

Epidemiological Profile and Associated Allergic Conditions of Atopic Dermatitis: Data from a Referral Service in Southeastern Brazil

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Abstract: *Background:* Atopic dermatitis is a chronic, inflammatory, and pruritic dermatosis of high prevalence, especially in childhood. a relevant public health issue. Atopic dermatitis is associated with several factors, including genetic, psychological, infectious, food, and environmental, and may be associated with other manifestations of atopy, such as asthma and rhinitis. *Objective:* To determine the epidemiological profile and the prevalence of personal and family history of allergy in children with atopic dermatitis at a referral service, comparing it to existing literature. *Methods:* We conducted a cross-sectional and descriptive hospital-based study involving children of both genders under 18 years with clinical diagnosis of atopic dermatitis (Hanifin and Rajka criteria) seen at the Pediatric Dermatology Outpatient Clinic of Hospital Municipal Universitário de Taubaté (HMUT), SP-Brazil, from October 2018 to April 2019. Epidemiological data and data related to personal and family history of allergies were collected from the medical records. Microsoft Excel 2019 was used for compilation and data analysis. *Results:* Of the 440 consultations in that period, 35 (7.9%) were for atopic dermatitis, of which 23 of them were females (65.7%) and 15 were phototype IV (42.9%); their mean age was 7.7 (standard deviation = 4.3), and the duration of disease ranged from 2 months to 14 years (mean 5.3 years; standard deviation = 4.3). Among the 35 patients, 31 (88.6%) manifested the condition by the fifth year of life. Personal history of allergies was observed in 27 individuals (77.1%), with a predominance of allergic rhinitis and in older age groups. *Conclusion:* This study, as a pioneer in the region, contributes to the epidemiological profile of patients with atopic dermatitis from the Pediatric Dermatology Outpatient Clinic of HMUT, revealing an early onset and a higher prevalence in females and individuals with higher phototypes. In addition, this study also demonstrated the prevalence of personal and family history of allergies in these patients, consistent with literature.

Keywords: Asthma; Atopic dermatitis/epidemiology; Atopic dermatitis/history; Food hypersensitivity; Rhinitis

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1. Introduction

Atopic dermatitis (AD) is a chronic inflammatory skin disease with high prevalence, especially in children ^[1]. It has a relapsing nature and is characterized by cutaneous xerosis and severe pruritus ^[2]. In the last three decades, the number of patients with AD has doubled or even tripled in most parts of the world, constituting a major public health problem, especially in industrialized countries ^[3-5].

The pathogenesis of AD includes alterations in skin barrier function, mutations in filaggrin gene, increased colonization by *Staphylococcus aureus*, and exacerbated Th2 immune response, with sensitization to allergens, increased immunoglobulin E (IgE) levels, and eosinophilia in peripheral blood [6].

There are several factors that have been associated with an increased risk of AD, including genetic factors, socioeconomic status, racial aspects, psychological factors, viral infections, parents who smoke, dietary factors, and environmental factors (exposure to dust, dust mites, and fungi, among other possible allergens) [7]. It is important to note that AD may be associated with other manifestations of atopy, such as asthma and allergic rhinitis, which occur more frequently in patients with severe or difficult-to-control AD [1].

The diagnosis of AD is essentially clinical and is based on the clinical-laboratory diagnostic criteria established by Hanifin and Rajka [3,8]. Investigations may support the diagnosis of AD but are insufficient to make a diagnosis [3,9].

Previous studies have highlighted that approximately 30% of children with AD develop asthma and 35% develop allergic rhinitis [10-13]. AD is usually the first manifestation of atopy in many patients who will also present with rhinitis, asthma, or both and/or even food allergy. This epidemiological pattern is known as the atopic march [10,14,15].

The association between AD and food allergy (FA) is estimated in approximately 35% of children with AD. In most patients, both conditions are transient and improve spontaneously in adolescence. Only a small percentage of adult patients who persist with AD have simultaneous FA [16,17]. AD and FA coexist predominantly in patients with early, aggressive, and persistent onset of AD [16,18,19]. FA, especially IgE-mediated FA, is considered an aggravating factor of AD [16].

Family history of atopy other than AD has been frequently referred to in literature, but rarely measured. Given this fact, we aimed to determine the epidemiological profile and prevalence of personal antecedents and family history of allergies in patients with AD under a referral service, comparing with data from literature.

