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ORIGINAL ARTICLE

Prevalence of food allergy in infants and pre-schoolers in Brazil

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Abstract
Background: Food allergy is an increasing problem in public health, especially in childhood. Its incidence has increased in the last decade. Despite this, estimates of the actual incidence and prevalence are uncertain. The aim of this study was to estimate the prevalence of food allergy in infants and pre-schoolers.
Methods: The parents of 3897 children completed questionnaires on the occurrence of any reaction to food. Children with parentally reported reactions were selected for further examination including a clinical interview, physical examination, allergic tests, and if necessary, oral food challenge to conclude the diagnosis of FA.
Results: The estimated prevalence of allergy in children aged 4–59 months was 0.61%, being, 1.9% in infants and 0.4% in pre-schoolers. Among the 604 patients physicians evaluated with parent-reported FA, 24 (4%) had a confirmed diagnosis of food allergy, and 580 (96%) were excluded in the remaining. Of these, approximately half (51/52.6%) of 97 infants and (128/48%) of 487 pre-schoolers already performed the diet exclusion suspected food for a period of time.
Conclusion: This study shows that high overall prevalence of parental belief of current food allergy however the same was not observed in the in physician-diagnosed food allergy. The prevalence of food allergy was lower than that observed in the literature. This study alerts health professionals to the risk entailed by overestimation of cases of food allergy and unnecessary dietary exclusion, which may result in impairment in growth and development of children, especially in their first years of life.

Introduction

Food allergy (FA) is an adverse immune response that occurs reproducibly on exposure to a given food.[1,2] FA may be classified according to the immunological mechanism involved:

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IgE-mediated in which the reaction generally occurs in the first two hours after food exposure and is mediated by Immunoglobulin E (IgE); non IgE-mediated with symptoms that usually occur hours or days after food exposure and is associated with a cellular response; and mixed that involves both mechanisms.[3,4]

The clinical manifestations differ based on the immune mechanism involved. IgE-mediated reactions could present skin reactions (atopic dermatitis, urticaria, angio-oedema), gastrointestinal (swelling and itching of the lips, tongue, vomiting and diarrhoea), respiratory (dyspnoea, rhinorrhoea) and systemic reactions (anaphylaxis). Non-IgE mediated reactions present mainly gastrointestinal symptoms as proctocolitis, enterocolitis, and enteropathy. Mixed reactions are implicated as manifestations of atopic dermatitis, eosinophilic oesophagitis, and eosinophilic gastroenteritis.[3,4]

FA has been associated with an impaired quality of life, psychosocial impact in children and their families resulting in limited social interactions, a heightened risk of severe allergic reactions and potential fatality, and high socioeconomic cost.[2,5,6] FA is an increasing problem in public health, especially in childhood.[2,7]

Despite the suggested increasing frequency of FA, estimates of the actual incidence and prevalence are uncertain.[2,7,8] Most studies have either focused on specific populations or only on selected food allergens and relatively few epidemiological studies have used the gold standard of diagnosis – the double-blind, placebo-controlled food challenge in defining FA. Most frequency estimates have been based on lay perceptions or specific IgE or skin prick test (SPT) sensitisation to common food allergens. Both self-perception and allergic sensitisation are known to substantially overestimate the actual frequency of FA.[7–9]

The latest three systematic reviews of reported frequency of FA estimates the prevalence of self-reported FA to range from 3 to 35% and confirmed FA range from 6% to 8% of the population.[1,3,6,8,10] A recent systematic review estimated reported prevalence of allergy to common food in Europe around 6% for cow's milk, 2.5% for egg, and 3.5% for wheat, while confirmation by oral food challenges reduced this to 0.6%, 0.2%, and 0.1% for the same foods. Allergy to cow's milk and egg was more common among younger children, and to peanut, tree nuts, fish, and shellfish was more common among the older ones. There were insufficient data to compare the estimates of soy and wheat allergy between the age groups.[8]

However, the prevalence of FA in Brazil is unknown. The objective of this study is to evaluate the prevalence and clinical characteristics of FA in infants and preschool children from Uberlândia, Brazil.

Methods

Population description

This study constitutes the second phase of research project entitled ''Prevalence of food allergy in infants and preschoolers from Uberlândia''. This cross-sectional study was conducted during the period from March 2012 to September 2013 and enrolled all children aged 4–59 months in the Public School District for Early Childhood Education. Uberlândia is located in Minas Gerais State, the estimated population in 2015 is 662,362 inhabitants, the human development index reached 0.789 in 2010, the climate is classified as tropical savannah but experiences a mild temperature (annual mean: 22 °C) since it is located at 850 m altitude[11].

The data from the first phase was previously published and describe the parent reported food allergy in these participants.[12] The study was approved by the Ethics Committee of the Federal University of Uberlândia. All parents were informed about the study and signed consents were obtained.

Study design

In the first phase, a validated self-administered questionnaire for FA screening was used to collect the data.[13] The questionnaires were delivered to the parents of children in all district municipal public schools and after appropriate filling; they were returned to the school office, where they were evaluated by the researchers. The data collected was about presence of atopy (history of rhinitis, atopic dermatitis and asthma), parent-reported food allergy and allergic symptoms related to food including the type of food and the symptoms experienced that had occurred.

In the second phase, all children whose parents responded positively to the question about the perception of presence of any food allergies were invited for further study, including a clinical interview, physical examination, allergic tests, and if necessary, an oral food challenge to conclude the diagnosis of FA. Patients with regular ingestion of implicated foods without symptoms were considered as non-allergic.

The diagnosis of food allergy was considered in three situations. (1) Patients with a recent history of urticaria, angio-oedema, or anaphylaxis occurred less than two hours after ingestion of suspected food plus a positive skin prick test; (2) Patients with a history of urticaria, angio-oedema, or anaphylaxis occurred less than two hours after ingestion of suspected food that maintain the diet exclusion of suspected food plus a positive oral food challenge; or (3) Patients with diagnosis of atopic dermatitis or enterocolitis that improve clinically after exclusion and present a worsening after the introduction of the suspected food.

Prick-to-prick skin test

The prick-to-prick skin test (SPT) with fresh foods was performed in children with history or symptoms suggestive of IgE mediated reaction. This test was performed in duplicate with a lancet with 1 mm tip on the volar surface of the forearm according to European Academy of Allergy and Clinical Immunology (EAACI) guidelines.[14] The suspected allergens foods were employed. Histamine dihydrochloride (10 mg/dl) and diluent served as a positive and negative control, respectively. Skin responses were measured 15 min later, considering a wheal diameter of $\geq$3 mm or larger as a positive skin reaction to the diluent.[15,16]

The SPT is considered the main method to confirm IgE mediated allergic sensitisation. It is a minimally invasive procedure, fast, easy to perform, and reproducible. SPT

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