showed significant association between nasal secretion and allergy to dust storms χ^2 =79.96 ; P< 0.05; OR=16.5 ; 95% CI= (8.02-33.97). Many allergens such as dust or pollen are airborne particles. In these cases, symptoms arise in areas in contact with air, such as eyes, nose, and lungs. For instance, allergic rhinitis, also known as hay fever, causes irritation of the nose, sneezing, itching, and redness of the eyes (13). The distribution of allergic patients & controls according to symptoms of eye irritation was studied and results showed significant association between eye irritation and allergy to dust storms χ^2 =23.65; P< 0.05; OR=4.22; 95% CI= (2.30-7.74). Commonly, particles in dust storms tend to be coarse and do not pose a serious health threat to the general public. However, some people with pre-existing breathing-related problems, such as asthma and emphysema, may experience difficulties. The most common symptoms experienced during a dust storm are irritation to the eyes and upper airways. The particle of dust contains microbial agents that account for the most common exposure to respiratory disease. It also shows that the intendment environment is playing a tremendous role in the increasing prevalence of organic dust toxic syndrome among the populace (14). The distribution of allergic patients & controls according to symptoms of breathing difficulties was studied and results showed significant association between breathing difficulties and allergy to dust storms χ^2 =69.89; P=0.00; OR=16.17; 95% CI= (7.41-35.27). Studying the distribution of allergic patients & controls according to perfume allergy showed significant association between perfume allergy and allergy to dust storms χ^2=69.89; P=0.00; OR=16.17; 95% CI= (7.41-35.27). Distribution of allergic patients & controls according to allergy to smoke was studied and the results showed significant association between allergy to smoke and allergy to dust χ^2 =6.74; P=0.01; OR=2.19; 95% CI= (1.20-3.98). Distribution of allergic patients & controls according to food allergy was studied and results showed significant association between food allergy and allergy to dust χ^2 =8.78; P=0.004; OR=2.43; 95% CI= (1.34-4.42). Allergic reactions can result from foods, insect stings, and reactions to medications like aspirin and antibiotics such as penicillin. Symptoms of food allergy include abdominal pain, bloating, vomiting, diarrhea, itchy skin, and swelling of the skin during hives. Food allergies rarely cause respiratory (asthmatic) reactions, or rhinitis (15). wide variety of foods can cause allergic reactions, but 90% of allergic responses to foods are caused by cow's milk, soy, eggs, wheat, peanuts, tree nuts, fish and shellfish. Other food allergies, affecting less than 1 person per 10,000 population, may be considered "rare (16). Distribution of allergic patients & controls according to family history of allergy was studied and results showed no significant association between family history of allergy and allergy to dust χ^2 =0.28; P=NS; OR=1.15; 95% CI= (0.69-1.93). Risk factors for allergy can be placed in two general categories, namely host and environmental factors. Host factors include heredity, gender, race, and age, with heredity being by far the most significant. However, there have been recent increases in the incidence of allergic disorders that cannot be explained by genetic factors alone (17). Distribution of allergic patients & controls according to drug allergy was studied and the results showed significant association between drug allergy and allergy to dust χ^2 =7.42; P=0.005; OR=3.97; 95% CI= (1.38-11.45). The distribution of allergic patients & controls according to duration of outdoor was studied and results showed no significant association between duration of outdoor and allergy to dust χ^2 =0.03; P=NS; OR=1.06; 95% CI= (0.56-2.02).

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دراسة ديموغرافية للاشخاص المصابين بالحساسية للعواصف الترابية في البصرة

تاريخ الاستلام : 2013\5\4 تاريخ القبول : 2013\7\27

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الخلاصة

أجريت هذه الدراسة في كلية الطب، جامعة البصرة خلال الفترة مابين (حزيران- أيلول) 2011 لمعرفة توزيع الأفراد في البصرة الذين يعانون من الحساسية للعواصف الترابية وفقا لنوع الجنس، الفئات العمرية، والأعراض، وتاريخ عائلي من الحساسية . 314 فرد ادخلوا ضمن هذه الدراسة، 128 من الذكور و 186 من الإناث. لم يكن هناك فرق معنوي بين الافراد الذين يعانون من حساسية من العواصف الترابية والاصحاء من ناحية الجنس و الفئات العمرية. كان هناك فرق معنوي بين الحساسية للعواصف الغبار ووجود أعراض إفرازات الأنف، تهيج العيون، وصعوبة في التنفس؛ $P < 0.05$؛ $OR = 16.5$، 95٪ $CI = (8.02 – 33.97)$، $P < 0.05$؛ $OR = 4.22$، 95 ٪ $CI = (2.30-7.74)$ و$P = 0.00$؛ $OR = 16.17$، 95٪ $CI = (7.41 – 35.27)$ على التوالي. كما أظهرت النتائج فرق معنوي كبير بين الحساسية للعواصف الغبار ووجود حساسية تجاه العطور، والدخان، والغذاء والدواء، $P = 0.001$؛ $OR = 3.93$، 95٪ $CI = (1.63-52.9)$، $P = 0.01$؛ $OR = 2.19$؛ 95٪ $CI = (1.20-3.98)$، $P = 0.004$؛ $OR = 2.43$، 95٪ $CI = (1.34-4.42)$ و$P = 0.005$؛ $OR = 3.97$، 95٪ $CI = (1.38 – 11.45)$ على التوالي. لم تظهر نتائج هذه الدراسة أي فرق معنوي مع التاريخ العائلي للحساسية من عواصف الغبار و فترة التواجد في الهواء الطلق.