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Research Article

Profile of Sensitisation to Food Allergens in Children in the Pneumology and Allergology Unit of the Lomé Teaching Hospital Campus, Togo

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Abstract

Introduction: Sensitisation to food allergens is described as a relatively common sensitivity. The aim of this study was to describe the profile of sensitisation to food allergens in children.

Methods: This was a cross-sectional study conducted between 1 July 2015 and 30 June 2022 in the pneumology and allergology unit of the Lomé Teaching Hospital, focusing on patients who, after accepting and undergoing skin tests, were found to be sensitised to food allergens.

Results: We identified a total of 468 patients aged between 7 months and 18 years; the mean age of patients was 8.1 ± 0.8 years, and the sex ratio was 1.3. The frequency of skin tests performed was 25.9% and that of sensitisation to food allergens was 66.9%. Allergic rhinitis was the reason for consultation in 39.9% of cases. Peanuts were the food implicated in 31.5% of cases as a food allergen in personal history. Patients were sensitised to oilseeds in 70.4% of cases (peanuts, sesame); leguminous in 24.6% of cases (soya, beans); vegetables in 4.7% of cases (okra, adémé); fruit (33.6%, including bananas and avocados); cereals (11.8%, including wheat and corn); tubers (1.9%, including cassava and yams); eggs (54.9%); shrimp (53.6%); cow's milk (51.1%); and crab (16.5%).

Conclusion: Sensitisation to food allergens was high and concerned both animal and vegetal proteins.

Keywords: Sensitisation; Food Allergens; Children; Skin Test; Togo

Introduction

Food allergy is defined as all clinical manifestations related to an immune-allergic response to food allergens [1,2]. The most common allergenic foods are peanuts, milk, eggs, wheat, nuts, soy, fish, and shellfish [3]. Allergic diseases are a major public health issue. According to the World Health Organisation (WHO), allergic diseases rank fourth among chronic diseases worldwide, behind cancer, cardiovascular disease and acquired immunodeficiency syndrome (AIDS). Recent studies have shown an increase in the prevalence of food allergies, with their frequency doubling in five years [4]. The aim of this study was to describe the profile of sensitisation to food allergens reported in children followed up in pneumology and allergology consultations.

Materials and Methods

This was a cross-sectional study conducted in the pneumology and allergology unit of the paediatrics department at the Lomé University Hospital Campus from 1 July 2015 to 31 June 2022. The study included all children under the age of 18 who consulted the pneumo-allergology unit of the University Hospital Campus during the study period. We included patients who, after accepting and undergoing skin testing, were found to be sensitised to food allergens.

Patients who refused skin testing, patients who were sensitised to food allergens but refused to answer questions, and patients with dermographism were not included in our study. The different

parameters studied were: the frequency of sensitisation to food allergens; age, gender, residence; clinical data (reason for consultation, mode of admission, date of consultation, time of consultation, date of onset of symptoms, personal and family history of allergy, clinical signs, medical emergency due to allergy, drug allergy); prick test results; diagnosis, treatment and outcomes.

The prick test in the study was performed using native foods and consisted of pricking the skin through a drop for liquid/diluted products or prick to prick for solid products. We used plastic needles (Stallerpoint 1 or ALK® prick lancets). We performed control tests to check skin reactivity (positive control) and rule out dermographism (negative control). Histamine hydrochloride at 10 mg/ml was used for the positive control and a glycerine solution for the negative control. The location of each allergen was marked with a ballpoint pen, and we maintained a safety distance of 2 cm between allergens, then measured the diameter of the papules. The positive control was read after 5 minutes and the tests after 20 minutes. The criteria for positivity were defined by the diameter of the induration. The European Academy of Allergy and Clinical Immunology (EAACI) defines a positive test as a wheal greater than or equal to 3 mm compared to the negative control or a wheal with a diameter greater than or equal to half the diameter of the positive control wheal [1,5].

