



# The Effect of COVID-19 in Patients with Allergic Rhinitis

Sedat ALAGÖZ<sup>1</sup>, Vedat DELİBAŞ<sup>1</sup>, Kemal Koray BAL<sup>2</sup>, Nur YÜCEL EKİCİ<sup>1</sup>, Talih ÖZDAŞ<sup>1</sup>, Gökhan KURAN<sup>1</sup>, Orhan GÖRGÜLÜ<sup>3</sup>

<sup>1</sup> Adana City Training and Research Hospital, Clinic of Otorhinolaryngology, Adana, Türkiye

<sup>2</sup> Mersin University Hospital, Clinic of Otorhinolaryngologic Diseases, Mersin, Türkiye

<sup>3</sup> Ortadoğu Private Hospital, Clinic of Otorhinolaryngology, Adana, Türkiye

**Cite this article as:** Alagöz S, Delibaş V, Bal KK, Yücel Ekici N, Özdaş T, Kuran G, et al. The effect of COVID-19 in patients with allergic rhinitis. JEURMEDS 2022;3(3):88-92.

## ABSTRACT

**Objective:** Allergic rhinitis (AR) is a pathology in which the nasal mucosa becomes inflamed by hypersensitivity to pollen, dust, spores, and is often accompanied by symptoms such as sneezing, nasal itching, nasal congestion and runny nose. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), also known as COVID-19, is a type of coronavirus that has not been previously identified in humans. SARS-CoV-2 is now known as a highly contagious virus. Our aim in this study was to determine the possibility of COVID-19 infection in patients with allergic rhinitis and its relationship with smoking.

**Material and Methods:** This study covers the period between October 2020 and January 2021, and 100 adult patients who were followed up in our clinic with the diagnosis of allergic rhinitis for at least five years and used nasal steroids.

**Results:** Of the patients, 52 (51%) were male and 48 (49%) were female. The mean age was 37.04 ± 8.79. While 40 (40%) of the patients were smokers, 60 (60%) were non-smokers. COVID-19 positivity was detected in 9% of the patients. The frequency of COVID-19 infection in smokers was significantly lower than in non-smokers ( $p < 0.01$ ). There was no significant difference in terms of COVID-19 positivity by gender ( $p = 0.305$ ). The frequency of COVID-19 positivity was found to be significantly higher in patients with first-degree relatives infected with COVID-19 ( $p = 0.009$ ). There was no difference in the frequency of COVID-19 infection in patients with and without COVID-19 positivity in the working environment ( $p = 0.597$ ).

**Conclusion:** The COVID-19 pandemic threatens health worldwide. AR is a common disease in society. In our study, although the frequency of COVID-19 increased in AR patients with a first-degree relative with COVID-19 positivity, positivity in coworkers did not increase the frequency of COVID-19. Also, interestingly, COVID-19 infection was less common in smokers with AR.

**Keywords:** Allergic rhinitis, cigarette, COVID-19, nasal steroid, pandemic

## ÖZ

### Alerjik Rinitli Hastalarda COVID-19'un Etkisi

**Giriş:** Alerjik rinit (AR), burun içi mukozasının polen, toz, sporlara aşırı duyarlılık göstererek iltihaplandığı ve sıklıkla hapşırma, burun kaşınması, burun tıkanıklığı ve burun akıntısı gibi semptomların eşlik ettiği bir patolojidir. COVID-19 olarak da bilinen şiddetli akut solunum sendromu koronavirus-2 (SARS-CoV-2), daha önce insanlarda tanımlanmamış bir koronavirus türüdür. SARS-CoV-2 artık oldukça bulaşıcı bir virüs olarak biliniyor. Bu çalışmadaki amacımız alerjik rinitli hastalarda COVID-19 enfeksiyonuna yakalanma olasılığını ve bu durumun sigara ile ilişkisini belirlemektir.

**Gereç ve Yöntemler:** Bu çalışma, Ekim 2020 ile Ocak 2021 arasındaki dönemi ve kliniğimizde en az beş yıldır alerjik rinit tanısı ile izlenen ve nazal steroid kullanan 100 erişkin hastayı kapsamaktadır.

