

ORIGINAL RESEARCH

Descriptive cross-sectional assessment of the comorbidities and environmental factors associated with atopic dermatitis in children and adults in dermatology-venereology

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ABSTRACT

Aim:The objective of this work was to document the comorbidities and environmental factors associated with atopic dermatitis (AD) in dermatology Venereology. **Methods:**A descriptive cross-sectional study was carried out in the Dermatology-Venereology. In the Dermatology-Venereology Department over the study period, we received 960 children and 2254 adults. Of these 960 children and 2254 adults, 200 children and 100 adults had AD. **Results:**Children between 0 and 5 years of age made up the majority of patients, 52% of the pediatric population, while young adults between 19 and 30 years of age made up the majority (40%) of the adult population. The median age at the time of the first episode was 4.7 years \pm 4.6 in children. Among adults, the median age at the time of the first episode was 31.9 years \pm 17. The main associated comorbidities were rhinitis and conjunctivitis in both children and adults but in different proportions: 50% of cases of rhinitis and 35% of cases of conjunctivitis in children against 34% and 25%, respectively, in adults. Asthma was present in 15% of children. **Conclusion:**In the Dermatology-Venereology Department, atopic dermatitis was associated with other atopic manifestations, the most frequent of which were rhinitis, conjunctivitis, and asthma. Environmental factors such as regular deworming, full vaccination, and living in an urban area were associated with the occurrence of AD. Heat associated with high humidity, skin irritants, and pneumallergens were reported in significant proportions.

Key words:Co-morbidities, environmental factors, atopic dermatitis

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INTRODUCTION

Typical comorbidities in patients with atopic dermatitis (AD) include allergic asthma, allergic rhinoconjunctivitis and food allergy¹. In addition, it has been shown that AD is associated with a number of other diseases, particularly autoimmune disorders such as rheumatoid arthritis, inflammatory bowel disease², systemic lupus erythematosus³, vitiligo⁴, and alopecia areata⁵⁻⁷. As early as 1942, atopic individuals were described as being tense, nervous, depressed, introverted and anxious⁸.

Atopic dermatitis (AD) is a chronic and recurrent pruritic inflammatory dermatosis that preferentially

affects infants. Worldwide, its prevalence has doubled or even tripled in the last 30 years⁹⁻¹¹. Several studies show that it is not a simple disease, but a skin condition with many different genetic and immunological mechanisms and underlying environmental factors. These factors influence the prevalence and clinical expression of the disease in different age groups, geographical regions and races¹²⁻¹⁶.

Atopic eczema (AE) is one of the most common inflammatory skin diseases¹⁷. The pathogenesis of AE is multifactorial resulting from a complex interaction between genetic and environmental factors. The onset

of AE is usually in early childhood, that often persists into or may begin in adulthood¹⁸. The lifetime prevalence of AE ranges from 7-20% in children, and it is considered to be one of the major allergic diseases alongside asthma and allergic rhinitis¹⁹. AE is characterized by an itchy rash, with typical morphology, site and age-specific patterns, which are chronic and relapsing. This chronic condition imposes a great burden on the family and patient, regardless of age. This burden has psychosocial, educational and occupational impacts, in addition to major financial burden via direct medical costs and decreased productivity²⁰. The Global Burden of Disease Study stated that the burden of dermatitis as assessed by Disability-Adjusted Life Years is high²¹.

The objective of this work was to document the comorbidities and environmental factors associated with atopic dermatitis (AD) in dermatology Venereology.

MATERIALS AND METHODS

A descriptive cross-sectional study was carried out in the Dermatology-Venereology. In the Dermatology-Venereology Department over the study period, we received 960 children and 2254 adults. Of these 960 children and 2254 adults, 200 children and 100 adults had AD.

