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ORIGINAL ARTICLE

Epidemiological profile of people with food allergies treated at a university hospital

Perfil epidemiológico de pessoas com alergia alimentar atendidas em um hospital universitário

Perfil epidemiológico de personas com alergia alimentaria atendidas en un hospital universitário

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ABSTRACT

Background and Objectives: food allergy is a disease that has an abnormal immune response after contact with a certain food. It represents a significant disorder, as it involves dietary, social and psychological restrictions. Thus, this work aims to describe the profile of the people treated at an allergy and clinical immunology outpatient clinic of a university hospital in Maceió, Alagoas. **Methods:** this is a descriptive and quantitative study, based on the analysis of medical records of patients with food allergy treated at the *Hospital Universitário Professor Alberto Antunes* Allergy and Clinical Immunology Outpatient Clinic, from October 2016 to October 2023. **Results:** of the 678 patients, 233 were included, with a prevalence of women (61.8%) and an average age of 21.8 years (SD= ±17.1). The predominant allergens were seafood (25.9%), cow's milk protein (24.2%), egg (10.3%), fruits (9.3%), milk (7.6%), grains (5.8%), fish (4.1%), meat (4.1%), chocolate (2.0%) and vegetables (1.0%). **Conclusion:** the population studied in this research presents an epidemiological profile similar to the data in the literature, and shows characteristics that justify the need for greater attention to early diagnosis and treatment, since there was a prevalence of involvement in the age group of young adults who are economically active, in addition to the significant presence of common foods in the menu of the Brazilian population. Furthermore, the diagnosis of food allergy is shared with other immunoallergic diseases, which makes it essential to encourage studies that analyze the pathophysiological relationship between these.

Keywords**:** *Food Hypersensitivity. Epidemiology. Allergens. Allergy and Immunology.*

RESUMO

Justificativa e Objetivos: a alergia alimentar é uma doença que apresenta resposta imunológica anormal após contato com determinado alimento. Representa um transtorno significativo, pois envolve restrições alimentares, sociais e psicológicas. Assim, este trabalho tem como objetivo descrever o perfil epidemiológico das pessoas atendidas no ambulatório de alergia e imunologia clínica de um hospital universitário em Maceió, Alagoas. **Métodos:** trata-se

de estudo descritivo e quantitativo, a partir da análise de prontuários de pacientes com alergia alimentar atendidos no Ambulatório de Alergia e Imunologia Clínica do Hospital Universitário Professor Alberto Antunes, no período de outubro de 2016 a outubro de 2023. **Resultados:** dos 678 pacientes, 233 foram incluídos, com prevalência de mulheres (61,8%) e idade média de 21,8 anos. Os alérgenos predominantes foram frutos do mar (25,9%), proteína do leite de vaca (24,2%), ovo (10,3%), frutas (9,3%), leite (7,6%), grãos (5,8%), peixes (4,1%), carnes (4,1%), chocolate (2,0%) e vegetais (1,0%). **Conclusão:** a população estudada nesta pesquisa apresenta um perfil epidemiológico semelhante aos dados da literatura, e evidencia características que justificam a necessidade de maior atenção quanto ao diagnóstico e tratamento precoce, visto que houve uma prevalência do acometimento da faixa etária de adultos-jovens que são economicamente ativos, além da presença significativa de alimentos comuns no cardápio da população brasileira. Ademais, o diagnóstico da alergia alimentar é compartilhado com outras doenças imunoalérgicas, o que torna essencial o incentivo de estudos que analisem a relação fisiopatológica entre essas.

