
Epidemiological Study of the Allergic Population in the North of Gran Canaria

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The prevalence of allergic diseases has increased considerably around the world during the last few decades. Although many factors contribute to this increase, climate change is one of the most important [1]. Gran Canaria is a volcanic island located off the western coast of North Africa. It is close to the Sahara Desert—a major source of natural mineral particles—and is impacted by Saharan dust for around 30% of the year [2]. The weather on the island is hot and humid, resulting in a high prevalence of allergic asthma [3]. Reliable data on other allergic conditions are scarce. Likewise, the sensitization profile of patients from the Canary Islands has never been compared with that of patients from other parts of Spain.

We conducted a descriptive, retrospective study from January 2010 through December 2012. The study population comprised all patients over the age of 14 attended at 1 of the 6 outpatient clinics of the Allergy Department at Hospital Universitario de Gran Canaria Doctor Negrín and who agreed to participate in the study. According to the latest government statistics, the Canary Islands have 2 118 519 inhabitants, of whom 845 676 live on Gran Canaria Island (40%). Our hospital is the core health center for the north of Gran Canaria, covering the needs of 336 000 people. In this study, we present demographic and clinical data and compare them with those reported in “Alergológica 2015”, a multicenter descriptive and prospective study performed in Spain [4]. Patients underwent skin prick tests (SPT) with extracts of mite, animal dander, molds, latex, and pollens (ALK Abelló). A positive SPT was defined as a mean wheal diameter of at least 3 mm [5]. Total

Table. Results of Allergen Testing

Allergen	Positive SPT, No. (%)	Positive IgE Test, No. (%)	Mean (SD) IgE
House dust mites	900 (88.2)		
<i>Dermatophagoides pteronyssinus</i>	886 (86.8)	873 (85.5)	46.8 (41.1)
<i>Dermatophagoides farinae</i>	876 (85.8)	830 (81.3)	37.57 (35.1)
<i>Euroglyphus maynei</i>	605 (59.3)	114 (11.2)	8.83 (11.5)
Storage mites	769 (75.3)		
<i>Blomia tropicalis</i>	734 (71.9)	664 (65)	13.5 (20.5)
<i>Acarus siro</i>	394 (38.6)	178 (17.4)	8.14 (21.6)
<i>Lepidoglyphus destructor</i>	568 (55.6)	481 (47.1)	5.07 (10.1)
<i>Tyrophagus putrescentiae</i>	584 (57.2)	460 (45.1)	5.25 (9.5)
Animal epithelium	514 (50.3)		
Dog	363 (35.6)	250 (24.5)	8.09 (20.3)
Cat	377 (36.9)	270 (26.4)	8.84 (19)
Rabbit	52 (5.1)	15 (1.5)	4.5 (9.2)
Horse	50 (4.9)	22 (2.2)	3.7 (4.7)
Feathers	8 (0.8)	4 (0.4)	0.31 (0.1)
Cockroach	80 (7.8)	26 (2.6)	3.81 (8.1)
Hamster	1 (0.2)	–	–
Pollens	152 (14.9)		
<i>Artemisia vulgaris</i>	82 (8)	52 (5.1)	5.62 (14.4)
<i>Olea europaea</i>	66 (6.5)	37 (3.6)	4.52 (7.5)
<i>Lolium perenne</i>	51 (5)	–	–
Other ^a	26 (2.6)	–	–
Latex	12 (1.2)	8 (0.8)	3.84 (2.9)
Molds	27 (2.6)		
<i>Alternaria</i>	15 (1.6)	–	–
<i>Aspergillus</i>	10 (1)	–	–
<i>Cladosporium</i>	3 (0.4)	–	–
<i>Penicillium</i>	2 (0.2)	–	–
Food	139 (13.6)		
Dry fruits	36 (3.5)	–	–
Egg	7 (0.7)	–	–
Fish	4 (0.4)	–	–
Fruits	32 (3.1)	–	–
LTP	6 (0.6)	–	–
Milk	2 (0.2)	–	–
Seafood	62 (6.1)	–	–
Other foods	12 (1.2)	–	–

Abbreviation: SPT, skin prick test.