The children and adults diagnosed with AD, after the free and informed consent of adult patients and regarding to children, those of their parents. The study was approved by the department head. The diagnostic criteria of the United Kingdom Working Party were used for the diagnosis of AD in children under 10 years of age⁹. In children over 10 years of age and adults, anamnestic (personal history of pruritic dermatosis, personal or family history of asthma, and/or allergic rhinitis or other atopic manifestations) and clinical (morphological and topographical aspects characteristic of AD in older children, adolescents, and adults, the presence of minor signs of atopy) arguments were used to establish the diagnosis of

AD^{22,23}. Sampling was exhaustive, non-probabilistic and nonrandomized and included all patients admitted to dermatology consultations who met the inclusion criteria.

According to the period of onset in adults, AD was classified as persistent when the first onset occurred in childhood, before 18 years of age and late when the first onset occurred after this period²². The degree of severity was assessed with the SCORAD (scoring of atopic dermatitis). The triggering and/or aggravating environmental factors were identified on the basis of the patients' allegations. The triggering factors sought were pneumallergens (house dustmites, pollen, mold, pet dander and smoke), infections, teething in infants, skin irritants (perfumed products, detergents and synthetic or woolen clothing), trophallergens (milk, egg white, peanuts, soy, shellfish and okra), psychological factors (stress and psychoaffective conflicts in adolescents and adults), hormonal factors in girls (premenstrual period), and physicochemical and climatic factors (sweat, heat, cold, and harmattan). Allergological tests, such as specific immunoglobulin E assays, prick tests, and patch tests, were not available to assess the relevance of the environmental factors reported by the patients. We relied on a thorough medical history (police-like questioning) to determine the notion of the cause and effect in the occurrence or recurrence of AD flare-ups in these patients. In case of a negative or doubtful answer, no factor was retained. The study was approved by local ethics committee of faculty of health sciences.

Demographic, socioeconomic, and clinical data were entered and analyzed with Epi-Data 3.1 and Epi-Info 7.0 softwares. The search for links between the occurrence of dermatosis and the other independent variables under study was carried out by univariate analysis; Pearson's chi-square or Fischer's test was used to search for the association between the variables. Results were significant when $p < 0.05$.

RESULTS

Table 1: Age distribution

0-5	104	52
6-10	56	28
Children 11-15	32	16
16-18	8	4
Total	200	100
19-30	40	40
31-40	25	25
Adults 41-50	15	15
51-60	12	12
>60	8	8
Total	100	100

Children between 0 and 5 years of age made up the majority of patients, 52% of the pediatric population, while young adults between 19 and 30 years of age

made up the majority (40%) of the adult population. The median age at the time of the first episode was 4.7

years \pm 4.6 in children. Among adults, the median age at the time of the first episode was 31.9 years \pm 17.

Table 2: Triggering or aggravating environmental factors

	ChildrenNumber(%)	P-value	AdultsNumber(%)	P-value
Rhinitis	100(50)	0.720	34(34)	0.640
Conjunctivitis	70(35)	0.430	25(25)	0.412
Asthma	30(15)	0.001	16(15)	0.240
ComorbiditiesSinusitis	8(4)	0.325	27(25.2)	0.720
Foodallergy	6(3)	—	4(3.7)	—
Drugallergy	0(0)	—	3(2.7)	—
Prurigo strophulus	6(3)	—	0(0)	—
AntecedentsDeworming	120(6)	0.012	48(48)	0.732
Vaccination	110(55)	0.001	—	—
Urban	110(55)		60(60)	
ResidencePeriurban	80(40)	0.002	38(38)	0.036
Rural	6(3)		3(3)	
	Dry season	90(45)	40(40)	
	Rainy season			
	Heat	84(42)	— 48(48)	—
	Pneumallergens	56(28)	— 35(35)	—
	Skin irritants	44(22)	— 58(58)	—
Triggering and/or aggravating factors	Trophallergens	35(17.5)	— 14 (14)	—
	Psychological	28(14)	— 34(34)	—
	Infections	20(10)	— —	—
	Teething	16(8)	— —	—

The main associated comorbidities were rhinitis and conjunctivitis in both children and adults but in different proportions: 50% of cases of rhinitis and 35% of cases of conjunctivitis in children against 34% and 25%, respectively, in adults. Asthma was present in 15% of children.