***Descritores*:** *Hipersensibilidade Alimentar. Epidemiologia. Alérgenos. Alergia e Imunologia.*

RESUMEN

Justificación y Objetivos: la alergia alimentaria es una enfermedad que presenta una respuesta inmunológica anormal tras el contacto con un determinado alimento. Representa un trastorno importante, ya que implica restricciones dietéticas, sociales y psicológicas. Por lo tanto, este trabajo tiene como objetivo describir el perfil de las personas atendidas en un ambulatorio de alergia e inmunología clínica de un hospital universitario de Maceió, Alagoas. **Métodos:** se trata de un estudio descriptivo y cuantitativo, basado en el análisis de historias clínicas de pacientes con alergia alimentaria atendidos en el Ambulatorio de Alergia e Inmunología Clínica del *Hospital Universitário Profesor Alberto Antunes*, de octubre de 2016 a octubre de 2023. **Resultados:** 678 pacientes, 233 Se incluyeron, con predominio de mujeres (61,8%) y edad media de 21,8 años. Los alérgenos predominantes fueron mariscos (25,9%), proteínas de la leche de vaca (24,2%), huevo (10,3%), frutas (9,3%), leche (7,6%), cereales (5,8%), pescado (4,1%), carne (4,1%), chocolate (2,0%) y hortalizas (1,0%). **Conclusión:** la población estudiada en esta investigación presenta un perfil epidemiológico similar a los datos de la literatura, y destaca características que justifican la necesidad de una mayor atención en cuanto al diagnóstico y tratamiento temprano, ya que prevaleció la afectación en el grupo etario de adultos jóvenes con recursos económicos. activo, además de la importante presencia de alimentos comunes en el menú de la población brasileña. Además, el diagnóstico de la alergia alimentaria es compartido con otras enfermedades inmunoalérgicas, lo que hace imprescindible impulsar estudios que analicen la relación fisiopatológica entre estas enfermedades.

Palabras Clave: *Hipersensibilidad Alimentaria. Epidemiología. Alérgenos. Alergia e Inmunología.*

INTRODUCTION

Food allergy (FA) is defined as a specific and adverse health response resulting from an abnormal immunological mechanism that occurs after contact with a certain food, and can be divided into three groups, according to the immunological process involved, namely: IgE-mediated; non-IgE-mediated; and mixed reactions.[1] Although data on the prevalence of food hypersensitivity reactions are conflicting, there has been an increase in cases in recent decades worldwide. The prevalence is estimated to be 6% to 8% in children up to 3 years of age, while in adults it ranges from 2% to 4%.[1,2] Family history, lifestyle changes and new eating habits in the population are very important in the increase in cases of FA.[1-3]

Furthermore, numerous foods have been recognized as allergens, but only a small portion of them have been responsible for the majority of reported reactions. This varies according to age group, geographic region of patients, and the large difference between the perception of symptoms related to a given food and the correct diagnosis of FA. Therefore, it is important to record the epidemiology of these events and their pattern of occurrence in the study population.[4]

It is also worth noting that FA represents a significant disorder imposed on the person who has it, as it often involves dietary and social restrictions, high levels of anxiety, as well as direct consequences of the immune system hyper-reactivity, such as severe reactions and potential subsequent fatalities.[4] In this regard, adequate management is essential in order to guarantee quality of life and well-being, capable of reducing negative outcomes, such as impacts on social life, work and personal limitations of individuals who are affected by this clinical condition.[5,6]

Understanding the prevalence profile of FA is therefore essential to ensure the best management of patients affected by this condition, considering the variables related to the presentation of each allergic condition. These variables, which involve everything from age to diverse exposure to allergens, are responsible for the uncertainties in global prevalence studies. Thus, as a potentially useful tool for planning objective actions aimed at improving and expanding care services, for earlier diagnosis and treatment, this study aimed to describe the profile of people treated at an allergy and clinical immunology outpatient clinic of a university hospital in Maceió, Alagoas.

METHODS

This is a descriptive study with a quantitative approach, based on documents, carried out through physical and electronic medical records of patients with FA treated at the *Hospital Universitário Professor Alberto Antunes* (HUPAA) Allergy and Clinical Immunology Outpatient Clinic in Maceió, Alagoas.

The HUPAA Allergy and Clinical Immunology Outpatient Clinic has been a state reference in the management of allergic patients since 1995. However, the provision of specialized services in this area began in 2016, which is why the period from this year until October 2023 was considered to select the medical records. This time interval was delimited to cover the longest possible period, including from the initial point of specialized care in allergy and clinical immunology at HUPAA until the deadline for collecting the analyzed data, from June to October 2023. During this period of specialized care, 678 medical records were recorded. Thus, the study includes all patients who were and still are treated by this reference service in the state's public health, who met the eligibility criteria.