**Bulgular:** Hastaların 52'si erkek (%51) ve 48'i kadın (%49) idi. Ortalama yaş 37.04 ± 8.79 idi. Hastaların 40'ı (%40) sigara içerken, 60'ı (%60) sigara kullanmıyordu. Hastaların %9'unda COVID-19 pozitifliği saptandı. Sigara içen hastalarda COVID-19 enfeksiyonu sıklığı sigara içmeyenlere göre anlamlı olarak daha düşüktü ( $p < 0.01$ ). Cinsiyete göre COVID-19 pozitifliği bakımından anlamlı bir fark bulunmadı ( $p = 0.305$ ). Birinci derece akrabalarda COVID-19 ile enfekte olan hastalarda COVID-19 pozitiflik sıklığı anlamlı şekilde yüksek bulundu ( $p = 0.009$ ). Çalışma ortamında COVID-19 pozitifliği bulunan ve bulunmayan hastalarda COVID-19 enfeksiyon sıklığı açısından fark saptanmadı ( $p = 0.597$ ).

**Sonuç:** COVID-19 pandemisi dünya çapında sağlığı tehdit etmektedir. AR toplumda yaygın görülen bir hastalıktır. Çalışmamızda birinci derece akrabalarında COVID-19 pozitifliği olan AR tanılı hastalarda COVID-19 sıklığı artmakla birlikte, iş arkadaşlarındaki pozitiflik COVID-19 sıklığını arttırmamıştır. Ayrıca ilginç olarak sigara içen AR'li hastalarda COVID-19 enfeksiyonu daha az görülmüştür.

**Anahtar Kelimeler:** Alerjik rinit, sigara, COVID-19, nazal steroid, pandemi

## Corresponding Address

### Vedat DELİBAŞ

Adana City Training and Research Hospital,  
Clinic of Otorhinolaryngology  
ADANA-TÜRKİYE

e-mail: delibasvedat.cd@gmail.com

This is an open-access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes (<http://creativecommons.org/licenses/by-nc/4.0/>).

Received: 06.10.2022

Accepted: 26.11.2022

Available Online Date: 27.12.2022

## INTRODUCTION

Allergic rhinitis (AR) is a pathology of the intranasal mucosa, which is often inflamed by showing extreme sensitivity to pollen, dust, spores, and is often accompanied by sneezing, nasal itching, nasal congestion, and nasal discharge (1). If it is not associated with asthma and anaphylaxis, it is not life-threatening, but it may cause morbidity that will significantly reduce the quality of life. AR constitutes a patient population that we frequently encounter in the ear-nose-throat (ENT) practice. Allergenic skin tests and some blood parameters can be helpful in diagnosis. Treatment is based on the symptoms of the patient and includes antihistamine, topical-oral-intravenous steroid and allergen immunotherapy (1). Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2 virus), also known as COVID-19, had not been detected among pathogens that caused disease in humans before. For the first time in December 2019, public health authorities in China reported several serious acute respiratory syndrome cases. Later, the disease was seen in all other continents and was declared a pandemic by the World Health Organization on March 11, 2020. Currently, SARS-CoV-2 is identified as a highly contagious virus (1). Findings in recent studies suggest that smoking may be associated with increased morbidity and mortality in COVID-19 patients (2). Our aim in this study was to determine the probability of getting COVID-19 in allergic rhinitis patients and the relation between this situation and smoking.

## MATERIALS and METHODS

This study covers the period between October 2020 and January 2021, and 100 adult patients who had been followed up with the diagnosis of allergic rhinitis in our ENT clinic for at least five years and had used nasal steroids until March 10, 2020, the pandemic onset period in our country, were included in the study. The patients were called for control and asked questions. The patients were examined and informa-

tion on having had covid, smoking, their first-degree relatives (spouse, child) and whether there was COVID-19 in the workplace were noted. None of the patients had received nasal steroids for at least six months. No patient, who had COVID-19, had pneumonic infiltration on computed tomography. These patients had simple signs of upper respiratory tract infection and smear PCR (polymerase chain reaction) positivity.

Chi-square test was used for the variables in categorical structure in statistical analysis. In summary statistics, mean  $\pm$  standard deviation values were given for numerical variables while frequencies and percentages were used for categorical variables. Statistical significance level was taken as  $p < 0.05$ . All analyzes were done with IBM SPSS 22 package program trial version.

