

# Allergic rhinitis among medical students: perceptions about diagnosis, symptom control, and quality of life

*Rinite alérgica em estudantes de Medicina: percepção sobre diagnóstico, controle dos sintomas e qualidade de vida*

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## ABSTRACT

**Introduction:** Allergic rhinitis is a disease involving nasal symptoms, such as rhinorrhea, sneezing and nasal congestion, which are caused by mucosal inflammation due to allergen exposure. The symptoms, which affect patient quality of life, frequently include sleep problems, irritability, and fatigue. The disease can have a negative impact on academic performance in affected students. **Objective:** In view of the disease's effects on academic performance, this study determined the prevalence of allergic rhinitis among medical students at the Universidade do Vale do Itajaí (Santa Catarina, Brazil), identifying the degree to which it impairs quality of life and relating this to symptom control. **Methods:** This descriptive observational study was based on data collected from medical students through 2 specific questionnaires to assess symptom control and quality of life: the Rhinitis Control Assessment Test (RCAT) and Sino-Nasal Outcome Test (SNOT-22). **Results:** Among the 88 medical students evaluated in this study, the prevalence of allergic rhinitis was 69%. The disease controlled in most affected students, indicating a lower impact on quality of life. The most prominent symptoms were sneezing, nasal obstruction, and tearing. According to the RCAT and SNOT-22 results, symptom control was significantly correlated with quality of life ( $r = -0.4277$ ;  $p < 0.001$ ). **Conclusion:** Unlike the rest of the population, the students' knowledge of allergic rhinitis led to greater awareness of the condition and better treatment adherence. Therefore, educating the population is essential for symptom control and guaranteeing collective quality of life.

**Keywords:** Allergic rhinitis, medical students, quality of life.

## RESUMO

**Introdução:** A rinite alérgica (RA) é uma doença com sintomas nasais, como rinorreia, espirros e congestão nasal, causada pela inflamação da mucosa após a exposição do indivíduo a um agente alérgico. A sintomatologia da doença causa consequências na qualidade de vida do paciente, que frequentemente possui problemas de sono, irritabilidade e fadiga. Estudantes podem ter seu desempenho acadêmico afetado de modo negativo pela doença. **Objetivo:** Tendo em vista a problemática que a doença causa na performance de estudantes, esse estudo pretende analisar a prevalência da RA nos discentes da Universidade do Vale do Itajaí (UNIVALI), com a finalidade de identificar o grau de comprometimento na qualidade de vida dos estudantes com a doença e relacionar com o seu grau de controle dos sintomas da rinite alérgica. **Métodos:** Trata-se de um estudo descritivo observacional, a partir de dados coletados de estudantes de Medicina, através de questionários específicos para avaliação do controle dos sintomas e impacto na qualidade de vida, sendo eles: o *Rhinitis Control Assessment Test* e o *Sino-Nasal Outcome Test*. **Resultados:** 88 estudantes de Medicina foram avaliados neste estudo, a prevalência da RA foi de 69%. A maioria dos estudantes possui a doença controlada, o que caracteriza menor impacto da doença na qualidade de vida desses pacientes. Entre eles, os sintomas de maior impacto são: espirros, obstrução nasal e lacrimejamento ocular. Houve correlação estatística entre o controle dos sintomas e o impacto dos mesmos na qualidade de vida, avaliado pelos questionários RCAT e SNOT-22 ( $r = -0,4277$ ;  $p < 0,001$ ). **Conclusão:** O conhecimento disseminado entre estudantes de Medicina sobre rinite alérgica, diferentemente do resto da população, permite que os mesmos tenham maior conscientização, aderência aos tratamentos e percepção do quadro. Por isso, a educação da população se faz essencial e útil para controle dos sintomas e garantia da qualidade de vida coletiva.