Results

During the study period, 3,500 patients consulted the pneumology and allergology department. Of these, 2,700 patients were eligible for skin tests (prick tests). The number of people who underwent skin testing was 700, representing a skin test frequency of 25.9%. Of the 700 patients who underwent skin testing, 468 were sensitised to food allergens, representing a frequency of 66.9%. The mean age of the patients was 8.1 ± 0.8 years, with ages ranging from 7 months to 17 years. The 5-10 age group accounted for 29.1% of patients (Figure 1).

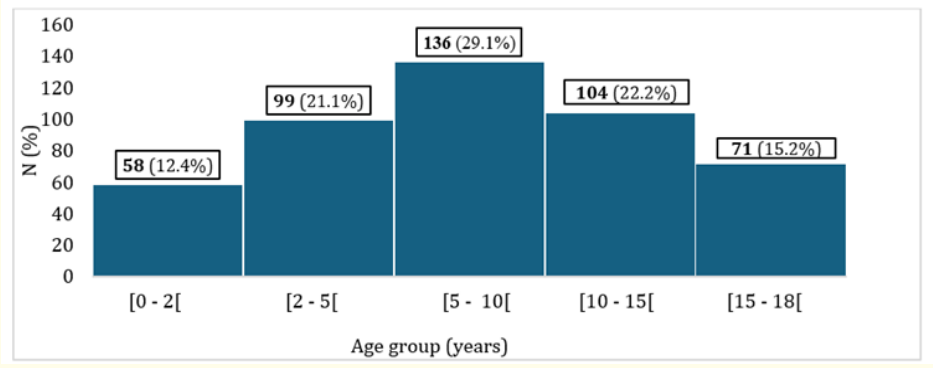

Figure 1: Distribution of patients by age group.

We recorded 262 boys (56%) and 206 girls (44%). The sex ratio was 1.3. Allergic rhinitis was the reason for consultation in 39.9% of cases, followed by asthma attacks (17.5%), endemic tropical limbo-conjunctivitis (15.8%), cough associated with asthma attacks (14.5%), cough alone (14.1%), eczema (8.8%), skin pruritus (7.3%), nasal pruritus (7.1%), prurigo (6.8%), sneezing associated with rhinitis (6.6%), urticaria (5.8%), sinusitis (2.6%), nasal obstruction (1.9%), tracheitis (0.9%), bronchiolitis (0.4%) and angioedema (0.4%).

Regarding the age of onset of symptoms, 49.8% of children had begun showing clinical signs between the ages of 0 and 5, 26.3% of children had begun showing clinical signs between the ages of 5 and 10, and 23.9% reported having begun showing clinical signs after the age of 10.

Of the 468 patients, 417 reported a personal history of allergy, representing 89.1% of cases. Allergic rhinitis was found to be a personal history of allergy in 52.8% of cases, followed by asthma (34.2%), pruritus (27.1%), allergic rhinitis associated with coughing (21.1%), prurigo (8.9%), eczema (7.7%), conjunctivitis (6.2%), sneezing associated with eczema (5.3%), urticaria (4.3%), endemic tropical limbo-conjunctivitis (3.1%), bronchiolitis (1.2%), angio-

edema (0.7%), and tracheitis associated with coughing (0.7%). Fathers were the most concerned about family history in 43.2% of cases, followed by mothers and siblings in 40.5%, 23.8% and 12.9% of cases, respectively. The food allergens involved in personal history of food allergy were dominated by peanuts (52.3%), followed by crab (36.4%), eggs (34.1%) and shrimp associated with crab (29.5%).

The clinical signs were nasal pruritus (54%), anosmia (20%), rhinorrhoea (54%), sneezing (52%), nasal obstruction (6.2%), papular and pruritic rash (20.1%), skin pruritus (7.1%); ocular pruritus (7.3%), ocular redness (7.3%), and dyspnoea (6.4%).