Our study was conducted in accordance with the Declaration of Helsinki. Signed informed consent was obtained from the participants. Ethics Committee Approval (Meeting Number: 74, Decision Number: 1235, Date: 13/01/2021) was obtained from the Ethics Committee. Written consent was obtained from the patients (or their legal guardians) that their medical data can be published.

## RESULTS

All 100 patients included in the study were diagnosed with allergic rhinitis and had been followed for at least five years. Fifty-two were males (51%) and 48 were females (49%). Patient age ranged from 19 to 54 years, and mean age was  $37.04 \pm 8.79$  years. While 40 (40%) of the patients were smoking, 60 (60%) were not smoking. Nine percent of the patients were positive for COVID-19. The number of covid-positive relatives of the patients with allergic rhinitis was 94. The number of positive colleagues was 84 (Table 1). No significant relation was found between sex and COVID-19 positivity ( $p = 0.305$ ). Patients with allergic rhinitis who smoked were less likely to get COVID-19 than non-smokers ( $p < 0.01$ ) (Table 2).

**Table 1.** The relation between COVID-19 and smoking, age, sex, work environment and relatives

		Frequency	Percent (%)
Sex	Male	52	52.0
	Female	48	48.0
Do you smoke?	Yes	40	40.0
	No	60	60.0
Has any of your first-degree relatives had COVID-19?	Yes	94	94.0
	Absent	6	6.0
Have you caught COVID-19?	Yes	9	9.0
	Absent	91	91.0
Has anyone had COVID-19 in the workplace?	Yes	84	87.5
	Absent	12	12.5

**Table 2.** The relation between COVID-19 and smoking, age, sex, work environment, relatives and P values

		Have you caught COVID-19?		p
		Yes	No	
Sex	Male	3 33.3%	49 53.8%	0.305
	Female	6 66.7%	42 46.2%	
Does she/he smoke?	Yes	0 0.0%	40 44.0%	0.010
	No	9 100.0%	51 56.0%	
Has any of your first-degree relatives had COVID-19?	Yes	6 66.7%	88 96.7%	0.009
	Absent	3 33.3%	3 3.3%	
Has anyone had COVID-19 in the workplace?	Yes	9 100.0%	75 86.2%	0.597
	Absent	0 0.0%	12 13.8%	

In allergic rhinitis patients, there was no statistically significant relation between the condition of getting COVID-19 and sex ( $p=0.305$ ). There was a statistically significant relationship between getting COVID-19 and smoking, which meant that patients with allergic rhinitis who smoked had significantly less COVID-19 ( $p=0.010$ ). The number of patients with allergic rhinitis with COVID-19 in their first-degree relatives was 94, and six of these 94 patients caught COVID-19. There was a statistically significant relation between getting infected with COVID-19 and having a first-degree relative with COVID-19 ( $p=0.009$ ). In allergic rhinitis patients, the situation of having COVID-19 in their first-degree relatives and not having COVID-19 was observed statistically significantly more (spouse, child) than having COVID-19.

There was no statistically significant relation between having COVID-19 and the presence of COVID-19 in the workplace ( $p=0.597$ ). There was no significant difference in allergic rhinitis patients in terms of getting COVID-19 and having a friend with or without COVID-19 in the working environment.

## DISCUSSION

Allergic rhinitis is a common pathology we encounter in the ENT outpatient clinic, and in this study, we aimed to reveal the relation of patients with allergic rhinitis and/or smoking with COVID-19. Allergic rhinitis is a sterile inflammation of the nasal passage by an allergic mechanism, and this inflam-

mation causes symptoms of runny nose, nasal congestion, itching, sneezing, and postnasal drip. The point we wanted to focus on in our study was that although ciliary activity is impaired due to secretions and congestion in the nasal cavity in patients with allergic rhinitis and smoking patients, colonization and replication of the virus is less with an unknown mechanism.

Some studies state that patients with allergic rhinitis should continue nasal steroid and oral antihistamine medical treatment. It is thought that patients with AR are more likely to spread COVID-19 when they are not treated because of their symptoms (1,3,4). We can accept that patients with AR can spread COVID-19 more with sneezing, droplet path and secretions, but we also think that these patients get less COVID-19. This is probably due to an unknown mechanism of nasal clearance and ciliary motility, which probably prevents the virus from infecting the person. More clinical studies are needed.

