



## ECZEMA PREVALENCE AND ASSOCIATED FACTORS IN A CITY IN BRAZIL'S NORTHEAST

### PREVALÊNCIA DO ECZEMA E FATORES ASSOCIADOS EM UMA CIDADE DO NORDESTE DO BRASIL

### PREVALENCIA DEL ECZEMA Y FACTORES ASOSIADOS EN UNA CIUDAD DEL NORESTE DE BRASIL

Diego Augusto Medeiros Santos<sup>1</sup>, Kelvyn Melo Vital<sup>2</sup>, Ana Carolina Neves Costa e Silva<sup>3</sup>,  
Emily Anara Oliveira Nascimento<sup>4</sup>, Auxiliadora Damianne Pereira Vieira Costa<sup>5</sup>, Mércia  
Lamenha Medeiros<sup>6</sup>

#### RESUMO

**Objetivos:** identificar a prevalência e analisar os fatores associados ao eczema entre adolescentes de 13 e 14 anos em Maceió, uma capital do Nordeste brasileiro. **Método:** trata-se de um estudo transversal, participante do *Internacional Study of Asthma and Allergies in Childhood (ISAAC)*, examinando adolescentes de escolas públicas e privadas, com coletas realizadas em dois momentos, 2002 e 2012. A análise estatística descritiva foi realizada por meio de frequências simples, média e desvio-padrão. Para o estudo dos fatores associados, utilizou-se análise bivariada por meio de OR - razão de chance e qui-quadrado. **Resultados:** a prevalência do eczema foi de 7,5% (2002) e de 4% (2012). Na análise bivariada entre os portadores de eczema, foram identificados os seguintes fatores associados: ter ambos os pais com eczema; tipo de piso; uso de travesseiro; ter irmão mais novo; frequentar creches e hábitos alimentares como o consumo de peixes, frutas e aleitamento materno até quatro meses de vida. **Conclusão:** este é o primeiro estudo, em Maceió, do qual se tem nota, com o objetivo de avaliar a prevalência em dois momentos, bem como tentar identificar fatores associados ao eczema entre adolescentes. Os dados encontrados podem auxiliar os profissionais da saúde, portadores e familiares quanto a uma melhor compreensão da enfermidade e dos fatores associados.

**Palavras-chave:** Eczema; Hereditariedade; Fatores de Risco.

#### ABSTRACT

**Objective:** to identify prevalence and analyze factors associated with eczema among 13- and 14-year-old adolescents in Maceió, a capital of northeastern Brazil. **Method:** this is a cross-sectional study, participating in the International Study of Asthma and Allergies in

<sup>1</sup>Resident. São Paulo University. Ribeirão Preto (SP), Brazil.

<sup>2,3,4</sup>Doctors. Federal University of Alagoas. Maceió (AL), Brazil.

<sup>5,6</sup>PhD. Federal University of Alagoas. Maceió (AL), Brazil.

Childhood (ISAAC), examining adolescents from public and private schools, with collections performed in two moments, 2002 and 2012. Descriptive statistical analysis was performed using simple frequencies, mean and standard deviation. For the study of associated factors, bivariate analysis was used by OR - odds ratio and chi-square. **Results:** the prevalence of eczema was 7.5% (2002) and 4% (2012). In the bivariate analysis among eczema patients, the following associated factors were identified: having both parents with eczema; floor type; pillow use; have younger brother; attend daycare centers and eating habits such as eating fish, fruits and breastfeeding up to four months of life. **Conclusion:** this is the first study, in Maceió, of which it is noted, aiming to evaluate the prevalence in two moments, as well as to try to identify factors associated with eczema among adolescents. The data found may help health professionals, patients and families to better understand the disease and associated factors.

**Keyword:** Eczema; Heredity; Risk Factors.

## RESUMEN

**Objetivo:** identificar la prevalencia y analizar los factores asociados con el eccema entre los adolescentes de 13 y 14 años en Maceió, una capital del Noreste de Brasil. **Método:** es un estudio transversal, participante del *Internacional Study of Asthma and Allergies in Childhood* (ISAAC), examinando adolescentes de escuelas públicas y privadas, con recolección realizadas en dos momentos, 2002 y 2012. El análisis estadístico descriptivo a través de frecuencias simples, mediana y desviación estándar. Para el estudio de los factores asociados, se utilizó el análisis bivariado por OR-chance ratio y Chi-cuadrado. **Resultados:** la prevalencia de eccema fue del 7,5% (2002) y del 4% (2012). En el análisis bivariado entre pacientes con eccema, se identificaron los siguientes factores asociados: tener a ambos padres con eccema; tipo de piso; uso de almohadas; tener hermanos menores; frecuentar a guarderías y hábitos alimenticios como el consumo de pescados, frutas y lactancia materna hasta cuatro meses de vida. **Conclusión:** este es el primer estudio, en Maceió, que hemos observado, con el objetivo de evaluar la prevalencia en dos momentos, así como tratar de identificar los factores asociados con el eccema entre los adolescentes. Los datos encontrados pueden ayudar a los profesionales de la salud, portadores y familiares a comprender mejor la enfermedad y los factores asociados.