**Descritores:** Rinite alérgica, estudantes de Medicina, qualidade de vida.

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## Introduction

Allergic rhinitis (AR) is a disease with nasal symptoms caused by exposure to specific allergens that induce an IgE-mediated inflammatory reaction.<sup>1,2</sup> This response is an immediate hypersensitivity reaction that produces IgE after exposure to an antigen, which binds to mast cell Fc receptors with subsequent release of its mediators.<sup>3</sup> Considered one of the most common chronic respiratory diseases, AR is a global health problem, affecting approximately 10% to 20% of the world's population.<sup>1,4,5</sup>

Symptoms of AR include clear rhinorrhea, nasal congestion, nasal itching, and sneezing. These symptoms are present for more than 1 hour on most days, for 2 or more consecutive days.<sup>1</sup> The onset of AR symptoms occurs most commonly in childhood, but the disease can begin at any age.<sup>2</sup>

The diagnosis of AR is essentially clinical, with a history of typical allergy symptoms.<sup>1,5</sup> The diagnosis is likely in patients with 2 or more of the typical symptoms of the disease for more than 1 hour on most days.<sup>5</sup>

AR treatment includes pharmacotherapy combined with environmental control and allergen avoidance. Pharmacologic options for the treatment of AR include antihistamines, decongestants, corticosteroids, leukotriene receptor antagonists, disodium cromoglycate, and immunotherapy.<sup>6</sup>

Health-related quality of life focuses on patients' perceptions of the impact of the disease on them.<sup>7</sup> AR symptoms have direct consequences for the patient's daily life. Fatigue, irritability, and sleep disturbances are commonly reported by patients with AR, affecting their productivity.<sup>7,8</sup>

Several instruments have been developed to assess the level of rhinitis control, including the Rhinitis Control Assessment Test (RCAT).<sup>2,9</sup> The RCAT was developed in English but translated into Portuguese and validated by Fernandes et al.<sup>10</sup> It consists of 6 questions that assess the intensity of symptoms over the past week, their interference with sleep and daily activities, and self-assessment of disease control. The final score ranges from 6 to 30, with scores of 21 or less indicating uncontrolled disease.<sup>7</sup>

In view of the close connection between disease control and patient quality of life, it is necessary to use a disease-specific questionnaire to effectively and reliably estimate the quality of life of each patient with AR, such as the 22-item Sino-Nasal Outcome Test (SNOT-22) designed to assess the impact of chronic rhinosinusitis (CRS) and nasal polyps on quality of life.

As with any disease-specific questionnaire, it allows a better clinical assessment than general questionnaires. The SNOT-22 was translated into Portuguese and validated by Kosugi et al.<sup>11</sup> It was originally published in English as an adaptation of the SNOT-20, which in turn is derived from the 31-item Rhinosinusitis Outcome Measure (RSOM-31). The SNOT-22 has shown internal consistency, reproducibility, validity, and responsiveness nationwide, consisting of 22 items (symptoms) whose intensity is scored by patients from 0 (no problem) to 5 (problem as bad as it can be). In addition, it assesses whether the patient has undergone surgery for the problem in question (CRS or nasal polyps), scoring the degree of improvement after surgery.

Given that AR symptoms likely contribute to academic impairment in young people and students, the current study aimed to analyze the frequency of AR symptoms in university students, identify the impact of the disease on their quality of life, and relate it to their level of symptom control.

## Methods

### Participants

We conducted a cross-sectional observational study of students from the Universidade do Vale do Itajaí (UNIVALI) Medical School, southern Brazil. All medical students were invited to participate regardless of sex, ethnicity, or social status. All enrolled medical students who agreed to participate were included in the study. Students who did not agree with the previously established terms and those who did not answer certain questions that could compromise the results of the study were excluded.

### Procedures

The study was approved by UNIVALI Research Ethics Committee (approval no. 4.885.968). Data were collected through virtual platforms via questionnaires containing questions covering patient age, sex, perceptions of the disease, and self-assessment of AR control. The participants also completed the RCAT and SNOT-22, both of which have been translated into Portuguese and validated for use in Brazil.

### Instruments

RCAT assesses AR control and consists of 6 questions that refer to symptoms over the past week,

3 of which address nasal congestion, sneezing, and watery eyes. Two questions address the interference of symptoms with sleep and daily activities, and 1 question refers to self-perception of symptom control. Each question is scored from 1 to 5, where 5 = never, 4 = rarely, 3 = sometimes, 2 = often, and 1 = extremely often. The total score ranges from 6 to 30, with scores of 22 or more indicating controlled disease, and 21 or less indicating uncontrolled disease.

