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ORIGINAL ARTICLE

Dermatophagoides pteronyssinus: Changes in sensitisation in the past 11 years and comparison with other centres in Mexico

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Abstract
Background: House dust mites are a ubiquitous air allergen in the human habitat. It has been shown that exposure to them is a fundamental factor in sensitisation and development of atopic disease. The objective of the study was to analyse changes in sensitisation to *Dermatophagoides pteronyssinus* (*Der p.*) in children treated in a tertiary level care hospital in Mexico City for a period of 11 years and compare with other studies carried out in Mexico.
Methods: A retrospective study was performed at the Hospital Infantil de México Federico Gómez (HIMFG). Information was gathered from skin tests for *Der p.* performed in the Allergy Laboratory from January 2004 to April 2015. Patients 2–18 years old who presented for examination of some type of allergic condition and who had immediate hypersensitivity tests to *Der p.* were included in the study. Results were compared with prior reports from other institutions. Descriptive analysis and χ^2 statistics were used.
Results: A total of 8794 patients were included in the study; 49.3% of the tests (95% CI 48–50) were positive for *Der p.* The percentage of monosensitised to mites was 2.7% for *Der p.* (95% CI 2–3). A significant difference was found between the results of older patients and those <6 years old. The frequency of sensitisation had a tendency to decrease during the 11 years analysed in all age groups.
Conclusions and clinical relevance: The frequency of sensitisation to *Der p.* increased with age until reaching adolescence. In the last 11 years a decrease in sensitisation to this air allergen was observed.

Abbreviations: *Der p.*, *Dermatophagoides pteronyssinus*; HIMFG, Hospital Infantil de México Federico Gómez; *Der f.*, *Dermatophagoides farinae*.

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Introduction

The house dust mite is a ubiquitous air allergen in human habitat and is considered to be one of the most important causes of sensitisation to indoor allergens.[1,2] It is an eight-legged arthropod of the *arachnid* group, belonging to the order *Acari* and comprises a large number of species grouped under several suborders, families and genera.

The term ''house dust mites'' has been used traditionally for members of the family *Pyroglyphidae* that live permanently and almost exclusively in house dust where the main representatives (80–90%) are *Dermatophagoides pteronyssinus* (*Der p.*), *Dermatophagoides farinae* (*Der f.*), and *Euroglyhpus maynei*; whereas others such as *Blomia tropicalis* and *Lipidoglyphus destructor*, despite being considered as warehouse mites, are species commonly found in homes located in tropical and subtropical climates.[3]

It has been demonstrated that exposure to dust mites is a fundamental factor for sensitisation and development of atopic pathology.[4] The prevalence of exposure and sensitisation varies greatly according to the region studied, which greatly depends on geographic and environmental factors of the mentioned regions, i.e., in Spain a sensitisation for *Dermatophagoides* is reported in children <6 years old of 11.8%, in Germany of 11.9% and The Netherlands of 13.6%,[5] with an overall average prevalence in Europe of 21.7% (4.8–36.8%) for *Der p.*[6]; whereas in Korea the frequency of sensitisation is from 36.8 to 40.9%.[7] In Latin America the frequency depends on the study location and ranges from 60.7% to *Der p.* in Colombia to 91.2% in Brazil.[8]

According to world statistics, an estimated 1–2% of the world's population could be allergic to this allergen, i.e., equivalent to 65–130 million persons.[1] In México, various studies have been published on the frequency of sensitisation to house dust mites (Table 1).

It is well known that there are differences in the percentage of positivity reported depending on the region where the test is applied, climate, and geography, as well as the technique used, the allergen extracted, and its strength. Most studies reported in Mexico on the sensitisation to mites are cross-sectional studies with the exception of the study by Meza-Velázquez et al. where a review of 2000 records of children with asthma or allergic rhinitis over a 10-year period was included.

Mexico is located in the American Continent, in the northern hemisphere; comprising 1.9 million square kilometres of land area, with a climate from warm to cold, however, temperatures range from 10 °C to 26 °C in 93% of the territory[15] (Table 2).

The prevalence of allergic diseases is increasing, but we do not know if, in terms of desensitisation, the same occurs as well, mainly to indoor allergens such as the house dust mites. The objective of this study was to determine the annual frequency and analyse changes in the sensitisation to *Der p.* in children treated in our hospital and compare these frequencies with different reports from Mexico.

Patients and methods

A retrospective study was conducted in the Allergy and Clinical Immunology Department of the hospital, which included the data collection of skin test results to *Der p.* carried out by physicians and laboratory technicians from January 2004 to April 2015. We recruited all patients aged 2–18 years old who presented for evaluation of any type of allergic condition and those who required a skin prick test (SPT) according to ongoing guides. After the clinical history and review by a certified allergist and immunologist, subjects who met the criteria had the skin test performed to inhalants (previous consent and assent signed), among which this indoor allergen was included. Patients came principally from Mexico City, Estado de México, and surrounding areas. Demographic information for all patients was reviewed as well as the referring diagnoses. This study was approved by the Ethics, Research and Biosafety Committees from HIMFG (protocol number HIM/2015/045) following the rules of the institution.

Skin tests were done during the entire time of the study with IPI Assac® extracts which have been standardised in the same way since 1999 and commercialised as UBE/ml (equivalent biologic unit). We used the same protocol for skin prick test SPT suggested by the Global Allergy and Asthma European Network, The European Academy of Allergy and Clinical Immunology and The American Academy of Allergy, Asthma and Immunology (AAAAI).[16,17] Allergen extracts were stored at +2 to +8 °C when not in use. Before the SPT, we recorded medications taken by the patient in the previous week to avoid false positives. Tests were applied on the upper back or in the volar aspect of the forearm, at least

Table 1 Prevalence of house dust mite sensitisation in Mexico.

Authors	Year	*n*	Included locations	% Sensitisation
Meza-Velázquez et al. [9]	1999	2000	Mexico City	89% *Der p.* and *Der f.*
Cavazos et al. [10]	2008	58	Monterrey, Irapuato, Tampico	Monterrey *Der f.* 88%, *Der p.* 83% Irapuato *Der p.* 70% and *Der f.* 60% Tampico *Der p. 1 55%*
Martínez et al. [11]	2010	334	Mexico City	56.6% to 1–4 mites (*Der p.*, *Der f.*, *Blo t*, *Der s*)
Larennas-Linnemann et al. [12]	2011	4169	Multicenter	*Der p.* 46–70%
Ramírez-Heredia et al. [13]	2013	150	Mexico City	*Der p.* 82.1%, *Der f.* 71.5%
Lopez-Rocha et al. [14]	2014	672	Mexico City	*Der p. and Der f. 72.2%*