**Palabras-clave:** Eccema; Herencia; Factores de Riesgo.

## INTRODUCTION

Atopic Eczema (AE) is a chronic inflammatory skin disease and is one of the most prevalent pathologies, with worldwide geographic variability between 1% and 20%.<sup>1</sup> Characterized by the symptom of severe itching accompanied by eczematous lesions, it needs attention because it has a great impact on social and psychological aspects.<sup>2</sup>

Prevalence and risk factors for eczema were understood thanks to the International Study on Asthma and Allergies in Childhood (ISAAC), which aimed to study asthma and allergic diseases from standardized questionnaires.<sup>1,3</sup> The study was developed in three phases: to evaluate the prevalence and severity of asthma and atopic diseases; identify possible risk factors related to phase I findings; repeat phase I after a period of five years to assess the temporal trends

in the prevalence of these diseases.<sup>3</sup> ISAAC allowed for a comparison between 153 centers in 56 countries where the prevalence of eczema was always higher for younger children.<sup>4</sup>

In this multicenter study (ISAAC), we sought to understand how atopic diseases behaved in different countries and continents. Atopy is an inherited predisposition of the immune system to favor type I hypersensitivity reactions, ie those that are IgE-mediated following mast cell stimulation provided by Th2 stimulation. This immune reaction occurs in response to antigens - or allergens - that are common to the home environment and even the external environment with which the individual has contact.<sup>4-5</sup> Initially, the term atopy related only to asthma and rhinitis, but ten years later, in 1933, those responsible for the term (Coca and Cooke) also classified atopic dermatitis as atopy by pattern similarity.<sup>6</sup>

Allergens are chemicals that contain a protein character, either by their own constitution or by association with glycosylated proteins that are soluble in body fluids. In this way, allergens are protected from denaturation and degradation, which allows them to be absorbed intact.<sup>6</sup>

Studies on genetic, environmental and dietary factors are relevant in view of their participation in the determination of atopic diseases and how they manifest themselves in various individuals.<sup>6</sup> Eczema has a multifactorial genetic character, which makes the study more complex.<sup>7</sup> Environmental factors that are studied in this paper include exposure to mold and the indoor environment. Aspects linked to breastfeeding and diet may be related to variations.

Atopic diseases, in general, had an increase in prevalence, as life habits changed, becoming more conducive to their onset. Housing forms, the use of curtains and cushions, new eating habits and major hygiene concerns may have contributed to the increase in the rates of these atopies or even increased their morbidity.<sup>8</sup>

The participation of research centers under the ISAAC protocol contributed to the greater representativeness of the data, at regional and national levels, favoring comparisons. This study aimed to identify the prevalence of eczema and the possible factors associated with eczema among 13- and 14-year-olds living in a city in northeastern Brazil.

## **METHOD**

### **Study Design and Place**

Cross-sectional study, conducted in the city of Maceió(AL), through the application of written, translated and validated questionnaires from the ISAAC.

### **Selection of Participants**

The sample established by ISAAC was 3000 children (aged six and seven) and 3500 adolescents (aged 13 and 14). In order to locate the investigated, the seven districts in which the city of Maceió(AL) is divided were provided as a reference system, provided by the municipal secretary of Education, respecting the proportionality between the number of public and private schools, to draw the schools and classes. Inclusion criteria were children aged six and seven years and adolescents aged 13 and 14 years, literate and who had cognitive conditions to answer the questions. Patients with severe cardiorespiratory and dermatological diseases, incorrect or incomplete questionnaires were excluded.

### **Instrument and Definition of Variables**

Participants were informed about the research and signed the Free and Informed Consent Term (FICT). The initial questionnaires contained questions about symptoms and severity for asthma, rhinitis and eczema. The diagnostic criterion for eczema (atopic dermatitis) was the "yes" response to the presence of "itchy rash that appears and disappears in the last 12 months".

The eczema carriers were identified and the control group of the same grade and school was drawn. In this second stage, the parents / guardians were sent the FICT and a questionnaire consisting of 33 questions regarding the conditions of birth, immunization, feeding, vaccination, socioeconomic, environmental factors, domestic animals, siblings, smoking and family history.

