

ASSOCIATION BETWEEN ALLERGIC RHINITIS AND GRADE POINT AVERAGE AMONG MEDICAL STUDENTS AT BAITURRAHMAH UNIVERSITY: THE MEDIATING ROLE OF QUALITY OF LIFE

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Abstract

Introduction: Allergic rhinitis (AR) is one of the most prevalent chronic inflammatory diseases of the upper respiratory tract and substantially affects patients' quality of life. Persistent symptoms, including nasal obstruction, rhinorrhea, sneezing, and nasal itching, may impair sleep quality, reduce concentration, and negatively influence cognitive performance. Among medical students, these conditions may interfere with academic activities and ultimately affect academic achievement, as reflected by the Grade Point Average (GPA). Nevertheless, evidence regarding the relationship between allergic rhinitis and academic performance among Indonesian medical students remains limited. Methods: An analytical observational study with a cross-sectional design was conducted among medical students of the Faculty of Medicine, Baiturrahmah University, class of 2023. Participants were selected using a simple random sampling technique based on predefined inclusion and exclusion criteria. Allergic rhinitis was assessed using the Score for Allergic Rhinitis (SFAR) questionnaire, while quality of life was evaluated using the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ). GPA data were obtained from the participants' academic records. Data were analyzed using the Chi-square test with statistical significance established at $p < 0.05$. Results: A statistically significant association was observed between allergic rhinitis status and quality of life. Students with allergic rhinitis experienced poorer quality of life than those without allergic rhinitis. Quality of life was also significantly associated with GPA, indicating that students with impaired quality of life tended to have lower academic achievement. Furthermore, allergic rhinitis demonstrated an indirect association with GPA through its detrimental impact on quality of life. Conclusion: Allergic rhinitis is significantly associated with reduced quality of life among medical students, and impaired quality of life is related to lower academic achievement.

Keywords: Allergic rhinitis; Quality of life; Grade Point Average; SFAR; RQLQ; Medical students; Academic performance

INTRODUCTION

Allergic rhinitis (AR) is one of the most common chronic inflammatory disorders affecting the nasal mucosa and is characterized by an immunoglobulin E (IgE)-mediated hypersensitivity reaction following exposure to environmental allergens. According to the Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines, allergic rhinitis is clinically manifested by recurrent sneezing, nasal

obstruction, rhinorrhea, and nasal itching. Although these symptoms are generally not life-threatening, they frequently persist over long periods and substantially impair patients' physical, psychological, and social well-being. Consequently, allergic rhinitis is increasingly recognized not merely as a localized nasal disorder but as a chronic condition capable of affecting multiple dimensions of health-related quality of life (Sultész *et al.*, 2020; Abdelhafeez, 2022).

The global burden of allergic rhinitis has increased considerably over the past decades. Epidemiological studies estimate that approximately 10–30% of the world's population is affected by allergic rhinitis, while the World Health Organization (WHO) and ARIA report that nearly 400–500 million individuals currently live with this condition. In several developed countries, the prevalence has approached 40% of the population, whereas studies conducted in Indonesia indicate a prevalence ranging from 1.5% to 12.4%, with considerably higher rates reported in several urban areas. These findings suggest that allergic rhinitis has become an increasingly important public health concern, particularly among adolescents and young adults who experience continuous exposure to environmental allergens and changing lifestyles (Chong and Chew, 2018; Choi *et al.*, 2021; Triansyah, Amran, *et al.*, 2023).

Despite being considered a non-fatal disease, allergic rhinitis exerts a substantial impact on daily functioning. Persistent nasal congestion often disrupts normal breathing during sleep, resulting in poor sleep quality, excessive daytime sleepiness, fatigue, and reduced cognitive performance. In addition, recurrent nasal symptoms may interfere with attention, memory, learning ability, and emotional well-being. Previous studies have demonstrated that individuals with allergic rhinitis are more likely to experience anxiety, depressive symptoms, decreased productivity, and impaired social functioning compared with healthy individuals. Consequently, the overall burden of allergic rhinitis extends beyond physical symptoms and encompasses multiple aspects of quality of life (Abdelhafeez, 2022; Nur Husna *et al.*, 2022; Triansyah, Lesdamiati, Vani, *et al.*, 2023).