SNOT-22 was used to assess quality of life. This CRS- and nasal polyp-specific questionnaire consists of 22 items, each one corresponding to a specific symptom. Items are scored from 0 to 5 to assess the level of intensity of each symptom. Symptoms are scored as follows: 0 = no problem, 1 = very mild problem, 2 = mild or slight problem, 3 = moderate problem, 4 = severe problem, and 5 = problem as bad as it can be. The scores of each item are summed to form a total score of 0 to 110, with higher scores indicating greater impact of symptoms on quality of life.

### Data analysis

The data obtained electronically were entered into Excel® spreadsheets and subsequently exported to BioEstat 5.0 and JASP version 0.14.1.0 for statistical analysis. Pearson's correlation coefficient was used to assess correlations between total quality of life scores and total AR symptom control scores. Results with a p-value <0.05 were considered statistically significant. The measures of central tendency used were mean and mode. Standard deviation (SD) was used as a measure of dispersion.

### Results

The sample evaluated in the current study consisted of 88 medical students from a university in southern Brazil; 60 were women (68%), 27 were men, and 1 did not report sex. Mean participant age was 22 years, ranging from 17 to 33 years. The prevalence of AR was 69% (n=61); of these, 68% (n=42) were women.

### Relationship between the sample and the questionnaires

In the 88 completed questionnaires, the mean RCAT score was 22 (SD, 4.4), noting that to be classified as controlled disease, a score of 22 or more

should be obtained. The minimum score was 10, and the maximum score was 30 (Figure 1).

The mean SNOT-22 score was 37 (SD, 23.3), noting that this score ranges from 0 to 110, with higher scores indicating greater impact on patient quality of life. The minimum score was 0, and the maximum score was 100 (Figure 2).

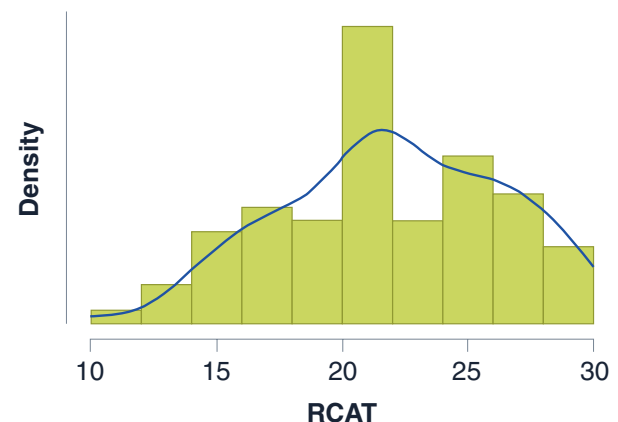
There was no significant difference in mean RCAT scores between men and women. However, the mean SNOT-22 score was 34 for men and 38 for women. Participant age did not influence RCAT scores (p=0.3), nor did it affect SNOT-22 scores (p=0.5), since age ranged from 17 to 33 years.

### Correlation between disease control and quality of life

The scatter plot in Figure 3 shows a negative correlation between symptom control and impact on quality of life ( $r = -0.4277$ ;  $p < 0.001$ ), that is, the more controlled the symptoms, the lower their impact on quality of life.

### Analysis of symptom control in the sample

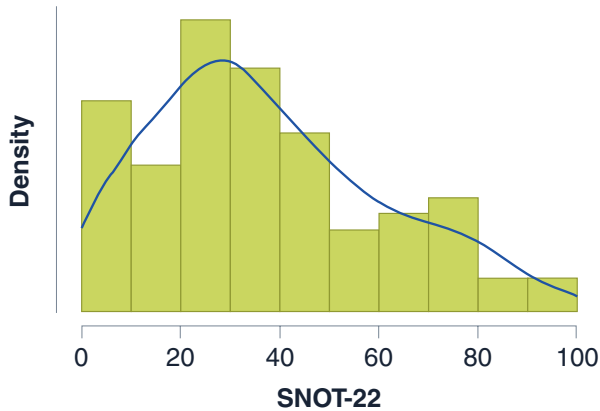
Among the 6 RCAT items, the one with the lowest mode value, that is, the least controlled category in the sample, was the frequency of sneezing, nasal congestion, and watery eyes (Table 1).



**Figure 1**

Sample distribution according to RCAT responses

RCAT = rhinitis control assessment test.