### **Statistical Analysis**

Data was transcribed to the EPIINFO database, version 3.5.4, by double entry. Frequencies of answers to each question were obtained in relation to the total number of valid questionnaires. The associations between gender, type of school and socioeconomic level (family income strata and maternal education)

were analyzed using the chi-square test ( $X^2$ ). The significance level established was 5% ( $p < 0.05$ ). The statistics have a descriptive part using simple frequencies, mean and standard deviation, and an analytical part using bivariate analysis using OR-odds ratio, chi-square, whose results guided the selection of the variables that participated in the analysis. multivariate analysis through Dichotomous Logistic Regression.

In multivariate analysis, variables with  $p < 0.20$  and those that were important in determining effects or that could be related to interaction or confounding were used.

## **Ethical Considerations**

Incorrectly completed questionnaires were excluded from the study. The research was approved by the research ethics committee of the Federal University of Alagoas under protocol 005247/2010-43.

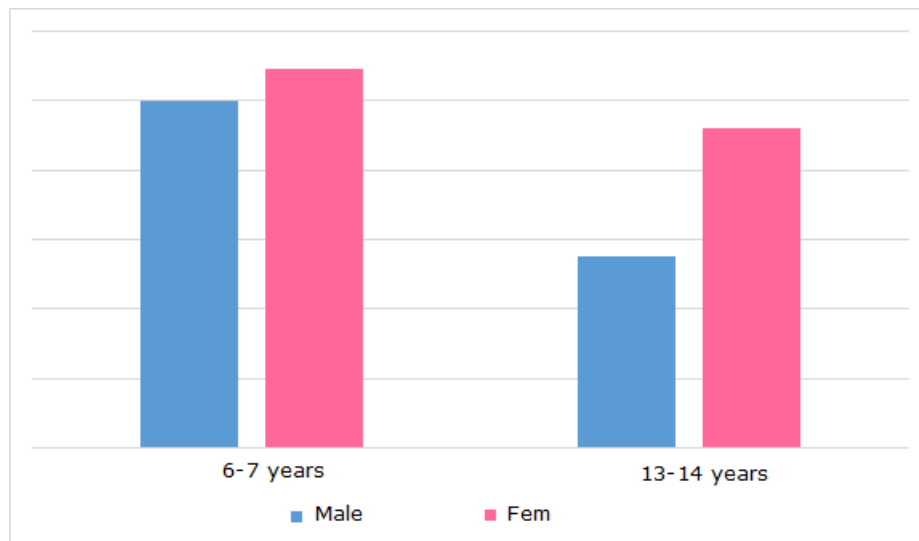
## **RESULTS**

### **Prevalence of Eczema**

In the first stage of ISAAC (2002), a valid sample was obtained with 66.4% of children (six and seven years old) and among 92% of adolescents (13 and 14 years old). The prevalence of AE, which was 10.5% in children and 7.5% in adolescents, was found to be associated with females, with  $p < 0.00$  of statistical significance (Figure 1).

The ISAAC epidemiological study was resumed in 2012 with 93.4% valid questionnaires in a population of 3500 adolescents. The prevalence of eczema among adolescents was 4% (130), who answered "yes" to the presence of "itchy rash that appears and disappears in the last 12 months".

**Figure 1. Prevalence of Eczema According to Gender Among School Children and Adolescents. ( $p < 0.00$ )**



### **Factors Associated With Eczema**

In the same study, of the 450 students evaluated for the presence of risk factors, 74 had eczema and 376 were case-control. Having breastfed for at least two to four months, attending kindergarten before the age of two, and having a smooth floor (without carpets) were considered protective factors, halving the chance of having eczema in the sample studied. On the other hand, not eating fresh fruits and fish, having a mother and father (both) with eczema, not using a pillow with a protective cover and being the eldest of at least four younger siblings were associated with two to four chances. four times in having the condition (Table 1). There was a tendency to male protective effect.

