

## Research Article

# Prevalence of Allergic Rhinitis and Associated Factors in a Primary Care Unit in Tijuana, Mexico

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## Abstract

**Background:** Allergic rhinitis is defined as the presence of nasal congestion, anterior or posterior rhinorrhea, sneezing and nasal pruritus. The prevalence in Mexico determined by epidemiological studies is 13%. Some of the associated factors are history of atopy, exposure to cigarette smoke and pets.

**Aim:** The purpose of this study is to determine the frequency of allergic rhinitis and associated factors in patients from 2 to 12 years in the family medicine unit #27.

**Design and Setting:** Analytic cross-sectional study.

**Methods:** In 209 patients in the Family Medicine Unit #27, Tijuana, Mexico, an analytic cross-sectional study was conducted in patients from 2 to 12 years old. We obtained general data such as age, atopy history, pets at home, exposure to cigarette smoke and the prevalence of allergic rhinitis with the diagnostic tool "allergic rhinitis diagnostic questionnaire for epidemiological studies". For statistical analysis, we applied descriptive statistics; for qualitative variables frequencies and percentages were used and for quantitative variables median and interquartile range. In the bivariate analysis, odds ratio and Chi-square were used with a 95% confidence interval, a  $p < 0.05$  was considered significant.

**Results:** The overall prevalence obtained was 20% of which 12% are male and 10% schoolchildren. The factor associated with statistical significance was the family history of atopy ( $p < 0.001$ ). 13% of the positives did not have pets and 18% had no exposure to cigarette smoke at home.

**Conclusion:** The prevalence obtained was higher compared to the general average of national studies that used the same questionnaire.

**Keywords:** Allergic Rhinitis; Prevalence; Atopy

## Introduction

The World Allergy Organization (WAO) defines allergic rhinitis (RA) as the presence of nasal congestion, anterior or posterior rhinorrhea, sneezing and nasal pruritus secondary to inflammation of the nasal mucosa mediated by immunoglobulin E [1]. Allergic rhinitis is characterized by epithelial accumulation of inflammatory cells (mast cells, basophils and eosinophils) in the nose, which when interacting with immunoglobulin E (IgE) antibodies that have been in contact with allergens, release histamine and other inflammatory substances, resulting in the symptoms of RA [2].

The recognized risk factors for RA include atopy, asthma, eczema and other allergic diseases, others more controversial are the presence of pets in the home, vitamin D, obesity, exposure to cigarette smoke, increased total serum IgE, increased blood eosinophils and other common environmental exposures in urban settings [3-7]. The diagnosis is usually clinical, based on the clinical history, characteristic symptoms and good response to empirical treatment with nasal antihistamine or steroid; the definitive diagnosis is through evidence of sensitization, either by the presence of specific IgE or by positive skin tests in the presence of disease symptoms [8].

There is no accepted gold standard for detecting allergic rhinitis, but there are validated instruments to detect the disease. The most used questionnaire in epidemiological studies is the International Study of Asthma and Allergies in Childhood (ISAAC). The ISAAC study is a global initiative that has allowed a better understanding of the prevalence of allergic diseases and their geographical variations, is validated for application in a population of 6-7 and 13-14 years, provides the prevalence of allergic rhinitis symptoms, asthma and atopic dermatitis [9]. In Mexico there is another instrument called "diagnostic questionnaire of allergic rhinitis for epidemiological studies", which was developed by Mancilla-Hernández, this tool establishes the diagnosis by a score and detects the prevalence of the disease; it is characterized by being simple and validated for Mexican population [10].

The global prevalence of childhood allergic rhinitis can be up to 40%, is more frequent during the school stage and affects the daily life of children. Epidemiological studies show that cases increase every year and about 400 million children suffer from it [11]. In Mexico there are no specific national data on RA, but there are studies that offer us a regional information using the "allergic rhinitis diagnostic questionnaire for epidemiological studies"; in Puebla a prevalence

of 15% was determined; Tulancingo (Hidalgo), 17%; Tlaxcala, 8%; Cancun, 14% [12] and Cuernavaca (Morelos), 12% [13]; with an average of 13.2% in the five cities. The objective of the research was to determine the prevalence of allergic rhinitis in the family medicine unit #27 in Tijuana, Mexico.