**Figure 2**  
Sample distribution according to SNOT-22 responses  
SNOT-22 = sino-nasal outcome test.

mode value, that is, the ones that most interfered with quality of life, were “blockage/congestion of nose,” “fatigue during the day,” “sneezing,” and “runny nose,” all scored as a moderate problem (response 3).

**Relationship between questionnaires and surgery**

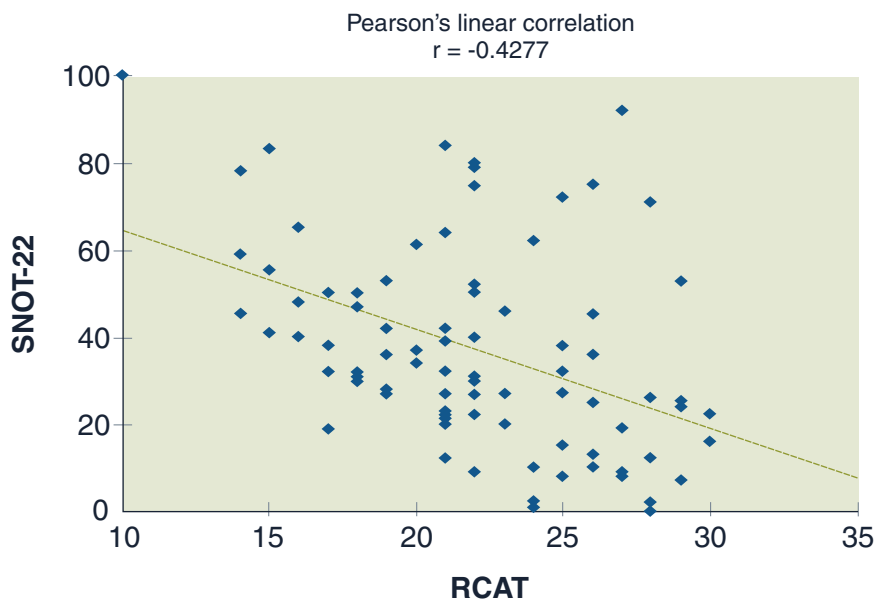
The most common surgical interventions were septoplasty (6%) and adenoidectomy (3%). The mean RCAT score was lower among the medical students who had already undergone surgery to improve CRS (mean score = 19.8). The mean SNOT-22 score was slightly higher in the students undergoing surgery than in those not undergoing surgery (mean score = 42.3). However, the difference in the mean scores between operated vs non-operated groups for both questionnaires was not statistically significant ( $p > 0.05$ ). Table 3 shows the participants’ perceptions after surgery.

**Analysis of the impact of symptoms on quality of life**

To assess which symptom had the greatest impact on the students’ quality of life, we used the mode values for the response to each symptom, as shown in Table 2. Among all SNOT-22 items, those with the highest

**Discussion**

AR is characterized by an inflammatory reaction and the respective onset of typical allergy symptoms, often capable of interfering with patients’ quality of life and daily activities.<sup>12</sup> In the current study, the



**Figure 3**  
Correlation between symptom control (RCAT) and impact on quality of life (SNOT-22)  
RCAT = rhinitis control assessment test; SNOT-22 = sino-nasal outcome test.

**Table 1**  
RCAT questionnaire and participants' most frequent responses

Symptom	RCAT response (n; %)
During the past week, how often did you have nasal congestion?	3 (25; 28.4%)
During the past week, how often did you sneeze?	3 (27; 30.6%)
During the past week, how often did you have watery eyes?	4 (30; 34.0%)
During the past week, to what extent did your nasal or other allergy symptoms interfere with your sleep?	5 (40; 45.4%)
During the past week, how often did you avoid any activities (for example, visiting a house with a dog or cat) because of your nasal or other allergy symptoms?	5 (71; 80.6%)
During the past week, how well were your nasal or other allergy symptoms controlled?	3 and 4 (29; 32.9%)

RCAT = rhinitis control assessment test.

prevalence of AR in medical students was 69%, with female predominance, accounting for 68% of cases. The rate of AR in this sample was much higher than that of the Brazilian population, young people, and university students from other countries, with rates of 15%-25%.<sup>9,13,14</sup>

The higher prevalence found in our sample of medical students may be related to their knowledge of AR, thus leading to a greater perception of the condition and incidence of testing and diagnosis. Knowledge of the disease allows a more effective and appropriate treatment to be started promptly, with higher adherence rates, leading to greater symptom control and, consequently, better quality of life. For this reason, raising the awareness of the lay population is essential, given the difference in the impact of symptoms on quality of life when comparing the scores of our study sample with those of a sample of the general population, illustrated by the mean SNOT-22 score (37 vs 62, respectively),<sup>11</sup> noting that the most

prevalent symptoms are the same in both samples, but less controlled in the general population.