Among university students, particularly those enrolled in medical education, these consequences may become even more pronounced. Medical students are exposed to intensive academic workloads, prolonged study hours, and continuous cognitive demands that require optimal concentration and sustained mental performance. Any condition that compromises sleep quality or cognitive function may adversely influence learning efficiency and academic achievement. Nasal obstruction, recurrent sneezing, rhinorrhea, and persistent itching associated with allergic rhinitis may reduce classroom participation, interfere with independent study, and impair clinical learning activities. Furthermore, students who continue attending academic activities despite experiencing persistent symptoms may exhibit decreased productivity, a phenomenon commonly described as *presenteeism*.

Academic achievement in higher education is commonly represented by the Grade Point Average (GPA), which reflects cumulative learning outcomes throughout a student's academic program. GPA is influenced by numerous internal and external factors, including learning motivation, psychological status, socioeconomic conditions, environmental support, and physical health. Among these determinants, health status has received increasing attention because chronic medical conditions may directly or indirectly affect students' learning performance.

Although allergic rhinitis is generally not regarded as a severe illness, its cumulative effects on sleep disturbance, fatigue, reduced concentration, and impaired quality of life may contribute to suboptimal academic performance over time (Terada and Kawata, 2022; Rosenfield *et al.*, 2024).

Several previous investigations have reported associations between allergic rhinitis and decreased quality of life. Other studies have shown that sleep disorders, psychological distress, and chronic inflammatory diseases may negatively influence academic outcomes. However, evidence specifically examining the relationship between allergic rhinitis and GPA remains limited, particularly among university students in developing countries. Most published studies have focused primarily on clinical manifestations, disease severity, treatment outcomes, or quality of life, while relatively few have evaluated how allergic rhinitis may influence educational performance through its impact on students' daily functioning (Seedat *et al.*, 2018; Choi *et al.*, 2021).

The relationship between allergic rhinitis and academic achievement is likely to be complex rather than direct. Chronic nasal inflammation may impair sleep quality and reduce daytime alertness, leading to diminished concentration, memory retention, and cognitive efficiency. These alterations subsequently affect students' quality of life and learning performance, ultimately influencing cumulative academic achievement. Therefore, quality of life may represent an important intermediate factor linking allergic rhinitis with educational outcomes. Understanding this pathway is essential because appropriate management of allergic rhinitis has the potential not only to relieve physical symptoms but also to improve students' overall well-being and academic productivity (Nisa and Amaliah, 2022; Triansyah, Lesdamiati, Teti Vani, *et al.*, 2023).

Medical students at Baiturrahmah University represent an appropriate population for investigating this issue because they experience relatively homogeneous academic demands and are expected to maintain consistently high levels of cognitive performance throughout their education. The class of 2023 was specifically selected because students in this cohort are still undergoing the preclinical phase of medical education, during which learning methods, academic assessments, and curricular exposure remain relatively comparable across individuals. Moreover, this cohort experienced the transition period following the COVID-19 pandemic, during which learning environments and health behaviors underwent substantial changes that may influence both quality of life and academic adaptation.

To date, no published study has specifically evaluated the relationship between allergic rhinitis, quality of life, and Grade Point Average among medical students at the Faculty of Medicine, Baiturrahmah University. This knowledge gap highlights the need for further investigation. Therefore, the present study aimed to determine the association between allergic rhinitis and quality of life and to examine whether allergic rhinitis is associated with academic achievement, as reflected by Grade Point Average, among medical students of the Faculty of Medicine, Baiturrahmah University, class of 2023. The findings are expected to contribute to the growing evidence regarding the academic consequences of allergic rhinitis and provide a scientific basis for developing preventive and clinical strategies that support both students' health and academic success.

METHODS

This study employed an analytical observational design using a cross-sectional approach to investigate the association between allergic rhinitis, quality of life, and Grade Point Average (GPA) among medical students. The research was conducted at the Faculty of Medicine, Baiturrahmah University, Padang, Indonesia, between September 2025 and February 2026. The target population consisted of all undergraduate medical students from the class of 2023. Participants were selected using a simple random sampling technique based on predefined inclusion and exclusion criteria to ensure that every eligible student had an equal probability of being included in the study. Students who agreed to participate provided written informed consent before data collection.

The diagnosis of allergic rhinitis was determined using SFAR questionnaire, a validated screening instrument that assesses allergic rhinitis symptoms, family history of atopy, physician diagnosis, triggering factors, and previous allergy history. A total SFAR score of ≥ 7 was classified as allergic rhinitis, whereas a score of < 7 was categorized as non-allergic rhinitis. Participants diagnosed with allergic rhinitis subsequently completed the RQLQ to evaluate disease-specific quality of life across multiple domains, including activity limitation, sleep disturbance, nasal symptoms, eye symptoms, practical problems, emotional function, and other related symptoms. Grade Point Average (GPA) data were obtained from the participants' academic records with their permission and were categorized according to the predetermined classification used in the study protocol.