DISCUSSION

Our study confirms the high prevalence of AD in children (16.71%) is pediatric prevalence is significantly higher than that reported in Abidjan (Cote d'Ivoire) in 2017²⁴. Several studies confirm the increase in AD prevalence over the last 10 years, particularly in developing countries¹²⁻¹⁴. In Africa, the prevalence of AD varies from country to country between 4.7% and 23%²⁵. Genetic factors alone are therefore not sufficient to explain the increase in AD around the world. There is a complex interrelation between these factors and environmental factors, which partly explains this observed disparity. The comorbidities frequently found in both children and adults were rhinitis and conjunctivitis. According to some authors, AD is considered the first manifestation of atopic gait, followed by food allergy, asthma and rhinitis or rhinoconjunctivitis^{9,26}. These allergic manifestations are often found in high proportions in atopic patients²⁶⁻²⁸. According to some authors, the risk of developing allergic rhinitis and asthma in the presence of AD is more or less important²⁹.

Considered as the key initiating event of atopic march, the alteration of the skin barrier accounts for the link between atopic dermatitis and subsequent atopic diseases^{29,30}. In our study, asthma, which is

significantly more frequent in adolescents and the multiplicity of allergic diseases, associated with the onset of AD, confirm this hypothesis. However, the notion of an atopic march has recently been controversial. On the one hand, some authors believe that allergic manifestations, collected on the basis of patient claims, are overestimated in most studies^{31,32}. On the other hand, AD is not always associated with other allergic manifestations. It has been suggested that these different manifestations, while sharing genetic and environmental risk factors, are independent conditions that can develop concomitantly or sequentially on an atopic site³². However, the concept of atopic march offers the possibility of research on the pathogenesis prospects for the prevention and treatment of atopic diseases. Correct measures to maintain or restore skin barrier function may help minimize the risk of developing allergic manifestations.

Heat was a reported contributing factor for both children and adults. The majority of flare-ups occurred during the hot season. A high temperature causes sweating, which becomes more important when humidity increases. This weather condition is the one observed in our region, hence the high frequency of this factor. Sweat can irritate the skin due to its acidic pH. This could promote Th2 inflammation, increased skin blood flow and a pruritogenic mechanism via nerve endings in the skin. There is not only a correlation between temperature and other climatic factors, namely, humidity, exposure to ultraviolet rays but also the pollen concentration in the environment, alteration of barrier function, and

skin irritants. This indicates the important role of climate and even climate change, in the increase in flare-ups of AD^{12,16}. Our study also confirms the role of skin irritants in the occurrence of flare-ups. Intrinsic barrier dysfunction can be aggravated when environmental factors such as soap and detergents cause further degradation of the epidermal barrier and irritants and allergens can interact with the immune system and promote inflammation. These irritants are thought to promote the synthesis of immunoglobulin E and sensitization to allergens³³. Similarly, the use of detergent or lightening soaps was associated with specific clinical forms of AD.

CONCLUSION

In the Dermatology-Venereology Department, atopic dermatitis was associated with other atopic manifestations, the most frequent of which were rhinitis, conjunctivitis, and asthma. Environmental factors such as regular deworming, full vaccination, and living in an urban area were associated with the occurrence of AD. Heat associated with high humidity, skin irritants and Pneumallergens were reported in significant proportions.

Multivariate analysis studies on a large series in the general population, supported by the demonstration of these factors using allergological tests and will provide a better understanding of these factors and their role in the onset or aggravation of atopic dermatitis. All these will contribute to a better knowledge of the pathophysiology of the disease and to a better therapeutic and above all preventive approach.

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