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# SEASONAL VARIATIONS IN EXACERBATIONS OF ALLERGIC RHINITIS AND ASTHMA IN GUARAPUAVA (PR): A CROSS- SECTIONAL OBSERVATIONAL STUDY

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**ABSTRACT:** Allergic rhinitis and asthma are highly prevalent and have a significant clinical impact; seasonality is a potential indirect marker of environmental exposures associated with the occurrence of exacerbations. This study aimed to evaluate the association between indirect environmental and demographic variables and the occurrence of exacerbations in patients with allergic rhinitis associated with asthma, treated at outpatient clinics in the municipality of Guarapuava (PR), Brazil. This is a cross-sectional observational study with retrospective data collection based on a review of medical records of patients aged  $\geq 5$  years who were treated between 2018 and 2025. The occurrence of exacerbations was analyzed using multivariate logistic regression. A total of 193 patients were included. Consultations conducted during spring showed a higher likelihood of exacerbation compared to summer (OR = 4.30; 95% CI: 1.21–16.18;  $p = 0.027$ ), while winter showed a trend toward an association (OR = 3.49; 95% CI: 1.01–12.66;  $p = 0.051$ ). The 19–40 age group was also associated with a higher likelihood of exacerbation (OR = 4.31; 95% CI: 1.29–15.21;  $p = 0.019$ ). It is concluded that seasonality was independently associated with the occurrence of exacerbations, especially in the spring, reinforcing the relevance of seasonal factors in the clinical variability of allergic respiratory diseases in the outpatient setting.

**KEYWORDS:** Asthma; Allergic Rhinitis; Seasonality; Exacerbation; Cross-sectional Studies.

## INTRODUCTION

Allergic respiratory diseases, particularly allergic rhinitis and asthma, constitute a major public health problem due to their high prevalence and functional impact on

affected individuals. Asthma affects hundreds of millions of people worldwide and is one of the leading chronic respiratory diseases, while allergic rhinitis has a high prevalence and frequently coexists with asthma, forming the concept of a single airway. This interrelationship shares common inflammatory mechanisms and implies reciprocal clinical repercussions, including poorer control and a higher risk of exacerbations.

The clinical course of these conditions results from a complex interaction between genetic predisposition and environmental factors. Exposures such as airborne allergens, climatic variations, pollutants, and respiratory infections play a central role in symptom variability. Seasonality may serve as an indirect marker of these exposures.

## MATERIALS AND METHODS

This is a retrospective, cross-sectional, observational epidemiological study based on a review of medical records of patients treated at outpatient clinics in Guarapuava (PR) between 2018 and 2025. Patients aged  $\geq 5$  years with a diagnosis of allergic rhinitis associated with asthma were included. Medical records that were incomplete or involved non-allergic respiratory diseases were excluded.

The dependent variable was exacerbation. Independent variables included seasonality, age group, sex, place of residence, change of environment, and healthcare facility. The analysis was performed using multivariate logistic regression, with a significance level of 5%.

## RESULTS

A total of 193 patients were included. Consultations conducted in the spring were associated with a higher likelihood of exacerbation compared to the summer (OR = 4.30; 95% CI: 1.21–16.18;  $p = 0.027$ ). Winter showed a trend toward association (OR = 3.49; 95% CI: 1.01–12.66;  $p = 0.051$ ). The 19–40 age group showed a significant association.

## DISCUSSION

The findings demonstrate an association between seasonality and exacerbations, especially in the spring. The literature indicates that seasonal environmental factors influence exacerbations of allergic respiratory diseases. Limitations include the retrospective design and the absence of direct measurement of exposures.

## CONCLUSION

A significant association was identified between seasonality and exacerbation, especially in the spring. The findings reinforce the importance of seasonal factors in the clinical variability of allergic respiratory diseases.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## FUNDING

This study did not receive external funding.

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Variable	OR	95% CI	p
<b>Seasonality</b>			
Winter vs. summer	3.49	1.01–12.66	0.051
Spring vs. summer	4.30	1.21–16.18	<b>0.027</b>
Fall vs. summer	1.83	0.49–6.88	0.373
<b>Age group</b>			
Ages 13–18 vs. Ages 5–12	—	—	> 0.05
19–40 years vs. 5–12 years	4.31	1.29–15.21	<b>0.019</b>
41–60 years vs. 5–12 years	—	—	> 0.05
> 60 years vs. 5–12 years	—	—	> 0.05
<b>Gender (male and female)</b>	—	—	> 0.05
<b>Residence (urban and rural)</b>	—	—	> 0.05
<b>Change of environment</b>	—	—	> 0.05
<b>Care unit</b>	—	—	> 0.05
<b>Registered CID</b>	—	—	> 0.05
<b>Treatment initiated</b>	—	—	> 0.05
<b>Symptom severity</b>	—	—	> 0.05
<b>Clinical signs</b>	—	—	> 0.05

Table 1. Multivariate logistic regression of factors associated with exacerbation.

Source: Prepared by the authors.

OR = odds ratio; 95% CI = 95% confidence interval; —: association not statistically significant or not estimated.

Note: Multivariate logistic regression model adjusted for all listed variables.

Reference category: summer (seasonality) and 5–12 years (age group).

Null deviance = 242.33 (df = 192); Residual deviance = 180.20 (df = 164); AIC = 238.2.