Brindisi et al. have stated in their study that treatment in AR should continue and there was no work in the opposite direction. In addition, with intranasal topical treatments, symptoms will decrease and so will the spread of COVID-19 (4). However, from a different point of view, the question comes to mind if not treating the patient with allergic rhinitis who complies with social distance, mask and hygiene rules, that is, not treating the nasal congestion, can act as a barrier and

prevent the virus from reaching the level of colonization-replication and infection and another point that should be emphasized is that the use of oral steroids that reduce mortality in COVID-19 in AR patients and avoiding nasal steroids can both prevent AR patients from getting the disease and reduce AR symptoms. This is the question in a situation that needs more clinical studies, and the answer is clinically important. We believe that despite highly harmful effects of smoking, as it increases congestion, it may block the nasopharyngeal replication of Coronavirus, and oral steroids may be more logical to use as they will cause less decongestion than nasal steroids.

Although allergic diseases are common in the world, there are not enough studies to reveal the relation with COVID-19. In addition, since allergic rhinitis is a subset of allergic diseases, the number of studies available is limited. Yang JM et al. have stated in their study that SARS-CoV-2 entered the host cells via ACE2 (angiotensin converting enzyme 2). In addition, it is thought that increased ACE2 expression in patients with chronic obstructive pulmonary disease, diabetes mellitus and hypertension increase the risk of COVID-19. ACE2 receptors are more abundant in nasal cavity cells and the idea is whether this area could be the entrance and spread gate for COVID-19. Previous studies have found the incidence of AR in patients with COVID-19 as low as 0% - 1.8%. However, ACE2's relation with this is not clearly known (5). Li Jian et al., in addition to ACE2, have mentioned an auxiliary molecule, TMPRSS2 (Transmembrane Serine Protease 2), in the entry of covid into the cell. Increased expression of both genes is thought to pose a risk for covid, and the authors have also emphasized that there is type 2 inflammation in AR and type 2 inflammation decreases ACE2 gene expression and thus decreases the possibility of getting COVID-19 (6). Decreased ACE2 expression in AR provides a low risk of getting COVID-19 (5,6).

In their study Dayal et al. have stated that staying at home and using masks during the COVID-19 period reduced AR symptoms (7). Staying at home and using masks act as a barrier against external allergens. Thus, we think that contamination to the environment is reduced due to decreasing symptoms.

Although Yin Yao et al. (8) have stated that COVID-19 test positivity in patients with allergic rhinitis, allergic asthma and non-allergic asthma had a poor clinical course, it is often reported in the literature that allergic diseases are not bad prognostic factors for COVID-19 and have the same symptoms and clinic as other patients (9-11).

In general, intranasal corticosteroids and other treatments are recommended for allergic rhinitis (11). Kow et al. have mentioned that montelukast has anti-inflammatory and anti-

viral effects. It is thought to reduce cytokine storm and show antiviral activity. Thus, it is assumed to reduce the symptoms of COVID-19 (12).

Although studies found that cough and loss of taste/smell are mostly associated with covid, having many common symptoms of allergic rhinitis and COVID-19 such as runny nose, sneezing, nasal congestion can cause social problems such as difficulty in diagnosis and late diagnosis or exclusion of allergic rhinitis patients by the society considering they are COVID-19 (13,14).

## CONCLUSION

The COVID-19 pandemic threatens health worldwide. AR patients are common in the community. In our study, we think that the patients in this group had more difficult disease although they had COVID-19 patients in their immediate environment. Nasal steroids can eliminate these barriers that prevent COVID-19 from entering the body by reducing edema and inflammation in the nasal cavity, therefore we must approach with caution. We believe that despite highly harmful effects of smoking, as it increases congestion, it may block the nasopharyngeal replication of coronavirus, and oral steroids may be more logical to use as they will cause less decongestion than nasal steroids.

**Ethics Committee Approval:** This study was approved by the Adana City Training and Research Hospital Clinical Research Ethics Committee (Decision Number: 1235, Date: 13.01.2021).

**Author Contributions:** Concept/Design: All of authors; Analysis/ Interpretation: All of authors; Data Acquisition: All of authors; Writing: All of authors; Critical Revision: All of authors; Final Approval: All of authors.