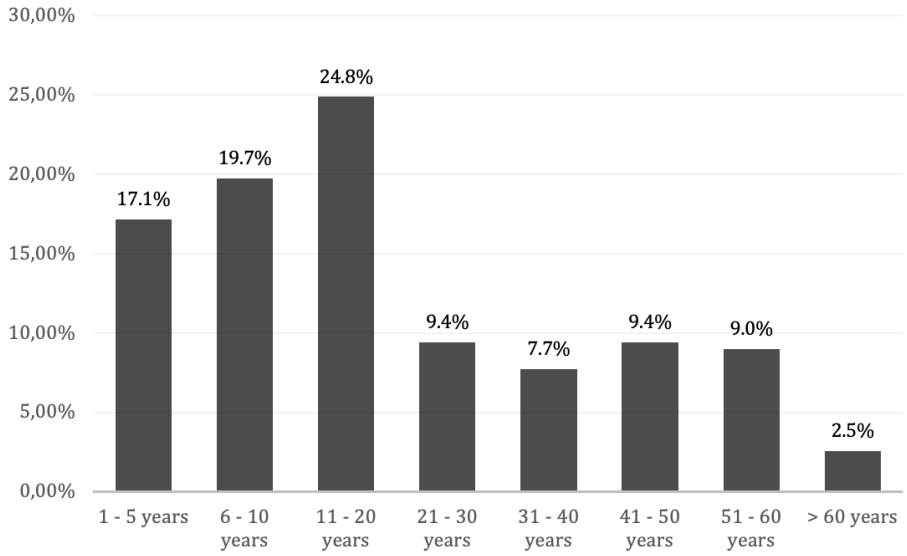
Inclusion criteria comprised medical records of patients diagnosed with FA, such as cow's milk protein allergy (CMPA), seafood (shrimp, fish and crustaceans), fruits (watermelon, pineapple, strawberry, coconut, cocoa), chocolate, grains (soy, corn, wheat, peanuts and nuts), meat, fish, eggs, milk and vegetables. For the diagnosis, the specific sensitization test and oral provocation test were considered. Thus, 233 medical records of patients with some type of FA were obtained, selected because they presented all the data necessary for epidemiological analysis. In turn, the exclusion criteria established included patients followed up in the outpatient clinic for other immunoallergic diseases exclusively and patients who only had a suspicion of FA. Moreover, medical records with incomplete data documentation were discarded, as they did not present sufficient information to conclude the study.

The epidemiological data collected from medical records were sex, age, foods recognized as allergenic substances and concomitant presence of FA and other immunoallergic diseases in this study population. After data collection, they were analyzed using descriptive statistics in Microsoft Office Word®, and, for better data visualization, tabular and graphical representation were used.

In compliance with Resolution 466/12 of the Brazilian National Health Council,[7] this project was approved by the Research Ethics Committee of HUPAA/UFAL/EBSERH, under Certificate of Presentation for Ethical Consideration (CAAE - *Certificado de Apresentação para Apreciação Ética*) 67320823.0.0000.0155 and Opinion 6.010.320, with approval date 05/18/23. The anonymity and confidentiality of the information obtained as well as all other prerogatives were guaranteed.

RESULTS

Of the 678 medical records registered at the HUPAA outpatient clinic, 233 patients were diagnosed with allergy to a specific food and met the inclusion criteria for the study. Therefore, 406 medical records were excluded from the total registered in the chosen period because they did not meet all the eligibility criteria. Of the 233 patients, the majority were female (61.8%), with a mean age of 21.8 years (SD=±17.1), with a minimum of 1 year and a maximum of 84 years, with emphasis on the youngest sample group (11 to 20 years – 24.8%) (Graph 1).