## Materials and Methods

### Study scenario

The family medicine unit #27 is located in the southeastern region of the city of Tijuana, is the largest primary care clinic in northwestern Mexico and serves 325,513 beneficiaries of medium and low socioeconomic status mainly. Tijuana is the sixth most populous city in Mexico with 1.6 million inhabitants, the climate is dry and very dry with temperatures ranging from 5°C to 30°C. Rains are very scarce with an average rainfall of 200 millimeters per year, mainly in the cold seasons [14].

### Study design and population

An analytic cross-sectional study was conducted in Tijuana, Baja California, Mexico, between October and December 2018. The research was carried out in the family medicine unit number #27 (UMF 27) of the Instituto Mexicano del Seguro Social (IMSS), it is a primary care unit and the main health care center in the region. Patients from 2 to 12 years old who agreed to participate in the study by informed assent and informed consent by parents were included. Children with neurological, psychiatric and allergic diseases in treatment were excluded from the study; the patients were recruited in the waiting rooms of family medicine.

### Analyzed variables

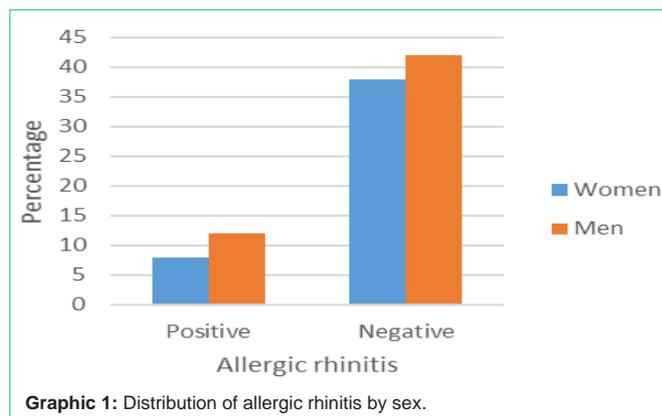
The collection of variables was done with a standardized data sheet; the variables collected were the following: age, which was collected directly from the patients and their medical card; sex, through phenotypic characteristics; exposure to cigarette smoke in the home, where the family was questioned about the presence of this addiction in any member of the family; pets in the home, asking directly if they had any animals at home. The diagnosis of allergic rhinitis was made with the Mexican questionnaire “diagnosis of allergic rhinitis for epidemiological studies”, which was validated in 2014 with a cronbach alpha of 0.7 designed for children and adults, consisting of eleven items, taking a score as a diagnosis greater than or equal to 0.75 [10].

### Statistical analysis

In the qualitative variables we use frequencies and percentages; for quantitative variables, median and interquartile range. The frequency of allergic rhinitis was determined using the formula for punctual prevalence. The normality of the data was performed using the Kolmogorov-Smirnov test. Chi-square analysis was performed to show differences in categorical variables and the odds ratio for relative risk was used. The results were evaluated in a 95% confidence interval, a  $p < 0.05$  was considered significant. For data analysis, the IBM SPSS program, version 20 (Armonk, NY, USA) was used.

### Ethics

The study was approved by the local health ethics and research committee number 204; with registration number R-2018-204-036. The research was conducted under the general health law on



Graphic 1: Distribution of allergic rhinitis by sex.

health research, the Helsinki declaration and bioethical principles. The parents of the minors signed the informed consent and the participants informed assent.