**Conflict of Interest:** There is no conflict of interest.

**Financial Disclosure:** The authors declared that this study has received no financial support.

## REFERENCES

1. Cianferoni A, Votto M. COVID-19 and allergy: How to take care of allergic patients during a pandemic? *Pediatr Allergy Immunol* 2020;31(26):96-101. <https://doi.org/10.1111/pai.13367>
2. Kashyap VK, Dhasmana A, Massey A, Kotnala S, Zafar N, Jaggi M, et al. Smoking and COVID-19: Adding fuel to the flame. *Int J Mol Sci* 2020;21(18):6581. <https://doi.org/10.3390/ijms21186581>
3. Brindisi G, De Vittori V, De Castro G, Duse M, Zicari AM. Pills to think about in allergic rhinitis children during COVID-19 era. *Acta Paediatr* 2020;109(10):2149-50. <https://doi.org/10.1111/apa.15462>
4. Shaker MS, Oppenheimer J, Grayson M, Stukus D, Hartog N, Hsieh EWY, et al. COVID-19: Pandemic contingency planning for the allergy and immunology clinic. *J Allergy Clin Immunol Pract* 2020;8(5):1477-88. <https://doi.org/10.1016/j.jaip.2020.03.012>

5. Yang JM, Koh HY, Moon SY, Yoo IK, Ha EK, You S, et al. Allergic disorders and susceptibility to and severity of COVID-19: A nationwide cohort study. *J Allergy Clin Immunol* 2020;146(4):790-8. <https://doi.org/10.1016/j.jaci.2020.08.008>
6. Jian L, Yi W, Zhang N, Wen W, Krysko O, Song WJ, et al. Perspective: COVID-19, implications of nasal diseases and consequences for their management. *J Allergy Clin Immunol* 2020;146(1):67-9. <https://doi.org/10.1016/j.jaci.2020.04.030>
7. Dayal AK, Sinha V. Trend of allergic rhinitis post COVID-19 pandemic: A retrospective observational study. *Indian J Otolaryngol Head Neck Surg* 2022;74(1):50-2. <https://doi.org/10.1007/s12070-020-02223-y>
8. Yao Y, Wang H, Liu Z. Expression of ACE2 in airways: Implication for COVID-19 risk and disease management in patients with chronic inflammatory respiratory diseases. *Clin Exp Allergy* 2020;50(12):1313-24. <https://doi.org/10.1111/cea.13746>
9. Chhibba KD, Patel GB, Vu THT, Chen MM, Guo A, Kudlaty E, et al. Prevalence and characterization of asthma in hospitalized and nonhospitalized patients with COVID-19. *J Allergy Clin Immunol* 2020;146(2):307-14. <https://doi.org/10.1016/j.jaci.2020.06.010>
10. Bousquet J, Akdis C, Jutel M, Bachert C, Klimek L, Agache I, et al. Intranasal corticosteroids in allergic rhinitis in COVID-19 infected patients: An ARIA-EAACI statement. *Allergy* 2020;75(10):2440-4. <https://doi.org/10.1111/all.14302>
11. Lee JH, Lee Y, Lee SY, Bever HV, Lou H, Zhang L, et al. Management of allergic patients during the COVID-19 pandemic in Asia. *Allergy Asthma Immunol Res* 2020;12(5):783-91. <https://doi.org/10.4168/aaair.2020.12.5.783>
12. Kow CS, Hasan SS. Montelukast in children with allergic rhinitis amid COVID-19 pandemic. *Acta Paediatr* 2020;109(10):2151. <https://doi.org/10.1111/apa.15491>
13. Bruno C, Locatello LG, Cilona M, Fancello G, Vultaggio A, Maltagliati L, et al. Seasonal allergic rhinitis symptoms in relation to COVID-19. *Allergy Rhinol (Providence)* 2020;11:2152656720968804. <https://doi.org/10.1177/2152656720968804>
14. Hosoki K, Chakraborty A, Sur S. Molecular mechanisms and epidemiology of COVID-19 from an allergist's perspective. *J Allergy Clin Immunol* 2020;146(2):285-99. <https://doi.org/10.1016/j.jaci.2020.05.033>