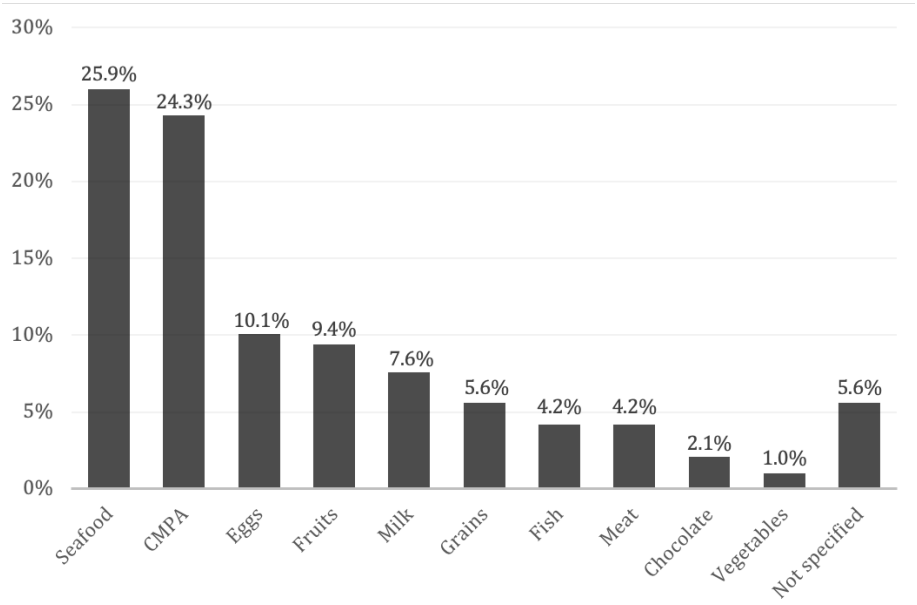
Source: Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic medical records (2016-2023).

Graphic 1. Age distribution of patients with food allergy treated at the Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic. Maceió, Alagoas, Brazil, 2016-2023.

Among the main allergens identified in the study, seafood (25.9%) stands out, especially shrimp (72.0%), CMPA (24.3%), egg (10.1%) and fruits (9.4%), with pineapple being responsible for the diagnosis of immunological sensitivity with the highest record within the sample (55.5%). Furthermore, CMPA (7.6%), grains (5.6%), such as wheat, peanuts, soy, corn and nuts, fish (4.2%), meat (4.2%), chocolate (2.1%) and vegetables (1.0%) were also identified. It is noteworthy that 5.5% of patients have FA to some allergen not specified in medical records. This occurs because diagnostic tests were inconclusive in identifying the specific allergen, however they presented clinically positive results, which is recorded as unspecified FA (Graph 2).

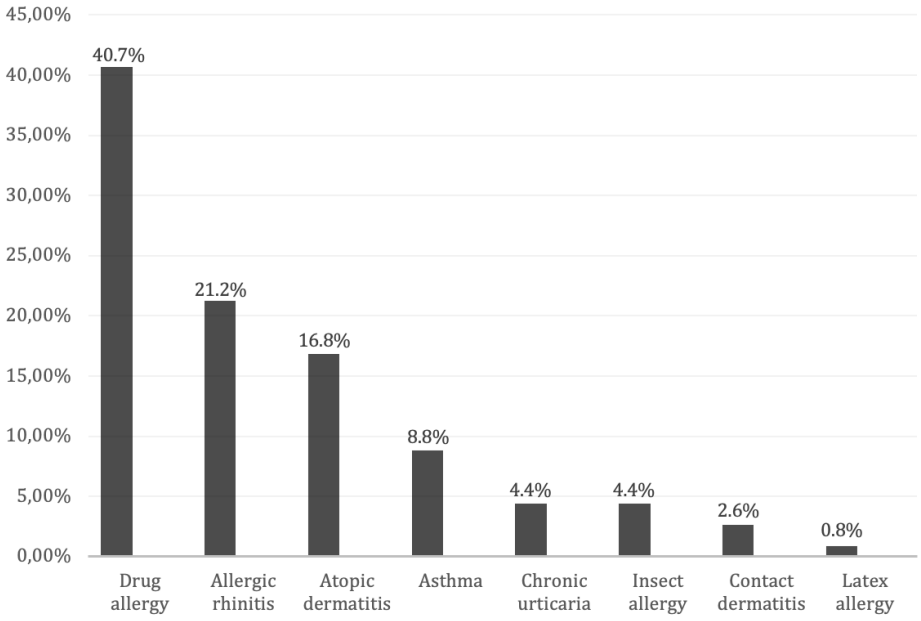
The distribution of food allergens by age group showed the prevalence of CMPA up to 20 years (95.7%), seafood, from 21 to 60 years (68%), eggs, between 1 and 20 years (72.4%), fruits, between 6 and 10 years (29.6%), milk, between 1 and 20 years (72.7%), and other foods, with equivalent distribution between age groups (Table 1).

It was also evident that 47.2% of patients concomitantly had other allergies or immunoallergic diseases, such as drug allergy (40.7%) and allergic rhinitis (21.2%) (Graph 3).



Source: Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic medical records (2016-2023).