Sensitisation to vegetal proteins was found in 422 (90.2%) patients. Among patients sensitised to vegetal proteins, sensitisation to leguminous and oilseeds was 77.9%. Peanuts were present in 90.3% of cases, sesame in 4.6% of cases, sesame combined with peanuts in 3.3% of cases, soybeans in 31.6% of cases, beans in 1.5% of cases, and beans and soybeans in 0.9% of cases. Twenty patients (4.7%) were sensitised to vegetables. Among them, 75% were sensitised to *Abelmoschus esculentus* (okra), 25% to *Corchorus olitorius* (demè), 20% to okra and *Lycopersicon lycopersicum* (tomato), 10% to tomato and *Allium cepa* (onion), 5% to *Daucus carota* (carrot), and 5% to *Allium sativum* (garlic). All patients were sensitised to one or more animal proteins. Egg was found in 54.9% of cases (Table 1).

	N	%
Egg	257	54,9
Shrimp	251	53,6
Cow's milk	239	51,1
Crab	77	16,5
Crab and shrimp	70	14,9
Others*	11	2,4

Table 1: Distribution of patients according to their sensitisation to animal proteins.

*Tuna: (2 cases); Sardine (1 case); Sea bass (1 case); Sea bream (1 case); Red carp (1 case); Barracuda (1 case); Whiting (1 case); Beef (1 case); Mutton (1 case); Chicken (1 case); Palm weevil (1 case).

One hundred and forty-two patients (33.6%) were sensitised to fruit. Among them, 73.2% were sensitised to bananas, 51.4% to avocado, 49.3% to both banana and avocado, 4.2% to orange, 2.8% to pineapple, 2.1% to hazelnut, 1.4% to red oil and black pepper, and 0.7% to mango.

Fifty patients, or 11.8%, were sensitised to cereals. Wheat was the cereal implicated in 90% of cases, followed by corn and rice in 16% and 4% of cases, respectively. Eight patients were sensitised to tubers (1.9%). Among them, 87.5% were sensitised to cassava, 62.5% to both cassava and yam, 25% to yam and 12.5% to potato.

Allergic rhinitis was found in 40.4% of cases. Some patients had multiple diagnoses (Table 2).

	N	%
Allergic rhinitis	189	40.4
Asthma and allergic rhinitis	102	21.8
ETC*	74	15.8
Conjunctivitis	68	14.5
Eczema	49	10.5
Prurigo	43	9.2
Urticaria	39	8.3
Urticaria and eczema	30	6.4
Atopic dermatitis	13	2.8
Sinusitis	12	2.6
Bronchiolitis	4	0.9
Tracheitis	4	0.9
Angioedema	2	0.4

Table 2: Distribution of patients according to diagnosis.

*ETC: endemic tropical conjunctivitis.

The preventive treatment offered to all patients was avoidance of the incriminated food allergen. All patients had received symptomatic treatment. This treatment consisted of an antihistamine (77.6%), a nasal decongestant (66%), an antihistamine combined with a nasal decongestant (64.1%), nasal corticosteroids (47.2%), an inhaled bronchodilator (42.5%), or a bronchodilator combined with inhaled corticosteroids (19.2%). No patients received tolerance induction treatment. The outcome was marked by recovery without relapse over a 12-month period in 75.9% of cases and frequent relapses in 24.1%. No deaths were recorded.

Discussion

In this study, the frequency of skin testing was 25.9%. For Malouche., *et al*. [6] in Tunisia in 2013 and Toloba., *et al*. [7] in Mali in 2017, the skin testing rate was 100%. The low rate of skin testing in this study may be linked to the lack of awareness among the Togolese population about allergic diseases and the high cost of skin tests.

The frequency of sensitisation to food allergens in this study was 66.9% of cases. These results are higher than those found (36.7%) by Bakondé., *et al*. [8] in 1998. This high frequency in this series could be explained by an increase in allergy consultations due to the availability of specialists in allergology.

