



# Risk factors that influence atopic dermatitis in children from 0 to 12 years of age. A single-center observational study.

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## Abstract

**Introduction:** Atopic dermatitis (AD) is a chronic inflammatory skin disease that is highly prevalent in the pediatric population; AD is characterized by eczema and pruritus and is strongly linked to a genetic predisposition. Its incidence is on the rise, and its association with other allergic conditions significantly impacts quality of life. This study aimed to identify the risk factors that influence AD among children aged 0 to 12 years in a provincial hospital in Ecuador.

**Methodology:** The present observational study was conducted at the Verdi Cevallos Balda Provincial Hospital of Portoviejo (Ecuador) from September 2013 to February 2014. Patient records from 0 to 12 years of age who came to the emergency department with a diagnosis of atopic dermatitis. The variables included age, sex, origin, etiology, symptoms, associated external factors, comorbidities, visible lesions on physical examination, type of dermatitis and treatment. Descriptive statistics were used.

**Results:** A total of 128 patients were analyzed. There were 68 men (53.1%) and 60 women (46.9%). From 0 to 1 year 12 (7.1%), from 1 to 4 years 41 (24.4%), from 5 to 9 years 33 (19.6%), and from 10 to 12 years 42 (28.6%). Ninety-one percent of the cases are from urban areas. Pruritus was the main symptom in 63% of the patients. A family history of atopy was present in 70% of the patients. The external factors included food (34%), insects (27%), and medications (9%). The most prevalent lesions present in the physical examination were rashes (60%) and erythema (28%). Oral corticosteroids were used in 66% of patients, and antihistamines were used in 33% of patients.

**Conclusions:** This retrospective study of 128 children with atopic dermatitis revealed a strong genetic predisposition with a family history and a high concentration in urban areas. Pruritus was the main symptom that prompted the emergency consultation. The primary external triggers were food and insects, with the management of the crisis primarily focused on the use of oral corticosteroids.

## Keywords:

Atopic dermatitis, children, external factors, pruritus.

## Abbreviations

AD: Atopic dermatitis.

## Supplementary information

No supplementary materials are declared.

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## Authors' contributions

**Luz Pilar Alcívar Solórzano:** Conceptualization, Research, Writing—original draft, Resources, Software, Supervision.

**Patricia Geoconda Álava Moreira:** Methodology, Data curation, Formal analysis, Acquisition of funds, Project administration, Validation, Visualization, Writing - review and editing.

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## Availability of data and materials

The datasets used and analyzed during this study are available to the corresponding author upon reasonable request.

## Introduction

The skin is the protective barrier of the internal environment and is susceptible to various conditions, with atopic dermatitis (AD) being among the most prevalent, especially in the pediatric population. AD is a chronic inflammatory skin disease characterized by edema and pruritus that can sometimes be confused with other infectious or parasitic skin conditions [1]. "The term "atopia" is closely related to a genetic predisposition to develop allergic reactions, manifested through hypersensitivity to external factors such as food and chemicals, which trigger an inflammatory cascade and give rise to characteristic eczematous lesions [2].

AD is not an isolated condition and is often linked to other atopic issues, such as asthma, allergic rhinitis, and food allergies, forming a sensitization spectrum that greatly affects the quality of life of affected children [3]. The most concerning trend is that the prevalence of NHBD is steadily rising, both in developed countries, with rates above 15%, and in developing nations, with rates around 5%, and both are increasing [4].

This disease has a marked prevalence in childhood, with a gradual decrease in intensity as the child grows. Sixty percent of cases present in the first six months of life, 85% before five years of age, and only 10% after seven years [5]. In addition, a hereditary or genetic factor is commonly identified, with 70–80% of affected children presenting a family or personal history of atopic diseases. The chronic nature of the NHBD not only imposes a significant burden on the clinical care of patients but also has a considerable socioeconomic impact on families because of the costs associated with prolonged treatments [6].

Given the early age of onset, the association with other allergic diseases, the strong influence of family history, and the worrying increase in its incidence, the diagnosis of atopic dermatitis should be early, and treatment should be timely. With this background, it is necessary to fully understand the factors that modulate its appearance and evolution in the child population. Therefore, in the present study, we formulate the following research question: What are the risk factors that influence atopic dermatitis among children aged 0 to 12 years in the emergency area of Verdi Cevallos Balda Provincial Hospital in the period from September 2013 to February 2014? To address this question, we present an observational study conducted at a provincial reference center for pediatric care.

## Materials and methods

### Study design

The present study is observational. The source is retrospective.

### Scenario

This study was developed in the Statistics Department of the Provincial Hospital Verdi Cevallos Balda, of the Ministry of Public Health of Ecuador, located in Portoviejo, in the province of Manabí (Ecuador), during the period from September 1, 2013, to February 28, 2014.

### Participants

Records of patients aged 0 to 12 years who came to the emergency department with a diagnosis of atopic dermatitis were included.

