

Pollen modelling in patients with atopic respiratory symptoms in the Alentejo region

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Abstract

The symptoms of pollen allergy by patients with pollinosis are the target of this study. Patients are from the region of Évora, and clinical data were collected at the Hospital of the Holy Spirit in Évora. The data collected is related to the years 2001-2007 for the months of March to June. The symptoms exhibited by patients, whose condition was determined by allergological test, were daily recorded over the same period. The series on pollen data was constructed based on daily records for the same period in the collection station of Évora integrated in the Portuguese Aerobiology Network (RPA). The data obtained allowed to characterize the patients sample, the pollen map in Évora region. The relationships between symptoms, clinical picture and concentration of pollen in the atmosphere were also questioned.

Keywords: Pollen, Symptoms, Modeling, Odds ratio, Risk.

AMS subject classifications: 62H15, 60E05.

1 Introduction

Currently over one third of the Portuguese population suffers from at least one allergic disease, which means that these diseases affect chronically over 3 million Portuguese: about 30% of the population claims current rhinitis; ..., about 10% have asthma. Detailed knowledge of the pollen map of each region is critical in addressing either diagnostic or therapeutic patient with pollinosis. In this sense the Portuguese Society of Allergology and Clinical Immunology (SPAIC) created and has been promoting the RPA. Created in 2002 RPA provides the bridge between biologists and immunoallergologists from across the country, and is currently comprised of nine monitoring centers and eight hospitals or allergology centers. In the present study, the pollen was collected from the collection station located in Évora and was analyzed by the Palynology laboratory, in Department of Biology, University of Évora. A total of 17 different species of pollen were collected and analysed. The clinical data are concern to 107 patients of both sexes who have been diagnosed rhinitis and / or asthma. These patients were subjected to a daily survey symptomatic

for assessing the severity of 9 symptoms associated with their clinical picture. These inquiries took place at the Hospital do Espírito Santo in Évora. The pollen and clinical data concern the years 2001 – 2007 for the months of March to June.

2 Methods

The study includes variables that are diverse: clinical diagnosis of patients (rhinitis, asthma, rhinitis and asthma) and gender, severity of symptoms (measured on a scale from 0– no symptom to 4– very strong) to nine distinct symptoms (e.g. sneezing, rhinorrhea, itchy nose, itchy eyes,) and concentrations of 17 different species of pollen measured in grains/ m^3 (e.g. Quercus, Poaceae and Plantago). Note that all data are dated allowing comparisons between clinical and pollen data. The clinical diagnosis for patients was performed by skin prick tests at Hospital do Espírito Santo in Évora. Measurements of the atmospheric pollen content in Évora region was performed with a manifold type "Hirst" (Recording Burkard Seven Day Volumetric Spore Trap). In order to establish and / or test the possible relationships between data chi-square tests between the severity of symptoms and months, sex, clinical diagnosis were performed. Odds-ratio and relative risks between sex and severity of symptoms were estimated. Spearman's correlation was used to establish the degree of association between symptom severity and pollen concentration. The establishment of a model which predicts the absence or presence of a symptom in correspondence with the other continues.

References

- 1.Everitt B. (1992). *The analysis of contingency tables*. Chapman and Hall, London.
- 2.McCullagh P. and Nelder J.A. (1989). *Generalized Linear Models*. Chapman and Hall, London.