The predominant age group was between 5 and 10 years old (29.1%). This high level of food sensitisation among children aged 5 to 10 was mentioned by Rancé., *et al*. [9]. Indeed, Rance., *et al*. found that food allergies were more common in children under the age of 15. The predominance of sensitisation to food allergens in children in our study could be explained by the early introduction of potentially allergenic foods such as eggs, peanuts and milk into children's diets.

A male predominance was noted in this study, with a sex ratio of 1.3. Mulier., *et al*. [10] found a male predominance with a sex ratio of 1.6 in France in 2006. However, Jalloul., *et al*. [11] found a female predominance in Morocco in 2020.

Fifty-two-point eight percent (52.8%) of patients sensitised to food allergens had a personal history of allergic rhinitis. Rance., *et al*. [9] in France in 1998 found a personal history of allergic rhinitis in 12.1% of cases. However, Hoyos-Bachiloglu., *et al*. [12] in Madrid, Spain, in 2014 noted asthma in 20% of cases.

The study showed a predominance of peanut sensitisation (90.3%), followed by soy (31.6%). In a study conducted in Cotonou, Benin, in 2017 by Agodokpessi., *et al*. [13], peanuts accounted for 3.4% of food allergens sensitisation. Sesame was found in 4.6% of cases. These results are higher than those found by Peters., *et al*. [14] in the United States in 2007, which was 0.4% of cases. This could be explained by the dietary habits in each country.

Most patients were sensitised to eggs (54.9%) and shrimp (53.6%). Cheick., *et al*. [15] in a multicentre study in the Maghreb and sub-Saharan Africa in 2013 reported a predominance of sensitisation to shrimp (14.1%), followed by sensitisation to eggs (13.7%). Mbainaissem., *et al*. [16] in 2011 in Togo found egg sensitisation in 11.65% of cases. Sensitisation to cow's milk in this study was 51.1% of cases. Bakonde., *et al*. [8] in 1998 in Togo found sensitisation to cow's milk in 7.1% of cases.

Among patients who were sensitised to vegetables, 75% were sensitised to okra. Okra is an integral part of our culinary traditions and is widely consumed by Togolese people in the form of okra sauce. This could explain why children are so highly sensitised to okra.

Banana sensitisation was found in 73.2% of cases, followed by avocado in 51.4% and orange in 4.2% of cases. These results are higher than those found by El-Sayed., *et al*. [17] in Egypt in 2013, where banana sensitisation was 7.5%. In a study conducted in India (Kolkata) in 2016, Dey., *et al*. [18] found a frequency of banana sensitisation in 32% of cases. While in Dey's study, high banana sensitisation was linked to genetic, environmental and cultural factors among Indians, in Togo this high frequency is likely linked to the early introduction of this fruit into children's diets in various forms.

Sensitisation to cassava accounted for 87.5% of sensitisation to tubers. Heinrich., *et al*. [19] in a study conducted in France in 2020 noted that cassava was the cause of anaphylactic reactions in two children. This result in this study could be explained by the fact that cassava is a staple food in Togo and is consumed in the form of tapioca, gari and foufou.

All patients had been advised to avoid the food allergen to which they were sensitive. Rancé [20], in a study conducted in France in 2004, emphasised that avoidance is the best treatment for food allergies.

Symptomatic treatment was dominated by antihistamines in 77.6% of cases. Antihistamines are the first-line symptomatic treatment. Pham-Thi., *et al*. [21] in France found that antihistamines were prescribed in 88.7% of cases.

Conclusion

Sensitisation to food allergens was high and concerned both animal and vegetal proteins. The foods concerned were oleaginous seeds (peanuts, sesame seeds); leguminous seeds (soybeans, beans); vegetables (okra, adémé); fruits (bananas, avocados); cereals (wheat, corn); tubers (cassava, yam); eggs; shrimp; cow's milk; and crab.

Conflict of Interest

The authors declared no conflict of interest.

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