### Variables

The variables included age, sex, origin, etiology, symptoms, associated external factors, comorbidities, visible lesions on physical examination, type of dermatitis, and treatment.

### Data sources/measurements

The source was indirect; an electronic form was used to record the data of the institutional medical history. To investigate the cases, multiple searches were performed for patients diagnosed with atopic dermatitis, allergic contact eczema, contact eczema, dyshidrotic eczema, neurodermatitis, nummular eczema, seborrheic eczema, drug dermatitis, and dehydrated dermatitis, with the following diagnoses. ICD-10 codes and diagnoses from L20 to L30.

### Bias

Observation and selection bias were avoided by applying the participant selection criteria. To avoid possible interviewer, information and memory biases, the principal investigator kept the data at all times with a guide and records approved in the research protocol. Two researchers independently analyzed each record in duplicate, and the variables were recorded in the database once their agreement was verified.

### Study size

The sample was probabilistic. In 2024, Portoviejo had 322,925 inhabitants, with a population aged 0–12 years comprising 20.51% (66,231 patients), corresponding to a prevalence of 15% atopic dermatitis among children. The target population is 9934 cases as the study population. With a 90% confidence level, a 5% confidence limit, and an expected

frequency of 13.4%, the calculated sample size was 124 cases. Epi Info™ version 7.2 was used (CDC, Atlanta, March 9, 2025).

### Quantitative variables

Descriptive statistics were used. The results are presented as frequencies and percentages. Variables on the scale were not converted into categorical variables.

### Statistical analysis

The qualitative variables were analyzed using frequencies and percentages. The statistical software used was IBM SPSS Statistics for Windows, Version 26.0, released by IBM Corp. in 2018, located in Armonk, NY.

## Results

### Participants

A total of 128 patients who met the inclusion criteria were analyzed, which ensured that 100% of the sample calculation was met.

### Characteristics of the study group

There were 68 men (53.1%) and 60 women (46.9%) (Table 1 and Figure 1).

**Table 1.** General description of patients with atopic dermatitis.

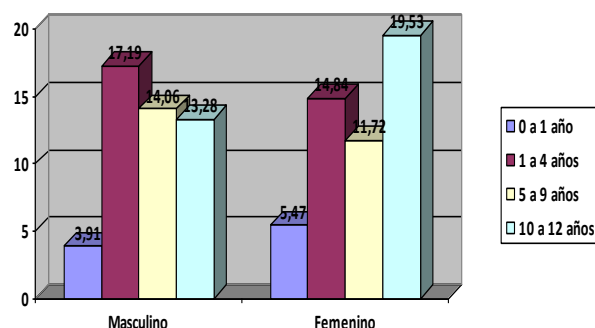
n=25	Men N=68	Women N=60	Total n=168
0 to 1 year	5 (7.35%)	7 (11.67%)	12 (7.1%)
1 to 4 years	22 (32.35%)	19 (31.67%)	41 (24.4%)
5 to 9 years	18 (26.47%)	15 (25.0%)	33 (19.6%)
10 a 12 años	17 (25.0%)	25 (41.67%)	42 (28.6%)

$\chi^2$ ,  $P=0.69$

### Origin, etiology, and internal factors

The majority of cases (91%) originated from urban areas, and the acquired etiology was present in 98% of cases. Pruritus was the main symptom in 63% of the patients. A family history of atopy was present in 70% of the patients (Table 2).

**Figure 1.** Incidence of MDR-TB in HIV+ patients between 20 and 64 years in the period 2019-2020.



### External factors, physical examination, type of dermatitis, and treatment.

The external factors present in the patients were food, which was associated with insects (27%), and medications (9%). The most prevalent lesions present in the physical examination were rashes (60%) and erythema (28%).

The type of clinical lesion was contact eczema in 82% of the patients. Oral corticosteroids were used in 66% of the patients, and antihistamines were used in 33% of the patients (Table 3).

**Table 2.** General description of patients with atopic dermatitis.

n=25	Frequency N=168	Percentage
<b>Origin</b>		
Urban origin	117	91.0%
Rural origin	11	9%
<b>Etiology</b>		
Acquired etiology	126	98%
Congenital etiology	2)	2%
<b>Symptomatology</b>		
Pruritus	81	63%
Burning	20	16%
Pain	16)	12%
Dry skin	6	5%
Others	5	4%
<b>Internal factors</b>		
Family history of atopy	90	70%
Age	38	30%

