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ORIGINAL ARTICLE

Parent-reported prevalence of food allergy in Mexican schoolchildren: A population-based study

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Abstract
Background: Food allergy (FA) prevalence is well documented in developed countries and appears to be increasing, but remains unknown in most Latin American countries. We aimed to evaluate on a population basis the parent-reported prevalence of FA and its clinical characteristics in Mexican schoolchildren.
Methods: A validated Spanish version of a structured written questionnaire was administered to parents of schoolchildren aged 5–13 years old from Culiacan, Mexico.
Results: A total of 1049 parents responded to the survey (response rate, 84%). The estimated prevalence rates (95% CI) were: adverse food reactions 10.0% (8.3–11.9), ''perceived FA, ever'' 5.5% (4.3–7.0), ''physician-diagnosed FA, ever'' 4.9% (3.7–6.3), ''immediate-type FA, ever'' 4.4% (3.3–5.8), ''immediate-type FA, current'' 3.5% (2.6–4.8), and anaphylaxis 1.2% (0.72–2.1). Immediate hypersensitivity reactions were mainly triggered by the consumption of shrimp (1.3%), other shellfish (0.7%), strawberry (0.6%), chocolate (0.5%), and egg (0.4%). Schoolchildren with ''immediate-type FA, current'' had more atopic dermatitis and allergic rhinitis ($p < 0.05$), but not asthma or drug allergy ($p > 0.05$) than children without FA. All cases of anaphylaxis sought medical attention, but only one child had physician-diagnosed anaphylaxis and was advised to acquire an epinephrine autoinjector.
Conclusions: The prevalence of ''immediate-type FA, current'' to any food is 3.5% in Mexican schoolchildren. The poor recognition of anaphylaxis and the low frequency of prescription of epinephrine autoinjectors suggest that acute food-induced allergic reactions are not optimally managed in Mexico.

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Introduction

Food allergy (FA) is a prevalent and potentially severe condition that affects children and adults worldwide. This immune disorder appears to be increasing and has become an important health concern in developing and developed countries.[1] It has been estimated that the condition affects more than 1–2% but less than 10% of the general population.[2] However, the epidemiology of FA remains unknown in most Latin American countries[1,3] with only three population-based studies published to date.[4–6] Notably, only one of these studies applied strict criteria for defining FA[5] and this has high sensitivity for positive specific food IgE in affected patients.[7–9] To our knowledge, no population-based studies of FA have been carried out in Mexico, a country inhabited by more than 120 million people. Thus, the aim of this study was to evaluate the parent-reported prevalence of FA and the clinical characteristics of this condition in a Mexican population of schoolchildren.

Materials and methods

Population survey

We conducted a population-based cross-sectional survey in Culiacan, Sinaloa, Mexico. All data were collected during the period from September 2014 to August 2015. The sampling was made by convenience in ten elementary schools (private and public schools) that geographically cover five areas of the city of Culiacan, Mexico (two schools in each of the following areas; North, South, East, Southeast, and downtown area). At least 20 schoolchildren per grade (120 per school, six grades) were included in the study except for two private schools that reported a reduced number of students (<100), but agreed to participate in the study. The questionnaires and informed consents were handed out to the teachers who in turn attached them to the children's homework notebooks. This process was carried out only once. If the questionnaire and signed informed consent were not returned back after three working days, this was considered as non-response by the parents.

Questionnaire

A validated Spanish version of a structured questionnaire designed to estimate the parent-reported prevalence of food allergy in schoolchildren[5] was slightly adapted to be used in this study. The adjustments were intended to enable the self-administration of the questionnaire by Mexican parents, but the parameters to measure the variables of interest were not modified. This instrument is composed of some questions that were taken from a validated Spanish questionnaire,[4] which was later customised for screening purposes,[5] and others from an in-depth questionnaire, which was validated in English[9] and Spanish.[5] To identify those children that at the time of the survey still had allergic reactions to the suspected foods, we included a key question in the instrument final version (is your child now able to eat the suspected food without any reactions), as previously described.[9]

Respondents first answered questions related to basic demographic and clinical information about the child. All respondents with a positive response to perceived food-related recurrent symptoms completed the second part of the questionnaire. This section incorporated standardised questions about symptoms suggestive of IgE-mediated FA; time of appearance of the symptoms after food ingestion; the foods involved in the allergic/adverse food reaction; and treatments prescribed during allergic reactions among others.

An Ethics Review Board of the Universidad Autónoma de Sinaloa approved the study protocol (ethic approval number CE-UACNYG-2014-AGO-001).

Definitions

Adverse food reactions and FAs were defined according to the algorithm shown in Fig. 1. Briefly, a child was regarded as having ''perceived FA, ever'' if the parents stated that their child had had allergic reactions to food.[10] An adverse food reaction was defined as any symptomatic recurrent adverse reaction to a specific food potentially mediated or not by immune mechanisms.[11] ''Immediate-type FA, ever'' was defined as having symptomatic recurrent adverse food reactions that were ''convincing'' of immediate hypersensitivity allergic reactions. This included skin with hives, angio-oedema, trouble breathing, wheezing or throat tightness, vomiting and diarrhoea, among other symptoms typical of immediate hypersensitivity reactions that occurred within 2 h after food ingestion; as previously described.[5,7–9] ''Immediate-type FA, current'' was defined as those cases that met criteria for ''immediate-type FA, ever'', but answered negatively to the question ''is your child now able to eat the suspected food(s) without any reactions''.[9] In addition, ''physician-diagnosed FA, ever'' was defined as those cases that met criteria for adverse food reactions and answered positively to the question, ''Has a doctor ever told you that your child has FA?''

Food-depending anaphylaxis was defined as those cases that met criteria for ''immediate-type FA, current'' and according to the three following criteria: (1) acute onset of an illness with involvement of the skin, mucosal tissue or both and respiratory compromise or reduced blood pressure; (2) two or more of the following that occur rapidly after food ingestion: (a) involvement of the skin-mucosal tissue, (b) respiratory compromise, (c) reduced blood pressure, (d) persistent gastrointestinal symptoms; and (3) reduced blood pressure after exposure to a food allergen.[12]

Statistical analyses

Statistical analysis was carried out using PASW statistics version 18.0 (SPSS Inc., IL, USA). Categorical variables were summarised by descriptive statistics including total numbers and percentages, and associations of FA with other atopic diseases, age, and season of birth were analysed by two-tailed Fisher exact test. Continuous variables were summarised by mean and range with differences between two groups calculated using the Student *t*-test. A *p*-value <0.05 was considered statistically significant. Prevalence rates were calculated using OpenEpi software version 3.03a

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