^aIncludes *Parietaria judaica*, *Poa pratensis*, *Chrysanthemum species*, *Taraxacum species*, *Anthoxanthum odoratum*, *Salsola species*, and *Phoenix canariensis*.

and specific serum IgE levels (ImmunoCap, Phadia) were determined. Qualitative variables were expressed as frequency and percentages, and quantitative variables as mean (SD). The χ^2 test was used for between-group comparisons. The consent of the Spanish Society of Allergy and Clinical Immunology (SEAIC) was requested for analysis of variables from the “Alergológica 2015” study. All analyses were performed using the R Project (Version 1.0.153). A *P* value <.05 was considered significant.

During the study period, 1022 allergic patients were recruited. The mean (SD) age was almost identical in our

series and in the Alergológica 2015 survey (32 [13] years and 33.6 [19] years, respectively). Most patients were females in both studies (66.4% and 58%, respectively). A total of 986 patients (96.6%) had rhinitis. The prevalence of persistent rhinitis (85.5%) was significantly higher than that reported in Alergológica 2015 (66%, *P*=.00149). As for severity, 667 patients (65.3%) were classified as having mild rhinitis and 299 (29.3%) moderate rhinitis. Only 18 patients (1.8%) had a severe form of the disease. The number of patients with allergic conjunctivitis was moderately low (184 [18%]). Nevertheless, there was a significant difference between the

proportion of patients with rhinitis or conjunctivitis in the study population (96.6%) and that reported in *Alergológica* 2015 (62%, $P=.0241$). The percentage of patients with asthma was also higher in our series (69.6%) than in *Alergológica* 2015 (23.4%, $P=.0147$). According to the Spanish guidelines GEMA4.2 [6], patients were classified as having intermittent (37.5%) and persistent asthma (62.5%). Only 15.9% had severe asthma; this percentage was slightly lower than those reported in the literature [7]. No significant differences were found in the percentage of patients with atopic dermatitis (29 [2.8%]) and food allergy (125 [12.2%]) compared with *Alergológica* 2015. Around 6% of the study population had had an anaphylactic reaction, mostly triggered by food (60%) and by ingestion of mite-contaminated flour (30.6%), followed by drugs (16.1%) and latex (1.2%). No specific triggers could be found in 8.1% of cases. The proportion of positive SPT results and determination of specific IgE to each allergen, as well as the mean value of specific IgE, are shown in the Table. The percentage of positive SPT results for house dust mite (HDM) was remarkably high. The mean values of specific IgE to HDM were also elevated in comparison with other allergens. Likewise, the segment of the Canarian population sensitized to *Blomia tropicalis* was significantly higher (71.9% in SPT and 65% in IgE) than percentages published by others in the same type of population (29.9% for SPT) [8].

This study shows a higher prevalence of persistent rhinitis and asthma in our series than in the population of the Spanish mainland, probably owing to the high exposure to perennial allergens as a consequence of the meteorological conditions in the Canary Islands [1]. These conditions promote the development of mites, thus explaining the high frequency of positive results with HDM allergy tests observed in our study [9]. Similarly, the high serum levels of specific IgE against HDM in comparison with other allergens tested might also be related to the high exposure to indoor allergens of the Canarian population, as previously suggested [10]. Our findings also confirmed *B tropicalis* to be a prevalent antigen in this population [8], and a higher proportion of positive allergy tests was observed. Since this type of mite has clearly been associated with warm environments, its presence is likely to increase further in the Canary Islands in the coming years.

The main limitation of our study is that only those patients attended at a tertiary reference hospital were included. Therefore, allergic patients followed up in primary care facilities or private clinics were not registered, as opposed to *Alergológica* 2015, which included outpatient units and private clinics. Additionally, our study design is different from that of *Alergológica* 2015; therefore, the 2 studies are not strictly comparable. As a consequence, selection bias cannot be ruled out, and our study may not actually represent the whole allergic population from Gran Canaria Island.

To our knowledge, this is the first study to analyze the complete sensitization profile of allergic patients in the Canary Islands, as well as the proportion of allergic diseases attended at a specialized service. Allergy and development of asthma are considerably affected by climate changes. Most studies on allergens and climate changes focus on pollens and molds [11]. Our study not only showed sensitization

to HDM to be more common in warm areas than in lower-temperature areas with a similar socioeconomic profile, but also highlighted the increased risk of developing persistent rhinitis and asthma with rising temperatures in developed countries.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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