2. Methods

This cross-sectional and descriptive hospital-based study involved children visiting the Pediatric Dermatology Outpatient Clinic of Hospital Municipal Universitário de Taubaté (HMUT) from October 1, 2018, to April 30, 2019.

This study included individuals of both genders, age ranging from 0 to 18, with a clinical diagnosis of AD (Hanifin and Rajka criteria). The following data were obtained from the medical records of these patients: epidemiological data (age, phototype, and gender) and data related to personal and family history of allergies (respiratory, food, drugs, and insect bites, among others). The majority of diagnoses were made clinically by a general practitioner, and occasionally, investigations (skin prick test and radioallergosorbent test [RAST]) were used to support the diagnosis. These data were already present in the medical records, regardless of the study in question.

The data were evaluated continuously and categorized. The program used for data analysis and compilation was Microsoft Excel 2019.

Since the study was based on medical records, the Free and Informed Consent (TCLE) was not required, but the protocols of the institution were adhered to in the publication of patient data. This study was approved by the Research Ethics Committee of the University of Taubaté (UNITAU), and the procedures were carried out in accordance with the regulations of the relevant clinical research ethics committee and those of the International Code of Medical Ethics of the World Medical Association (Declaration of Helsinki, as revised in 2013).

3. Results

From the 440 consultations in that period, 35 (7.9%) were for AD, among which 12 (34.3%) were males and 23 (65.7%) were females.

The average age of the patients was 7.7 (standard deviation, SD = 4.3), ranging from 6 months to 15 years. In 14 patients (40.0%), AD manifested in the first year of life, while in 31 patients (88.6%), it did not manifest until the fifth year of life.

Fifteen patients were phototype IV (42.9%), while 9 were phototype III (25.7%). The skin phototypes of the patients are shown in **Figure 1**.

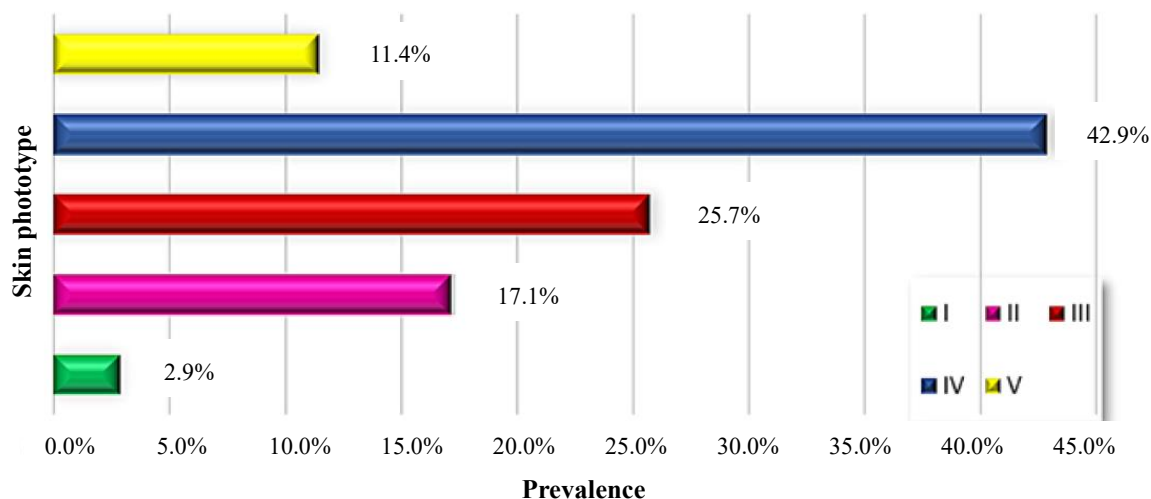


Figure 1. Skin phototypes of patients with atopic dermatitis based on Fitzpatrick scale

Of the 35 patients with AD, 27 (77.1%) reported a history of atopic pathologies and other related allergic conditions, and among them, 12 (34.3%) had two or more types of allergies. Allergic rhinitis (16 patients, 45.7%) predominated in this study, followed by prurigo strophulus (13 patients, 37.1%) and asthma/bronchitis (9 patients, 25.7%). The category “other allergies” had the lowest occurrence, with only 1 patient (2.9%) having dog hair allergy (pruritus on contact and positive RAST).

When we grouped rhinitis, asthma, and bronchitis into respiratory allergies, we observed their predominance (71.4%) over other categories. Food allergy was reported in 6 patients (17.1%), 5 being allergic to cow’s milk and one to egg white (RAST positive). Four patients were clinically diagnosed with drug allergies (11.4%); two to dipyrone (erythema multiforme and drug-fixed eruptions), one to ketoprofen (not discriminated), and one to amoxicillin (exanthema), as shown in **Figure 2**.