Graphic 2. Distribution of allergens identified in patients with food allergy treated at the Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic. Maceió, Alagoas, Brazil, 2016-2023.



Source: Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic medical records (2016-2023).

Graphic 3. Distribution of other immunoallergic diseases in patients with food allergy treated at the Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic. Maceió, Alagoas, Brazil, 2016-2023.

Table 1. Distribution of food allergens according to age group of patients with food allergy treated at the Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic. Maceió, Alagoas, Brazil, 2016-2023.

Types of allergens	Age groups															
	1-5 years		6-10 years		11-20 years		21-30 years		31-40 years		41-50 years		51-60 years		<60 years	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Seafood	1	2%	8	13.7%	15	22.3%	12	46.1%	9	39.1%	14	48.2%	15	51.7%	1	14.2%
Cow's milk protein	33	66%	17	29.3%	17	25.3%	1	3.8%	1	4.3%	-	-	1	3.4%	-	-
Egg	6	12%	10	17.2%	5	7.4%	1	3.8%	4	17.3%	-	-	1	3.4%	2	28.5%
Fruits	3	6%	8	13.7%	3	4.4%	4	15.3%	1	4.3%	4	13.7%	2	6.8%	2	28.5%
Milk	3	6%	4	6.8%	9	13.4%	1	3.8%	1	4.3%	3	10.3%	1	3.4%	-	-
Grains	3	6%	3	5.1%	3	4.4%	1	3.8%	1	4.3%	1	3.4%	4	6.8%	1	14.2%
Fish	1	2%	2	3.4%	-	-	2	7.6%	3	13%	3	10.3%	1	3.4%	-	-
Meat	-	-	3	5.1%	4	5.9%	1	3.8%	1	4.3%	2	6.8%	1	3.4%	-	-
Chocolate	-	-	1	1.7%	3	4.4%	1	3.8%	-	-	-	-	1	3.4%	-	-
Vegetables	-	-	1	1.7%	-	-	-	-	-	-	1	3.4%	-	-	1	14.2%
Not specified	-	-	1	1.7%	8	11.9%	2	7.6%	2	8.6%	1	3.4%	2	6.8%	-	-

Source: Hospital Universitário Professor Alberto Antunes Allergy and Clinical Immunology Outpatient Clinic medical records (2016-2023).

DISCUSSION

According to the World Health Organization (WHO), 200 to 250 million people suffer from allergies to some type of food,[8] a scenario in which FA is currently a serious public health concern that has been growing throughout the world, especially in industrialized countries. The urban lifestyle favors the development of risk factors for the disease, such as easy exposure to allergens, misuse of antibiotics, changes in intestinal flora and microbial effects on the immune system.[9] Furthermore, these countries provide a more advanced research arsenal in identifying FA, which is not the reality in Brazil, given that there is no precise epidemiological data on the subject in the country.[9,10] Therefore, FA deserves special attention from healthcare services and public policies, as it is a clinical condition capable of affecting quality of life and generating serious complications in individuals affected by this disease.[10,11]

The majority of patients in this study were female. According to the literature, women tend to have more FA diagnoses than men, however there is little scientific evidence to justify this reason, since the numbers presented in the literature vary widely, such as 46.34% in the study by Andrade *et al.*[12] and 81.1% in the study by Costa *et al.*[13] Furthermore, Lobo[9] mentions male sex as a risk factor for the disease, which makes this relationship between sex and FA questionable, as it does not yet present a solid analysis.[9,12]

Regarding age group, the study showed a prevalence among young people in the first two decades of life (1-20 years), supporting the literature.[14,15] The higher prevalence in this age group is explained by the relationship with genetic predisposition, environmental factors and the influence of early exposure to allergens, contributing to the development of FA, especially in the first two years of life.[16] Then, as the immune system matures, these hypersensitivities are overcome during the transition to adulthood,[2] with only 10% of the group that already had this disease in early childhood persisting.[17]

Studies report that, among the most prevalent foods in the child population, cow's milk, eggs, soy and wheat are the most prominent allergens.[1] Thus, it is worth noting that the present study also highlighted these same foods as the main allergens and that CMPA in childhood deserves special attention, since, in this research, there was a prevalence of 24.3%. In national territory, there is a prevalence of 5.4% and an incidence of 2.2% of CMPA in children aged less than or equal to 24 months.[2,18,19]