The independent variable in this study was allergic rhinitis status, while quality of life and Grade Point Average served as the primary outcome variables. Data collection was performed using structured self-administered questionnaires distributed directly to eligible participants. Before data analysis, all completed questionnaires were checked for completeness, coded, and entered into a computerized database. Data processing included editing, coding, data entry, cleaning, and tabulation to ensure data accuracy and minimize entry errors prior to statistical analysis.

Statistical analyses were performed using IBM SPSS Statistics version 26.0. Descriptive statistics were used to summarize participants' characteristics, allergic rhinitis status, quality of life, and GPA distribution, with categorical variables presented as frequencies and percentages. Bivariate analysis was conducted using the Chi-square test to evaluate the association between allergic rhinitis status and quality of life, quality of life and GPA, and allergic rhinitis status and GPA. Statistical significance was established at $p < 0.05$ with a 95% confidence interval. This study received ethical approval from the Research Ethics Committee of the Faculty of Medicine, Baiturrahmah University before data collection commenced, and all research procedures complied with ethical principles governing research involving human participants.

RESULT

The prevalence of allergic rhinitis identified using SFAR questionnaire was 52 %. Assessment of disease-specific quality of life using the RQLQ demonstrated that 55,3 students experienced impaired quality of life (table 3) . The distribution of GPA according to the study classification is summarized in Table 2.

Table 1. Distribution of Allergic Rhinitis Status Among Medical Students

Variable	n	%
Allergic Rhinitis	64	52.0
Non-Allergic Rhinitis	59	48.0
Total	123	100.0

Table 2. Distribution of Quality of Life Based on RQLQ Scores

Quality of Life Category	n	%
No Impairment	55	44.7
Mild Impairment	8	6.5
Moderate Impairment	44	35.8
Severe Impairment	16	13.0
Total	123	100.0

Table 3. Distribution of GPA Among Medical Students

GPA Category	n	%
3.51–4.00 (With Honors)	14	11.4
3.01–3.50 (Highly Satisfactory)	35	28.5
2.76–3.00 (Satisfactory)	25	20.3
2.00–2.75 (Pass)	49	39.8
Total	123	100.0

Bivariate analysis revealed a statistically significant association between allergic rhinitis and quality of life ($p < 0,001$). Students diagnosed with allergic rhinitis were more likely to experience impaired quality of life than those without allergic rhinitis. Furthermore, quality of life demonstrated a statistically significant association with Grade Point Average ($p < 0,001$), indicating that students with poorer quality of life tended to have lower academic achievement. The association between allergic rhinitis and GPA was also analyzed according to the study objectives, and the corresponding statistical results are presented in Table 5

Table 4. Association Between GPA and Quality of Life

GPA Category	No/Mild Impairment n (%)	Moderate/Severe Impairment n (%)	Total n (%)	p-value
Pass–Satisfactory	14 (11.4)	60 (48.8)	74 (60.2)	<0.001
Highly Satisfactory–With Honors	49 (39.8)	0 (0.0)	49 (39.8)	
Total	63 (51.2)	60 (48.8)	123 (100.0)	

Note: Chi-square test, $p < 0.001$

Table 5. Association Between Allergic Rhinitis Status and GPA

GPA Category	Non-Allergic Rhinitis n (%)	Allergic Rhinitis n (%)	Total n (%)	p-value
Pass-Satisfactory	11 (8.9)	63 (51.2)	74 (60.2)	<0.001
Highly Satisfactory- With Honors	48 (39.0)	1 (0.8)	49 (39.8)	
Total	59 (48.0)	64 (52.0)	123 (100.0)	

Note: Chi-square test, $p < 0.001$

DISCUSSION

The present study demonstrated a significant association between allergic rhinitis and quality of life among medical students. Participants diagnosed with allergic rhinitis were more likely to report reduced quality of life than students without allergic rhinitis. This finding is consistent with the well-established pathophysiology of allergic rhinitis, in which persistent nasal inflammation causes recurrent nasal obstruction, rhinorrhea, sneezing, and nasal itching that interfere with daily activities, sleep quality, emotional well-being, and social functioning. Because these symptoms frequently persist throughout the day and often worsen at night, their cumulative effect extends beyond physical discomfort and substantially influences health-related quality of life (Al Khalaf *et al.*, 2025; Ozoh *et al.*, 2025).