Analyzing the history of allergies by age group, 11 patients (40.7%) were 10 years of age or older, 10 patients (37.0%) were between 5 and 10 years old, and 6 patients (22.2%) were between 1 and 5 years old. No patient under 1 year of age was diagnosed with allergy other than AD (**Figure 3**).

Of the 35 patients with AD, 22 (62.9%) had family history of allergies.

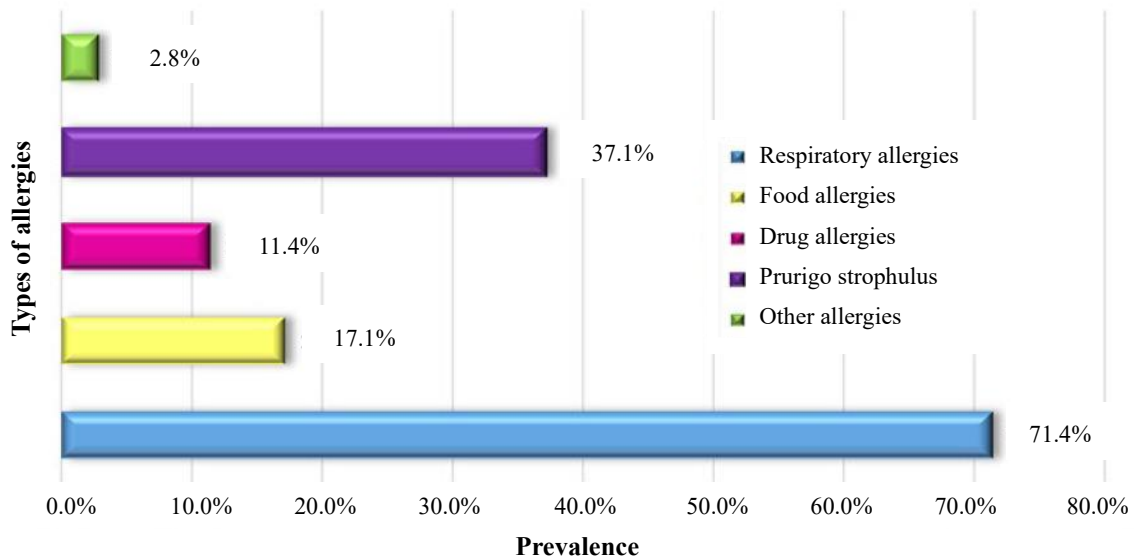


Figure 2. Atopic dermatitis and history of allergies

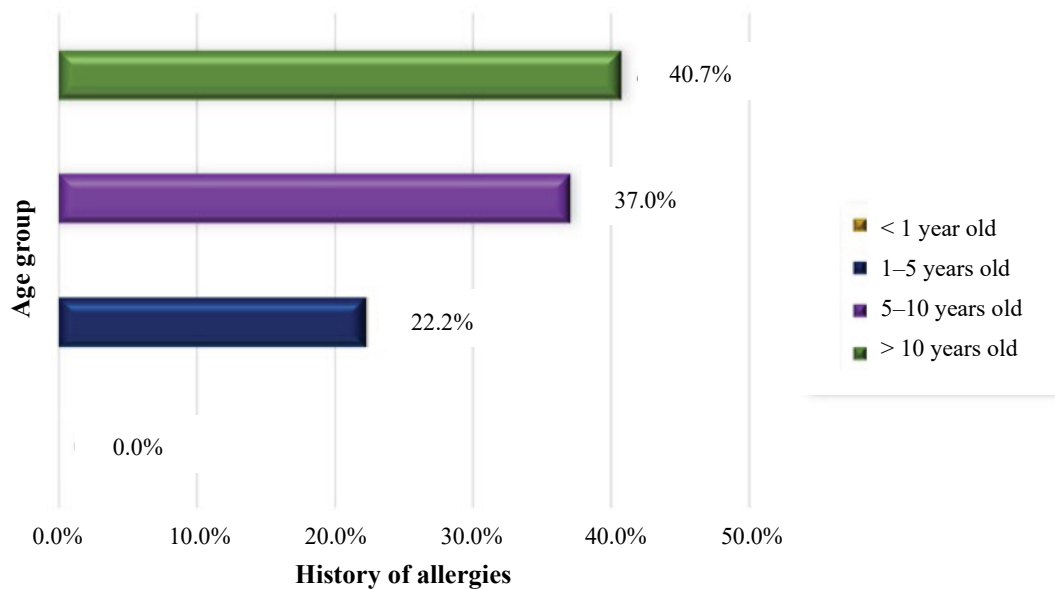


Figure 3. History of allergies by age group

4. Discussion

In this study, a pioneer in the Vale do Paraíba Paulista region, we analyzed the epidemiological profile and allergic conditions associated with AD.