**Table 1. Prevalence of Factors Associated With Eczema Among Adolescents.**

Variables	ECZEMA (450)		OR (CI 95%)	P
	Yes (74) N (%)	No (376) N (%)		
<b>Demographics</b>				
<b>Sexo masculino</b>	19 (25.7)	141 (37.5)	0.58 (0.33 – 1.01)	<b>0.05</b>
<i>Eating habits</i>				
Breastfeeding 2 to 4 months	11 (14.8)	104 (27.6)	0.45 (0.22 – 0.89)	<b>0.02*</b>
Never consumes fish	14 (18.9)	33 (8.7)	2.39 (1.18 – 4.81)	<b>0.01*</b>
Never consumes fruit juice	7 (9.4)	39 (10.4)	3.46 (1.43 – 8.39)	<b>0.00*</b>
<b>Family members</b>				
Both parents with asthma	10 (13.5)	63 (16.7)	0.78 (0.35 – 1.66)	0.49
Both parents with eczema	8 (10.8)	16 (4.2)	2.73 (1.02 – 7.11)	<b>0.02*</b>
<b>Environmental</b>				
Reduced smoking at home	5 (6.7)	9 (2.4)	2.52 (0.80 – 7.96)	0.10
Does not use pillow currently	8 (10.8)	14 (3.7)	3.13 (1.15 – 8.37)	<b>0.02*</b>
Flat floor 1st year / present	29 (39.2)	193 (51.3)	0.55 (0.32 – 0.96)	<b>0.04*</b>
Removed animals from home	9 (12.2)	22 (5.8)	2.17 (0.94 – 5.02)	0.06
Presence of mold in the house	15 (20.3)	55 (14.6)	1.48 (0.75 – 2.91)	0.22
Kindergarten <2 years	5 (6.7)	71 (18.9)	0.44 (0.20 – 0.99)	<b>0.04*</b>
More than 4 younger brothers	9 (12.2)	12 (3.2)	4.48 (1.75 – 11.48)	<b>0.00*</b>
<b>Socioeconomic</b>				
Income < 5 SM	63 (85.1)	304 (80.8)	1.36 (0.65 – 2.88)	0.38
Maternal Education <8 years	28 (37.8)	136 (36.2)	1.04 (0.60 – 1.82)	0.87

## DISCUSSION

The prevalence of eczema among adolescents declined in ten years, data consistent with some studies, which also found this reduction, whose authors attributed to environmental factors, which are fundamental in the expression of eczema, because genetic changes are unlikely in such a short period of time (from five to ten years). Higher prevalence was observed among children when analyzed in 2002, and in the literature it was found that between 30% and 50% of AS patients, the disease improves until adolescence.<sup>2</sup>

In this study, when both parents had eczema, adolescents were almost three times more likely to have eczema. The interaction of genetic inheritance with allergies is already known, but it is still difficult to know the polymorphisms of the various genes, which interact with several other factors, whether environmental, personal and lifestyle.<sup>9</sup> There are a lot of associated genes, such as the filaggrin gene.<sup>10</sup>

Eczema is triggered by skin barrier defects that facilitate the entry of allergens and irritants, largely caused by mutations in the filaggrin gene, one of the proteins responsible for skin integrity.<sup>9,11-12</sup> These mutations have gained prominence in studies of the genetic basis of the disease, although they are not present in all cases, and therefore cannot be considered solely responsible for the development of this atopy.<sup>11-12</sup>

Breastfeeding should be exclusive until six months of age for a number of aspects, such as increasing the affective bond between mothers and their babies, providing increased protection against chronic and infectious diseases, and reducing immunoallergic diseases, thus reducing infant morbidity and mortality.<sup>13-</sup>

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The protective effect of exclusive breastfeeding concerns the development of a probiotic-rich intestinal flora, making it difficult to transport antigens in the mucosa as it becomes less permeable, thereby reducing the development of allergies.<sup>15</sup>

The findings of this study revealed an association in the use of breastfeeding, between two and four months of life, including, with statistical significance ( $p < 0.02$ ), data consistent with those of studies that showed this variable as a protective factor in the development of atopy,<sup>16</sup> Exclusivity up to four months of age stood out as the minimum time.<sup>17</sup> These findings are consolidated by the literature, which described that the use of infant milk formulas (even without cow's milk and soy protein), when compared to breast milk, caused a higher incidence of atopic dermatitis.<sup>18</sup>

In investigated the relationship between breastfeeding and aeroallergen sensitization, demonstrating that the differentiation genotype (CD14) defines breastfeeding as protection or risk.<sup>20</sup> In fact, many argue that breastfeeding is able to prevent allergies and support the theory of the benefits of breast milk in this regard,<sup>23</sup> however, there is still much controversy, probably because of the numerous aspects that influence the maintenance of a healthy infant.