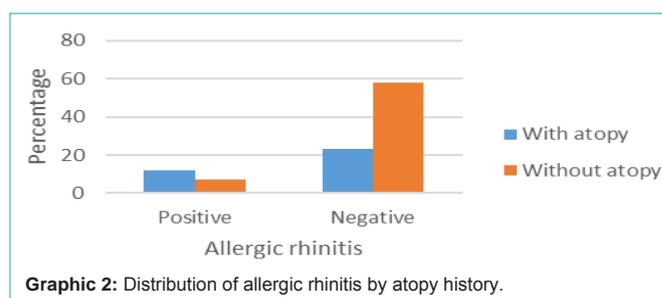
## Results

209 surveys were applied to the parents of preschool, school and adolescent patients of the UMF #27. The age distribution was from 2 to 12 years with an average of  $5.83 \pm 2.93$ . According to the age group: 42% were preschoolers, 44% schoolchildren and 14% teenagers. Of these patients, the prevalence of allergic rhinitis was 20% (n=41). Negative and positive cases by sex are shown in graphic 1. In the prevalence of allergic rhinitis by age groups we found that it was more frequent in schoolchildren (n=21), followed by preschoolers (n=13) and adolescents (n=7). The mean age of patients with allergic rhinitis was  $6.46 \pm 3$ .

In the factors associated with allergic rhinitis, the family history of atopy had statistical significance ( $p < 0.001$ ) with a odds ratio of 4.4 (95% CI, 2.1-9.1). In graphic 2 we can observe the prevalence of atopy family history. Exposure to cigarette smoke at home of patients with allergic rhinitis was 18% (n=37). Of the patients with allergic rhinitis, most did not have pets.

## Discussion

Mancilla-Hernández applied the diagnostic questionnaire of allergic rhinitis to 150 parents with children 2-12 years old, they obtained an average age of  $6 \pm 2.1$  years; this result is similar to our study [10]. The result of the prevalence of allergic rhinitis was 20%, therefore it is a higher percentage when compared to the prevalence of 13% reported by Mancilla-Hernández in Puebla, Tulancingo, Tlaxcala, Cuernavaca and Cancun [12], where the prevalence was also obtained from the test “diagnostic questionnaire of allergic rhinitis”.



Graphic 2: Distribution of allergic rhinitis by atopy history.

The prevalence with ISAAC methodology was 24% in Ciudad Victoria, Mexicali, Monterrey and Tijuana [15], very similar to our study, however, it is mentioned that there are wide variations in different states, we do not use this questionnaire to determine the prevalence but the ISAAC questionnaire is a standardized and widely accepted tool to compare regional differences in the prevalence of asthma and allergic diseases [16]. It was confirmed that rhinitis is more prevalent in the school stage, a result different from that reported by Lee who mentioned that it is more prevalent during the primary school stage [17]. Although exposure of cigarette smoke at home and the presence of pets inside the home had no statistical significance, Saulyte reported a significant association of passive smoking with allergic rhinitis [18].

Varona-Pérez found that the risk factors for allergic rhinitis were the following: smokers at home, presence of dogs, family history of allergy and asthma, identifying the latter as the most important [19]. Only the family history of atopy coincides with that obtained in our study. In conclusion, all our objectives were satisfactorily met, we found that the prevalence obtained was higher than the general average of national studies that used the same questionnaire. Therefore, during the medical evaluation we must consider that patients with a family history of atopy will have an increased risk of allergic rhinitis and subsequently the diagnosis will have to be confirmed with a validated instrument like the one used in our research.