From the epidemiological point of view, AD is one of the most common inflammatory dermatoses in childhood, often manifesting itself in the first years of life. Its prevalence is estimated to have increased during the last three decades ^[20,21]. According to the ISSAC (International Study of Asthma and Allergies in Childhood) study in 1999, the average prevalence of AD in Brazil is around 6.3%, as corroborated by the findings of this study (7.9%) ^[22].

Of children who develop AD, 50% manifest the condition by the first year of life and 30% from the first to the fifth year of life ^[23]. In the present study, 88.6% of children manifested AD by the fifth year of life, in agreement with the aforementioned literature.

Data regarding gender are scarce in literature. In his review on AD, Veiga ^[14] stated that both genders are equally affected until 6 years of age, but females would predominate beyond this age. This is consistent with our findings (65.7% female, mean age 7.7).

As to skin phototype, the predominance of higher phototypes in this study may be justified by the great racial miscegenation observed in our population. Previous studies have also shown correlations between atopic symptoms and higher phototypes ^[24].

In agreement with Belda *et al.* ^[10], our study showed allergic rhinitis as the most prevalent allergy in patients with AD. In terms of the prevalence of asthma/bronchitis in AD, our findings are also consistent with literature ^[10,11].

Only 17.1% of patients with AD in the present study were known to have FA, a percentage lower than that found by Rojas *et al.* ^[16]. However, these authors state that both of these conditions can be transient, indicating that some of the patients in the present study may later be identified as having FA.

The present study showed a higher prevalence of history of allergies in older patients (age above 10 or older), corroborating the theory of atopic march in which FA is the first atopic condition to manifest ^[10,14,15]. Family history of allergies other than AD was reported by approximately 63% of patients with AD in the present study, in agreement with Rivitti *et al.* ^[25], who reported a 70% family occurrence of atopy (eczema, asthma, or allergic rhinitis).

The small sample size, the short study period, and the incongruities and limitations in filling in the medical records are possible limitations of this study.

5. Conclusion

Through this pioneer study, the epidemiological profile of patients with AD at the Pediatric Dermatology Outpatient Clinic of HMUT was determined, revealing an early onset (about 89% up to 5 years of age) and a higher prevalence in females and individuals with phototype IV.

Furthermore, we also identified the prevalence of personal and family history of allergies in these patients, demonstrating the association of AD with other atopic pathologies (rhinitis, asthma, and food allergy) and thus corroborating the atopic march with other allergic conditions, such as prurigo strophulus, in line with existing literature.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Zaniboni MC, Samorano LP, Orfali RL, et al., 2016, Skin Barrier in Atopic Dermatitis: Beyond Filaggrin. *An Bras Dermatol*, 91(4): 472–478. <https://doi.org/10.1590/abd1806-4841.20164412>
- [2] Bruscky DMV, Melo ACCDB, Sarinho ESC, 2017, Cross-Cultural Adaptation and Validation of the Pruritus Severity Scale in Children and Adolescents with Atopic Dermatitis. *Rev Paul Pediatr*, 35(3): 244–251.
- [3] Campos ALB, Araújo FM, Santos MAL, et al., 2017, Impact of Atopic Dermatitis on Quality of Life of Pediatric Patients and Their Caregivers. *Rev Paul Pediatr*, 35(1): 5–10.
- [4] Watson W, Kapur S, 2011, Atopic Dermatitis. *Allergy Asthma Clin Immunol*, 7: S4.
- [5] Pérez PV, Ortiz DF, Águila R, et al., 2012, Prevalencia de Síntomas de Dermatitis Atópica en Niños y Adolescentes en la Habana (2002–2003) [Prevalence of Atopic Dermatitis Symptoms in Children and Adolescents in Havana (2002–2003)]. *Rev Cubana Med Gen Integr*, 28(1): 42–51.
- [6] Leite AC, Leite RM, Borges W, et al., 2000, Seria o Aleitamento Materno Capaz de Alterar a Intensidade