The role of dietary factors is controversial, as observational studies have shown that diets low in antioxidants (vitamins A and C), magnesium, selenium and omega-3 polyunsaturated fats (fish oil), or high in sodium and polyunsaturated omega-6s are associated with a higher risk of developing asthma. Vitamin D deficiency may also predispose to the development of this disease. However, intervention studies with dietary supplements have not confirmed that dietary



factors play an important role.<sup>21</sup> In this study, data regarding current diet, not consuming fruit or fish was associated and significant for eczema (p 0.004 and 0.013, respectively), increasing the risk for the disease. On the other hand, some studies have suggested that certain characteristics of the Western diet, such as the consumption of processed foods to the detriment of fruits and vegetables with antioxidant effects and decreased omega-3 fatty acid intake, may be associated with increased disease incidence. allergic and asthma.<sup>22</sup>

These results were attributed to the rich content of polyunsaturated fatty acids,<sup>23-24</sup> omega 3, which act to inhibit the Th2 response and the synthesis of interleukins 2 and 4, responsible for the development of atopy.<sup>24</sup> Some studies have revealed related benefits in the Mediterranean diet, where there is a higher consumption of fruits, fish and olive oil, promoting lower rates of atopy.<sup>15</sup>

In environmental issues, the presence of younger siblings was found to increase the risk in significance (p 0.003). A study conducted in Itajubá(MG), showed that there was a risk relationship, since a higher prevalence of atopic diseases was found in children who had two to four siblings compared to those who only had one.<sup>25</sup>

According to the hygienist hypothesis, the presence of large families and the coexistence of children in kindergarten are a protection against the development of atopy due to the greater possibility of infections acquired by contact between children,<sup>9,20</sup> as well as attending kindergarten was a protective factor (p 0.041). This hypothesis assumes that a higher number of childhood infections slows the development of allergies as there is greater stimulation of the Th1 pattern, as observed in studies in which younger siblings were less allergic than older ones because they had more frequent infections.<sup>10</sup> Cohort studies also showed a protective relationship for the coexistence of children in day care centers in the first years of life.<sup>2</sup>

Mites are an important causative agent of allergies, and their allergens play a role in lowering the skin's stratum corneum barrier.<sup>24</sup> Thus, the use of synthetic pillows that accumulate more mites increases the risk of developing atopic dermatitis in the early years of life.<sup>7,24-25</sup> The use of pillow covers and beds significantly reduces exposure to allergens and therefore the severity of injuries.<sup>26</sup> It was identified in this study that the non-use of pillows (p 0.02) and the use of smooth floor (0.04) were significant. The fact that you prefer smooth flooring may provide less accumulation of these mites, causing a lower risk for AE.

Environmental characteristics related to an allergic child's room and home are associated with the development of atopic diseases. According to the Allergic Environmental Assessment Guide, created by the Allergic Rhinitis Guidance Center of the University of São Paulo School of Medicine Hospital das Clínicas, there are some characteristics that should be analyzed in order to classify the home environment as appropriate or not for the allergic. The absence of carpets, curtains, rugs, cushions and animals, associated with the presence of pillows with cover, comforter, indispensable furniture and mold-free walls, makes the environment considered adequate.<sup>27</sup>

Regarding gender, in this study, there was a higher prevalence of eczema in males, but not significant ( $p = 0.052$ ). Several studies in the literature show that males are the most prevalent among atopic diseases.<sup>20</sup> According to a study done in Criciúma, Santa Catarina, there was also a higher prevalence in boys.<sup>28</sup>

Given the above, there was a need for further research to consolidate the factors related to AE, in order to better understand atopic diseases, thus reducing the damage caused by a chronic disease.<sup>29</sup> In addition, by better understanding the associated risk factors, new paths in primary and secondary prevention can be traced, and a better quality of life may be possible.<sup>30</sup>

The prevalence of asthma and allergic rhinitis, associated with atopic dermatitis in the early years of the child's life, demonstrated that there is a risk relationship between atopic dermatitis, asthma and allergic rhinitis, especially when found in its most severe clinical form and by reliable risk association measures.

It is ratified by studying the prevalence of asthma and rhinitis<sup>31</sup> also in this same population, previously published, and the consequences of these on quality of life, especially in the pediatric range and remembering to consider atopic gait as a possible evolution, as well as evidence of the relationship associated factors, the importance of care measures in primary care, treatment and management of eczema from the earliest years of life in order to possibly prevent eczema, asthma and rhinitis and to ensure quality of life in patients with eczema.<sup>3</sup> In international multicenter studies, even validated like this one, there is always the risk of misunderstanding the questionnaire and possible confusion with other dermatitis.

## CONCLUSION

This is the first study in Maceió(AL), a capital of northeastern Brazil, of which it is noted, with the objective of evaluating the prevalence in two moments and identifying factors associated with eczema among adolescents. The data on the reduction of the prevalence and the association of eczema with genetic factors, some environmental and food, may help patients, families and health professionals to better understand the disease and associated factors. It is noteworthy that eczema is related to quality of life and it is necessary to consider atopic gait as a possible evolution.

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