Therefore, early diagnosis of this specific condition becomes essential, as it is a determining factor for therapeutic conduct, which is based on an exclusion diet and the use of infant formulas, affecting the immunological and emotional development of these children, in addition to impacting the mother-child relationship and financial aspects.[18,19] In the older age groups (21-50 years), the most prevalent allergy-causing foods in this study were seafood and fish, eggs, fruits and grains.[1,19] Similar results are found in the literature, where shellfish, dairy products, eggs and grains are among the most prevalent allergens in the study population.[20,21] This data is supported by scientific analyses that show that FA triggered by allergens such as peanuts, fish and seafood are considered persistent and, therefore, tend to remain from childhood to adulthood.[22] This occurs due to a failure in the allergen tolerability mechanism during the immune system maturation, since these foods have glycoproteins that are resistant to the digestion and cooking processes, favoring the phenomenon of cross-reactivity with other allergens that carry similar amino acids.[23,24]

The current exponential growth of adults and older adults, associated with environmental and lifestyle changes, has partially altered epidemiological data on FA, since the increasing incidence of this pathology even at advanced ages reveals the emergence of a new scenario for allergies, considering that the presence of FA among older adults is around 10%, with a tendency to increase

over the next few years.[25] However, underdiagnosis is still a reality for this age group, as the immunopathological mechanism related to the phenomenon of immunosenescence is not well understood, which also makes it difficult to recognize clinical manifestations, which may be present in small quantities, be confused with other age-related diseases, or even be masked by the use of medications.[1,17]

Another aspect of analysis is the presence of FA concomitant with other types of allergic diseases, with drug allergy, allergic rhinitis, atopic dermatitis (AD) and allergic asthma being the most frequent in both this study and in the literature.[26] Concerning drug allergy, there is still a lack of studies that demonstrate a direct association with FA. However, allergic rhinitis, AD and asthma are considered diseases of the atopic march, and there is an important predisposition relationship between these diseases and the development of FA, especially in children.[25] This relationship is due to the strongest known risk factor for FA, which is eczema, a classic clinical manifestation of AD, since the damaged skin barrier can allow the absorption of food allergens through the skin, triggering, in turn, an immunological response of food sensitization and allergy in the absence of pre-existing oral tolerance to these foods. However, this mechanism still remains inconclusive, being influenced by genetic and environmental theories.[16] Furthermore, cohort studies on the atopic march have shown that 40% of children with AD have FA, with the severity of this dermatological pathology being an aggravating factor for the development of food hypersensitivity. [27,28]

Therefore, the epidemiological study of patients with FA registered at the HUPAA Allergy and Clinical Immunology Outpatient Clinic is similar to that described in the world literature and serves as an epidemiological basis in the Brazilian population and in the Northeast region for new studies and future interventions in the area. There was a predominance of the disease in the pediatric group than in the adult group as well as the most frequent allergens, such as CMPA, cow's milk, eggs and seafood. Furthermore, the concomitant presentation of other allergies with FA, such as drug allergy, allergic rhinitis and allergic asthma, stood out, a situation that worsens the quality of life of patients with FA.

Thus, it is important to recognize FA in healthcare services, with the purpose of adopting measures in the planning of actions aimed at the diagnosis and treatment of these patients, which ratifies the need to value reference centers for allergic diseases in the Brazilian Health System to approach these patients and, with this, modify the growing scenario of this disease and its impacts on health and the economy.

It is also worth noting that the lack of a broad research arsenal in the area and the difficulty in accessing physical medical records were barriers that delayed the development of the study, making it necessary to expand the search for data and analysis time. Thus, it is essential to develop future studies on this topic so that the epidemiological understanding of FA acquires an increasingly broad analysis in the national scenario and that health promotion policies can be created in order to improve the quality of care for its carriers.

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AUTHORS' CONTRIBUTIONS

Vinícius Vital de Oliveira contributed to bibliographic research, abstract writing, introduction, methodology, discussion, interpretation and description of results, preparation of tables, conclusions, review and statistics. **Stephany Abdias Varjão** contributed to bibliographic research, abstract writing, introduction, methodology, discussion, interpretation and description of results, preparation of tables, conclusions, review and statistics. **Iramirton Figuêredo Moreira** contributed to project management, abstract writing, methodology, interpretation of results, conclusions and review.

All authors have approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and integrity.