

Research Letter

Skin Sensitization and Classroom Exposure to Dermatophagoides Pteronyssinus and Dermatophagoides Farinae Allergens in Andean Ecuadorian Students

Recently, we demonstrated the abundance of mites and their allergens in cities of Ecuador [1] and suggested that *Dermatophagoides* are important sensitizing agents in bronchial asthma [2, 3]. Quito, the capital of Ecuador, is located in the Andes Mountains, at 2800 m above from sea level. Its temperature ranges from 7°C to 26°C and its annual mean relative humidity is 75%. While children's greatest exposure to indoor allergens is in the home, other public places may also be the source of significant allergen encounters. Students spend a great deal of their time in classroom, and aeroallergen exposure in the school environment could facilitate allergic sensitization and development of asthma.

As a preliminary study before launching a larger investigation related with the sensitization and exposure levels to *Dermatophagoides pteronyssinus* (Der p1) and *Dermatophagoides farinae* (Der f1) in students of Quito, we randomly selected two urban elementary school with a total of 589 students. Two hundred and seventy-three students (163 of the first school and 110 of the second school) participated in the study. Their age ranged from 5.7 years to 20.7 years with a mean of 12.3 years. One hundred and twenty-five (45.7%) were males and 148 (54.2%) females. Skin prick tests were conducted on the volar surface of the forearms using standardized extracts of *D. pteronyssinus*, *D. farinae*, *Lepidoglyphus destructor*, *Tyrophagus putrescentiae*, grasses mix (*Dactylis*

glomerata, *Festuca pratensis*, *Poa pratensis*, *Phleum pratensis* and *Lolium perenne*), weeds mix (*Artemisia vulgaris*, *Chenopodium album*, *Parietaria judaica*, *Plantago lanceolata* and *Taraxacum officinale*), dog and cat dander and mould mix (*Alternaria tenuis*, *Chaetomium globosum*, *Cladosporium fulvum*, *C. herbarum*, *Fusarium* sp., *Aspergillus amstelodami*, *A. fumigatus*, *A. niger* and *A. terreus*) (Laboratorios LETI, Tres Cantos, Madrid, Spain). Dust samples were collected from 10 classrooms of each school and Der p1 and Der f1 allergen levels were quantified by ELISA using monoclonal antibodies (Indoor Biotechnologies, VA, USA). Out of the 273 students tested, 94 (34.4%) had skin sensitizations to at least one allergen. The main sensitizer was *Dermatophagoides* with 41 (25.1%) and 39 (23.9%) of the 163 students of the first school and 43 (39%) and 33 (30%) of the 110 students from the second school sensitized to *D. pteronyssinus* and to *D. farinae*, respectively (Table 1). The other allergens tested produced statistically lesser sensitizations than those obtained with *Dermatophagoides*. High Levels of Der p1 [geometric mean of 6.76 µg/g (range 3.4–77.7 µg/g)] and Der f1 [5.93 µg/g (range 1.6–79.5) µg/g] were found in 50% of the dust samples collected (Table 2) in the second school. In most cases, allergen levels exceeded the concentrations that have been proposed for sensitization and presence of symptoms [4]. There were not detectable levels of Der p1 and Der f1 in the dust samples collected in the first school. It might be possible that some of the sensitizations to *Dermatophagoides* in our students could be developed through classroom exposure to high levels of Der p1 and Der f, specially in the second school studied.

TABLE 1
Positive skin tests to *Dermatophagoides* spp. among the 273 students, divided by age and sex groups

	School 1			School 2		
	Students (N)	Positive test, N (%)		Students (N)	Positive test, N (%)	
Age (years)						
5–10	133	38	28.5	43	17	39.5
11–15	30	12	40	44	20	45.4
16–20				23	6	26
Sex						
Male	78	25	32	47	21	44.6
Female	88	25	29.4	63	22	34.9
Total	166	50	30.6	110	43	39

Differences were not statistically significant to compare the students sensitized to *Dermatophagoides* in any age group.

TABLE 2
Der p1 and Der fl levels in 10 classroom dust samples collected in the second school

Allergen	Sample size	Geometric mean (range)
Der p1		
% > 0 µg	50	6.7 (3.4–77.7)
% > 2 µg	30	
% > 10 µg	20	
Der fl		
% > 0 µg	50	5.9 (1.6–79.5)
% > 2 µg	40	
% > 10 µg	10	

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