## References

- Organización Mundial de Alergia. Libro blanco de la WAO sobre alergia: actualización del resumen ejecutivo de 2013. Milwaukee (WI): WAO. 2013.
- Bousquet J, Khaltaev N, Cruz AA, Denburg J, Fokkens WJ, Togias A. Allergic Rhinitis and its Impact on Asthma (ARIA). *Allergy*. 2008; 63: 8-160.
- Sultész M, Katona G, Hirschberg A, Gálffy G. Prevalence and risk factors for allergic rhinitis in primary schoolchildren in Budapest. *Int J Pediatr Otorhinolaryngol*. 2010; 74: 503-509.
- Bedolla-Barajas M, Morales-Romero J, Robles-Figueroa M, Fregoso-Fregoso M. Asthma in Late Adolescents of Western Mexico: Prevalence and Associated Factors. *Arch Bronconeumol*. 2013; 49: 47-53.
- Skoner DP. Allergic rhinitis: Definition, epidemiology, pathophysiology, detection, and diagnosis. *J Allergy Clin Immunol*. 2001; 108: 2-8.
- Zhang YM, Zhang J, Liu SL, Zhang X, Yang SN, Gao J, et al. Prevalence and associated risk factors of allergic rhinitis in preschool children in Beijing. *Laryngoscope*. 2013; 123: 28-35.
- Baumann LM, Romero KM, Robinson CL, Hansel NN, Gilman RH, Hamilton RG, et al. Prevalence and risk factors for allergic rhinitis in two resource limited settings in Peru with disparate degrees of urbanization. *Clin Exp Allergy*. 2015; 45: 192-199.
- Wheatley LM, Togias A. Allergic Rhinitis. *N Eng J Med*. 2015; 375: 456-463.
- Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, et al. International study of asthma and allergies in childhood (ISAAC): Rationale and methods. *Eur Respir J*. 1995; 8: 483-491.
- Mancilla-Hernández E, Medina-Ávalos MA, Osorio-Escamilla RE. Validación de un cuestionario diagnóstico de rinitis alérgica para estudios epidemiológicos. *Rev Alerg Mex*. 2014; 61: 153-161.
- Pawankar R, Sanchez-Borjes M, Bonini S, Kaliner M. The burden of allergic diseases. In: WAO. The World Allergy Organization (WAO) white book on allergy. Milwaukee. 2013.
- Mancilla E, Medina M, Barnica R, Guerrero R, Zecua Y. Prevalencia de rinitis alérgica en poblaciones de varios estados de México. *Rev Alerg México*. 2015; 62: 196-201.
- Mancilla-Hernández E, González-Solórzano EVM, Medina-Ávalos MA, Barnica-Alvarado RH. Prevalence of allergic rhinitis and its symptoms in the schoolchildren population of Cuernavaca, Morelos, Mexico. *Rev Alerg Mex*. 2017; 64: 243-249.
- Instituto Nacional de Estadística y Geografía México.
- Bäcker C, Barraza-Villarrea A, Moreno-Macfas H, Escamilla-Núñez C, Romieru EI. Efecto del ambiente rural sobre la prevalencia de rinitis alérgica en escolares de Mexicali, Baja California, México. *Rev Panam Salud Publica/Pan Am J Public Heal*. 2009; 25: 431-437.
- Mallol J, Solé D, Baeza-Bacab M, Aguirre-Camposano V, Soto-Quiros M, Baena-Cagnani C. Regional variation in asthma symptom prevalence in Latin American children. *J Asthma*. 2010; 47: 644-650.
- Lee YS, Kim SH, You JH, Baek HT, Na C, Kim BN, et al. Attention deficit hyperactivity disorder like behavioral problems and parenting stress in pediatric allergic rhinitis. *Psychiatry Investig*. 2014; 11: 266-271.
- Kramer E, Herman O, Frand J, Leibou L, Schreiber L, Vaknine H. Active or Passive Exposure to Tobacco Smoking and Allergic Rhinitis, Allergic Dermatitis, and Food Allergy in Adults and Children: A Systematic Review and Meta-Analysis. *Isr Med Assoc J*. 2014; 16: 229-232.
- Varona Pérez P, Fabrè Ortiz DE, Venero Fernández S, Suárez Medina R, Molina Esquivel E, Romero Placeres M. Rinitis alérgica, prevalencia y factores de riesgo en adolescentes cubanos. *Rev Cubana Hig Epidemiol*. 2014; 52: 330-345.