The main AR symptoms include rhinorrhea, sneezing, and nasal congestion, which can begin at any age, but most commonly begin in childhood.<sup>1,2</sup> The current study is in line with the existing literature by showing that, among medical students, the most impactful symptoms also were nasal congestion, rhinorrhea, sneezing, and fatigue.<sup>8,15</sup>

The symptomatology and the respective quality of life impairment among the students are directly related to disease control, since the impact on quality of life decreases with increasing disease control. In this respect, our sample's mean score for the symptom control questionnaire (RCAT) was 22, while for the questionnaire on the impact of symptoms on quality of life (SNOT-22), it was 37. The mean score for these questionnaires in the general population was 20.4 (SD, 4.2) for the RCAT<sup>16</sup> and 62.3 (SD, 25.3) for the

SNOT-22,<sup>11</sup> suggesting that the study sample has greater control over the symptoms of the disease, and that the symptoms have a lower impact on the patients' quality of life.

Another point to be analyzed is surgical intervention in patients with AR. Overall, there was little improvement after surgical intervention, with a recurrence rate of about 30%, which may suggest persistent AR (14% of cases), and more complex interventions, such as vidian neurectomy, may be considered in cases of vasomotor rhinitis.<sup>17</sup>

AR is a disease with a significant prevalence that is probably underestimated, and therefore it is extremely important to raise the population's awareness of symptoms, which may lead to a higher rate of diagnosis and, consequently, better disease control. It is crucial to provide patients with effective guidance and education on environmental control measures, that is, avoiding exposure to allergens that trigger or aggravate symptoms.

It can be concluded that adequate control of AR symptoms favors a better quality of life in affected

**Table 2**  
SNOT-22 questionnaire and participants' most frequent responses

Symptom	SNOT-22 response (n; %)
Need to blow nose	2 (26; 29.5%)
Sneezing	3 (24; 27.2%)
Runny nose	3 (21; 23.8%)
Cough	0 (40; 45.4%)
Post-nasal discharge (dripping at the back of your nose)	0 (30; 34.0%)
Thick nasal discharge	0 (39; 44.3%)
Ear fullness	0 (34; 38.6%)
Dizziness	0 (48; 54.5%)
Ear pain/pressure	0 (55; 62.5%)
Facial pain/pressure	0 (40; 45.4%)
Difficulty falling asleep	0 (33; 37.5%)
Waking up at night	0 (37; 42.0%)
Lack of a good night's sleep	0 (29; 32.9%)
Waking up tired	2 (23; 26.1%)
Fatigue during the day	3 (27; 30.6%)
Reduced productivity (in daily activities)	2 (21; 23.8%)
Reduced concentration (in daily activities)	2 (19; 21.5%)
Frustrated/restless/irritable	2 (21; 23.8%)
Sad	0 (29; 32.9%)
Embarrassed	0 (32; 36.3%)
Sense of taste/smell	0 (47; 53.4%)
Blockage/congestion of nose	3 (28; 31.8%)

**Table 3**  
Relationship between surgical procedures and postoperative perceptions

After surgery, you felt:	Frequency	%	Surgery performed (n)
Slightly worse	1	7.6%	Adenoidectomy and tonsillectomy (1)
The same	3	23.0%	Septoplasty (3)
Slightly better	7	53.8%	Adenoidectomy (2), septoplasty (2), septoplasty and adenoidectomy (1), tonsillectomy (1), turbinectomy (1)
Much better	2	15.4%	Adenoidectomy (1), septoplasty (1)
Did not answer	0	0	
Total	13	100	

patients. In this respect, there was statistical significance between the responses in both questionnaires (RCAT and SNOT-22), which showed that factors such as sex and age did not interfere with symptom control or quality of life. In addition, symptom improvement was not related to surgical intervention, with a high rate of persistent AR among patients even after surgery. Therefore, the best option for the maintenance of AR remains effective guidance and education of the population.

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