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ORIGINAL ARTICLE

Exposure to dogs but not cats is associated to a decrease in the prevalence in atopic dermatitis amongst school-children

M. Bedolla-Barajas^{a,*}, J. Morales-Romero^b, T.I. Bedolla-Pulido^c, T.R. Bedolla-Pulido^a,
C. Meza-López^d, N.A. Pulido-Guillén^e

^a Servicio de Alergia e Inmunología Clínica, Hospital Civil de Guadalajara "Dr. Juan I. Menchaca", Salvador de Quevedo y Zubieta No. 750, Colonia La Perla, C.P. 44340, Guadalajara, Jalisco, Mexico

^b Instituto de Salud Pública, Universidad Veracruzana, Av. Luis Castelazo Ayala s/n., Colonia Industrial Ánimas, C.P. 91190, Xalapa, Veracruz, Mexico

^c Centro Universitario de Ciencias de la Salud, Universidad de Guadalajara. Sierra Mojada No. 950, Colonia Independencia Oriente, C.P. 44340, Guadalajara, Jalisco, Mexico

^d División de Pediatría, Hospital Civil de Guadalajara "Dr. Juan I. Menchaca", Salvador de Quevedo y Zubieta No. 750, Colonia La Perla, C.P. 44340, Guadalajara, Jalisco, Mexico

^e Psicología Clínica, Eulogio Parra No. 2330-301, Col. Las Américas, C.P. 44650, Guadalajara, Jalisco, Mexico

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KEYWORDS

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Dogs;
Cats

Abstract

Introduction: The association regarding the exposure to pets, especially cats and dogs, and the prevalence of allergic diseases is inconsistent.

Objective: We analyzed the role played by early exposure to dogs or cats in the prevalence of allergic diseases amongst school-aged children.

Method: Through a cross-sectional study, we examined 756 children, aged 6–7; these candidates were selected through cluster sampling. We inquired about the exposure that these children had had to dogs and cats, and whether these pets spent most of their time indoors or outdoors during the first year of the child's life. In order to identify the prevalence of allergic diseases and their symptoms, each child's parent completed the *International Study of Asthma and Allergies in Childhood* questionnaire.

Results: Exposure to outdoor dogs was associated to nocturnal coughing, odds ratio (OR) 0.64, with a confidence interval of 95% (95% CI) 0.43–0.95 and with atopic dermatitis (OR: 0.39; 95% CI: 0.20–0.76). Interestingly, exposure to outdoor cats was associated to nocturnal coughing (OR: 0.51; 95% CI: 0.32–0.83) and current rhinitis symptoms (OR: 0.59; 95% CI 0.36–0.97). After carrying out the multivariate analyses, only exposure to dogs, both indoor and outdoor, was significantly associated to a decrease in the prevalence of atopic dermatitis OR 0.40 (95% CI: 0.20–0.79) and OR 0.38 (95% CI: 0.18–0.83), respectively.

* Corresponding author.

E-mail address: drmbedbar@gmail.com (M. Bedolla-Barajas).

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Conclusion: Our findings suggest that exposure to dogs, whether they be indoor or outdoor pets, is associated to a decreased prevalence in atopic dermatitis.

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Introduction

On a global level, there is controversy regarding the role that interaction with dogs or cats plays in the development of allergic diseases. Through epidemiological studies have proven that pets are a risk factor when it comes to the development of asthma, allergic rhinitis and atopic dermatitis^{1,2}; on the other hand, there is also evidence that has demonstrated that pets actually act as protective agents³⁻⁵; moreover, there are additional studies that have found pets to be irrelevant factors in the matter.^{6,7}

There is also discrepancy concerning the type of pet that could be associated to the development of these allergic diseases, since there are places in the world where farm animals are considered children's pets,⁸ in some cases fish, birds and rodents act as childhood companions^{2,7}; yet, only cats and dogs have been studied consistently. In Mexico, the role that cats and dogs play in the prevalence of allergic diseases has only been studied a handful of times.

In Mexico, the role that the exposure to dogs and cats plays in the development of the prevalence of allergic diseases has rarely been studied.^{2,8-11} In our country, the most common household pets are cats and dogs, notably the interaction with these pets can vary, as some Mexican families tend to allow their pets to live indoors. The study at hand aims to evaluate how early exposure to dogs or cats affects the prevalence of allergic diseases amongst school-aged children, and whether it makes a difference if these pets reside indoors or outdoors.

Methods

Design and sample size

For this cross-sectional study, we included boys and girls, aged 6–7, all of whom attended primary schools in the city of Guadalajara, Mexico. The study universe consisted of 30,234 children from the 2013 to 2014 school year, distributed throughout 705 public and private schools.

Sampling procedure

For a detailed description of the sampling procedure, read above.¹² In brief, children were incorporated into our study through stratified conglomerated sampling, from April to December of 2014, Fig. 1. The city of Guadalajara is divided into seven administrative districts, each of these regions was contemplated as a stratum; through the proportional assignment technique we obtained a sub-sample from each area, we then multiplied the total sample size by the proportion of

registered students in each district. Through random selection, we chose at least one school (conglomerate) within each district (stratum), and when it was necessary, we selected more schools in order to obtain the required sub-sample size.

Questionnaire

Our inquiry form was structured, and it included questions regarding each family's medical history of allergic diseases for both parents, as well as any previous medical diagnoses of atopic diseases for each child. In order to identify children with allergic diseases, we applied *The International Study of Asthma and Allergies in Childhood* (ISAAC) questionnaire to parents of the children. We also asked whether or not each child had been exposed to dogs or cats during the first year of life, and whether this pet had been a predominantly indoor or outdoor pet.

Ethics

This study was approved by the Ethics and Research Committees at The Hospital Civil de Guadalajara Dr. Juan I. Menchaca; furthermore, this study received support from the Secretaría de Educación del Estado de Jalisco. Most importantly, each parent or guardian, along with his or her child, signed a written consent form in order to participate.

Analysis

The prevalence of allergic diseases and their symptoms was estimated by dividing the number of subjects that answered each question affirmatively in The International Study of Asthma and Allergies in Childhood questionnaire, by the total number of subjects in the study group, additionally, we estimated confidence intervals for proportions. In order to identify a possible association between allergic diseases and the exposure to dogs and cats, we calculated the odds ratio (OR) and their respective Confidence Intervals to measure the magnitude of this association. We employed logistic binary regression to estimate the adjusted OR (ORa), in which the dependent variable was atopic dermatitis and the independent covariates were: exposure to dogs (indoor or outdoor), sex, family history of atopy, personal history of atopy, a cesarean birth, and breastfeeding. The values $p \leq 0.05$ served as a means to establish statistical significance. Analysis of the data was performed by using the IBM SPSS program, version 20.0 for Windows (Armonk, NY, USA).

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