The findings are in agreement with previous studies reporting that allergic rhinitis is associated with significant deterioration in disease-specific quality of life, particularly in domains related to sleep disturbance, fatigue, concentration, and emotional function. Poor sleep quality secondary to chronic nasal obstruction has been shown to impair daytime alertness and reduce cognitive efficiency. Consequently, students affected by allergic rhinitis may experience difficulties maintaining concentration during lectures, participating in academic discussions, and sustaining prolonged periods of independent study. These mechanisms provide a biologically plausible explanation for the poorer quality-of-life scores observed among students with allergic rhinitis in the present study (Ozoh *et al.*, 2025; Pratidina *et al.*, 2025).

This study also identified a significant association between quality of life and GPA. Students with poorer quality of life tended to demonstrate lower academic achievement than those reporting better quality of life. Academic performance is influenced by multiple factors, including cognitive ability, motivation, psychological health, learning environment, and physical health. Chronic health conditions that disrupt sleep quality, concentration, and emotional stability may indirectly impair learning performance. Therefore, the observed relationship suggests that deterioration in quality of life may adversely affect students' ability to achieve optimal academic outcomes (Ramdhani, Daniller and Seedat, 2021; Almalki *et al.*, 2023; Pratidina *et al.*, 2025).

Although allergic rhinitis is generally considered a benign condition, its long-term consequences should not be underestimated in populations with demanding academic responsibilities. Medical students are required to maintain sustained attention, process large volumes of information, and participate in intensive academic activities. Recurrent allergic symptoms may reduce

productivity despite continued attendance, a phenomenon known as presenteeism, which has been widely reported among individuals with chronic allergic diseases. Consequently, even mild but persistent symptoms may gradually influence academic performance through reduced learning efficiency and diminished quality of life (Ramdhani, Daniller and Seedat, 2021; Triansyah, Lesdamiati, Vani, *et al.*, 2023).

The present findings support the hypothesis that quality of life may represent an important pathway linking allergic rhinitis to academic achievement. Rather than directly reducing GPA, allergic rhinitis appears to impair daily functioning through chronic symptoms, sleep disturbance, fatigue, and reduced concentration, which subsequently affect academic performance. This interpretation is consistent with the conceptual framework proposed in the present study and explains why interventions aimed at improving symptom control may also contribute to better educational outcomes (Vieira *et al.*, 2022; Kitsos, Michoula and Grivea, 2025).

From a clinical perspective, early identification and appropriate management of allergic rhinitis among university students should become an important component of student health services. Comprehensive treatment—including allergen avoidance, pharmacological therapy, and patient education—may improve symptom control and quality of life while supporting students' academic productivity. Universities may also benefit from implementing health-promotion programs that encourage early recognition of allergic symptoms and timely medical consultation (Almalki *et al.*, 2023; Kitsos, Michoula and Grivea, 2025).

This study has several strengths. It is among the first to evaluate the relationship between allergic rhinitis, quality of life, and academic achievement among medical students at Baiturrahmah University using validated instruments, namely the SFAR and RQLQ questionnaires. Furthermore, the use of standardized questionnaires and random sampling enhanced the reliability of the collected data. Nevertheless, several limitations should be acknowledged. First, the cross-sectional design does not permit causal inference between allergic rhinitis and academic performance. Second, allergic rhinitis was identified using a validated screening questionnaire rather than physician-confirmed clinical diagnosis or allergy testing, which may introduce misclassification bias. Third, the study was conducted in a single institution with one student cohort, thereby limiting the generalizability of the findings to other populations. Future multicenter longitudinal studies incorporating objective allergy assessments are recommended to further clarify the causal relationship between allergic rhinitis, quality of life, and academic achievement.

CONCLUSION

Allergic rhinitis was significantly associated with impaired quality of life among medical students at Baiturrahmah University. Students with poorer quality of life also demonstrated lower GPA, and allergic rhinitis status was significantly associated with academic achievement. These findings suggest that allergic rhinitis may influence students' academic performance through its impact on daily functioning and quality of life. Early detection and appropriate management of allergic rhinitis should therefore be considered to improve both students' well-being

and academic outcomes. Further prospective multicenter studies are warranted to confirm these findings and establish causal relationships.

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