**Table 3.** External factors in patients with atopic dermatitis.

External factors	Frequency	Percentage
Food	43	34%
By insects	34	27%
Medications	12	9%
Perfumes and makeup	10	8%
Soaps and cleaners	7	6%
Environmental	7	5%
Moisture	5	4%
Water	4	3%
Per diaper	3	2%
<b>Physical examination lesions</b>		
Skin eruptions	77	60%
Erythema	36	28%
Dry and itchy skin	8	6%
Blisters	7	6%
<b>Type of dermatitis</b>		
Contact eczema	105	82%
Nummular eczema	9	7%
Dyshidrotic eczema	7	5%
Drug dermatitis	3	2%
Allergic contact eczema.	2	2%
Dehydrated Dermatitis	2	2%
<b>Treatment</b>		
Corticosteroids	84	66%
Antihistamines	43	33%
Topical creams or ointments	1	1%

## Discussion

The present retrospective study focused on identifying risk factors and clinical characteristics of atopic dermatitis (AD) in a pediatric population (0–12 years) treated in the emergency department of a provincial hospital in Ecuador. The present findings are consistent with the international literature regarding the high incidence, multifactorial etiology, and symptom burden [7].

The distribution by sex in the present sample (53.1% men and 46.9% women) did not significantly differ ( $\chi^2$ ,  $P=0.69$ ), a result that aligns with studies indicating an equal prevalence between sexes in childhood, although some research reports a slight male predominance in early stages. The highest proportion of cases in the 1–4 years (24.4%) and 10–12 years (28.6%) groups likely reflects two peaks of disease presentation since this incidence is not population-wide but results from local referrals to a specialized center. The high percentage of patients from urban areas (91%) is a notable finding that suggests environmental factors and related lifestyles, such as exposure to contaminants or diet, may play a role and warrant further investigation. future etiological research.

The predominance of acquired etiology (98%) results from the interaction between genetic susceptibility and external triggering factors. This is supported by the finding of a family history of atopy in 70% of cases, which aligns with the literature estimating a hereditary factor in 70–80% of affected children. This further emphasizes the importance of genetic predisposition in the development of AD. Regarding symptoms, pruritus was by far the most common manifestation (63%), confirming that pruritus is the hallmark symptom of NHBD and the primary reason for seeking emergency care. The identification of food (34%) and insects (27%) were the main associated external factors. The association with food can be linked to the well-known condition of atopy, where AD precedes or coexists with food allergies [8–10]. The high rate of association with stings or contact with insects could be magnified by the nature of the study in a subtropical region, where exposure to environmental allergens and the insects themselves is greater, triggering exacerbations that require urgent management.

At the clinical level, the findings of rashes (60%) and erythema (28%) as the most common lesions on physical examination are consistent with the acute and subacute phases of the disease. However, the fact that contact eczema was the most common type of clinical lesion (82%) deserves deep reflection. It is possible that the use of broad search criteria (including “allergic contact eczema”) or the atypical presentation of NHBD in an emergency setting resulted in diagnostic classification bias in the records. NHBD is fundamentally an atopic eczema, and although it can simulate contact eczema, the latter has a different etiology (type IV hypersensitivity reaction). Therefore, this high frequency could be a reflection of the diagnostic subprocess in emergencies rather than the actual etiology, which suggests the need to standardize the diagnostic criteria of the NHBD in hospital triage.

The high use of oral corticosteroids (66%) and antihistamines (33%) in initial management is due to the severity of the exacerbations that reach the emergency department. Systemic corticosteroids are used to rapidly control inflammation and severe itching, while antihistamines aim to reduce the main symptoms. The low usage of topical creams or ointments (1%) is notable, likely because this is an emergency setting, where topical therapies are more commonly used for outpatient or chronic management rather than acute crises.

The results validate the relevance of a family history of atopy and exposure to external factors (such as food/insects) as the primary modulators of AD in this pediatric population. The main limitation of this retrospective observational study lies in the reliance on clinical history records, which may have

introduced information and classification bias, especially in the diagnosis of the type of eczema.

Despite these limitations, this work provides a foundation for understanding the epidemiology of the AD in this province and serves as a basis for implementing clinical guidelines and training emergency personnel in the differential diagnosis and timely management of the disease. pediatric atopic dermatitis.

## Conclusions

This retrospective study on atopic dermatitis (AD) in children aged 0 to 12 years treated emergently revealed that the disease in this population is strongly modulated by a genetic predisposition, as evidenced by a family history of atopy in 70% of cases. Pruritus was the main symptom that motivated the consultation (63%) and was a cardinal symptom of the NHBD. Among the triggering factors, exposure to food (34%) and insects (27%) stood out as the main associated external factor. Additionally, 91% of the cases involved urban areas, suggesting a possible influence of environmental factors and urban lifestyles. Clinically, the management of acute emergencies focused on reducing inflammation and severe pruritus, with the predominant use of oral corticosteroids (66%) and antihistamines (33%).

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## Statements

### Ethics committee approval and consent to participate

The study was approved by the Bioethics Committee of the Faculty of Health Sciences at the Technical University of Manabí.

### Consent for publication

This information was not needed because the present study did not publish images, radiographs or specific studies of patients.

### Conflicts of interest

This research has no financial interests or conflicts of interest.

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