



## ORIGINAL ARTICLE

# Lower prevalence and greater severity of asthma in hot and dry climate<sup>☆</sup>

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**KEYWORDS**

Asthma;  
Risk factors;  
Allergic rhinitis;  
Adolescent;  
Epidemiology;  
Prevalence

**Abstract**

**Objective:** To estimate asthma prevalence, severity, and associated factors in adolescents who live in a low relative humidity environment.

**Methods:** In this cross-sectional study, adolescents aged 13–14 years from the city of Petrolina located in the Brazilian semiarid region answered the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire. The possible explanatory variables of the study were gender, family income, mother's education, smokers in the household, parental history of asthma, personal history of allergic rhinitis or atopic dermatitis, and physical activity level. Poisson regression analysis was used to assess the association between asthma and the explanatory variables.

**Results:** A total of 1591 adolescents participated in the study, of whom 49.7% were male. The prevalence of active asthma, severe asthma, and physician-diagnosed asthma were 14.0%, 10.4%, and 17.8%, respectively. Adolescents with asthma missed more school days than their peers (33 vs. 22 days/year;  $p < 0.03$ ). Associated factors that remained significant after adjustment were history of asthma in parents (PR = 2.65,  $p < 0.001$ ) and personal diagnosis of allergic rhinitis (PR = 1.96,  $p < 0.001$ ) and/or atopic dermatitis (PR = 2.18,  $p < 0.001$ ).

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**PALAVRAS-CHAVE**

Asma;  
Fatores de risco;  
Rinite alérgica;  
Adolescente;  
Epidemiologia;  
Prevalência

**Conclusion:** Asthma prevalence in this low-humidity environment was lower, but more severe than those reported in other Brazilian cities. The dry climate might hamper disease control and this may have contributed to the higher school absenteeism observed. The association of asthma with allergic rhinitis and atopic dermatitis as well as a history of asthma in parents suggests that atopy is an important risk factor for asthma in this population.

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**Menor prevalência e maior gravidade da asma em clima quente e seco****Resumo**

**Objetivo:** Estimar a prevalência, a gravidade e os fatores associados à asma em adolescentes que vivem em uma região de baixa umidade relativa do ar.

**Método:** Estudo transversal em adolescentes de 13 e 14 anos do semiárido brasileiro. Os participantes responderam ao questionário *International Study of Asthma and Allergies in Childhood* (ISAAC). As variáveis explanatórias do estudo foram sexo, renda familiar, escolaridade da mãe, fumante na residência, antecedente de asma nos genitores, antecedentes de rinite alérgica, dermatite atópica e nível de atividade física. A análise de regressão de Poisson foi utilizada para avaliar a associação entre a asma e as variáveis explanatórias.

**Resultados:** Participaram da pesquisa 1.591 adolescentes, sendo 49,7% do sexo masculino. As prevalências para asma em atividade, asma grave e diagnóstico médico de asma foram de 14,0%, 10,4% e 17,8%, respectivamente. Adolescentes asmáticos faltaram mais as aulas do que seus pares (33 vs 22 aulas/ano;  $p < 0,03$ ). Fatores associados que permaneceram significantes após ajuste foram antecedentes de asma nos genitores (RP = 2,65,  $p < 0,001$ ), rinite alérgica (RP = 1,96,  $p < 0,001$ ) e/ou dermatite atópica (RP = 2,18,  $p < 0,001$ ).

**Conclusão:** Neste ambiente de baixa umidade foram observadas menor prevalência, mas maior gravidade da asma que aquelas relatadas em outras cidades brasileiras. O clima seco talvez possa dificultar o controle da doença e isso pode ter contribuído para o maior absenteísmo escolar nos doentes. A associação entre rinite alérgica, dermatite atópica e antecedentes de asma nos genitores sugerem que a atopia é importante fator de risco para a asma nesta população. © 2016 Sociedade Brasileira de Pediatria. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Introduction**

Asthma is a common chronic inflammatory airway disease in childhood, clinically characterized by recurrent episodes of wheezing, breathlessness, and coughing.<sup>1</sup> It is quite prevalent worldwide and climatic factors, especially humidity, can have an important role in disease development, considering the low prevalence found in desert regions when compared to regions where humidity and rainfall are higher, as in tropical regions.<sup>2-7</sup>

This characteristic may be related to the proliferation of house dust mites, which cannot survive in low-humidity environments and are a major determinant of allergic sensitization.<sup>4-10</sup> In this case, in dry climate regions, other agents rather than mites can be responsible for triggering asthma; they include other airborne allergens such as pollen, air pollution, small particles present in soils, and animal epithelia, in addition to the use of humidifiers in homes.<sup>4,8,9</sup>

In Brazil there is still scarce research on asthma and risk factors in different regions of the country, especially regarding the different ecosystems.<sup>2,11</sup> This fact makes it difficult to plan and carry out public policies aimed at

prevention, as the existing studies were mainly performed in larger municipalities, especially in capital cities, most of which are located on the coast or in subtropical regions in the South/Southeast states.<sup>2,11</sup>

Thus, the aim of the study was to evaluate the prevalence, severity, and factors associated with asthma in adolescents aged 13–14 years residing in low-humidity regions, with hot and dry climate. The study was carried out in a municipality whose climate is classified as semi-arid, characterized by scarce and irregular rainfall and high temperatures.

**Methods**

This was a cross-sectional, population-based study carried out with students aged 13 and 14 years, enrolled in state public schools in 2014 in the municipality of Petrolina (state of Pernambuco) located in northeastern Brazil, which has a population of approximately 294,000 inhabitants,<sup>12</sup> occupying an area corresponding to 4561.872 km<sup>2</sup>. This study was approved by the Ethics Committee on Human Research of Universidade de Pernambuco (protocol: 459.304).

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