- das Manifestações de Atopia na Infância? [Would Breastfeeding be Capable of Altering the Intensity of Manifestations of Atopy in Childhood?]. *An Bras Dermatol*, 75(3): 311–319.
- [7] Giavina-Bianchi MH, Giavina-Bianchi P, Rizzo LV, 2019, Dupilumab in the Treatment of Severe Atopic dermatitis Refractory to Systemic Immunosuppression: Case Report. *Einstein*, 17(4): 1–4.
- [8] Hanifin JM, Rajka G, 1980, Diagnostic Features of Atopic Dermatitis. *Acta Derm Venereol*, 92: 44–47
- [9] Severity Scoring of Atopic Dermatitis: The SCORAD Index. Consensus Report of the European Task Force on Atopic Dermatitis, 1993, *Dermatology*, 186(1): 23–31.
- [10] Belda JW, di Chiacchio N, Criado PR, 2018, *Tratado de Dermatologia [Dermatology Treatise]* 3rd Ed, Atheneu, Rio Janeiro.
- [11] Luoma R, Koivikko A, Viander M, 1983, Development of Asthma, Allergic Rhinitis and Atopic Dermatitis by the Age of Five Years: A Prospective Study of 543 Newborns. *Allergy*, 38(5): 339–346.
- [12] Hanifin JM, Reed ML, 2007, A Population-Based Survey of Eczema Prevalence in the United States. *Dermatitis*, 18(2): 82–91.
- [13] Lowy G, Cestari SC, Cestari TF, et al., 2013, *Atlas Topográfico de Dermatologia Pediátrica do Diagnóstico ao Tratamento [Topographic Atlas of Pediatric Dermatology for Diagnosis and Treatment]* 2nd Ed, Revinter, Rio de Janeiro.
- [14] Veiga SP, 2012, Epidemiology of Atopic Dermatitis: A Review. *Allergy Asthma Proc*, 33(3): 227–234.
- [15] Sabin BR, Peters N, Peters AT, 2012, Chapter 20: Atopic Dermatitis. *Allergy Asthma Proc*, 33: S67–S69. <https://doi.org/10.2500/aap.2012.33.3553>
- [16] Rojas AR, Quezada LA, 2013, Relación Entre Dermatitis Atópica y Alergia Alimentaria [Relationship Between Atopic Dermatitis and Food Allergy]. *Rev Chil Pediatr*, 84(4): 438–450.
- [17] Worth A, Sheikh A, 2010, Food Allergy and Atopic Eczema. *Curr Opin Allergy Clin Immunol*, 10(3): 226–230. <https://doi.org/10.1097/ACI.0b013e3283387fae>
- [18] Greenhawt M, 2010, The Role of Food Allergy in Atopic Dermatitis. *Allergy Asthma Proc*, 31(5): 392–397. <https://doi.org/10.2500/aap.2010.31.3393>
- [19] Allen K, Dharmage SC, 2010, The Role of Food Allergy in the Atopic March. *Clin Exp Allergy*, 2010(40): 1439–1441. <https://doi.org/10.1111/j.1365-2222.2010.03605.x>
- [20] Sturgill S, Bernard LA, 2004, Atopic Dermatitis Update. *Curr Opin Pediatr*, 16(4): 396–401. <https://doi.org/10.1097/01.mop.0000133632.33920.dd>
- [21] Pontes LM, Sena NV, Souza MLP, et al., 2020, Epidemiological Profile of Patients with Atopic Dermatitis Assisted in the Dermatology Service of BWS, São Paulo-SP. *BWS J*, 3: e20060076.
- [22] William H, Robertson C, Stewart A, et al., 1999, Worldwide Variation in the Prevalence of Symptoms of Atopic Eczema in the International Study of Asthma and Allergies in Childhood. *J Allergy Clin Immunol*, 103: 125–138.
- [23] Freiberg IM, Eisen AZ, Wolff K, et al., 2003, *Fitzpatrick's Dermatology in General Medicine* 6th Ed, McGraw Hill, Bethesda.
- [24] Curi VC, de Macedo AC, Sakai FD, et al., 2010, Prevalência de Pitiríase Alba em Pacientes com Dermatite Atópica na Infância, de Acordo com o Fototipo [Prevalence of Pityriasis Alba in Patients with Atopic Dermatitis in Childhood According to the Phototype]. *Rev Bras Med*, 67: lil-555292.
- [25] Rivitti EA, 2018, *Dermatologia [Dermatology]* 4th Ed, Artes Médicas, São Paulo.

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