OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences
Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) | ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article **Otorhinolaryngology**

The COVID-19 Pandemic Had a Positive Impact on Patients with Allergic Rhinitis

Dalia Alarfaj[1*], Fatimah Al Hassan[1], Ali Almomen[1], Jaffar A. Al-Tawfiq[2, 3, 4], Haifa Alenzi[5]

[1]Department of Otorhinolaryngology Head and neck Surgery, King Fahad Specialist Hospital, Dammam, KSA
[2]Department of Internal medicine and infectious diseases, Johns Hopkins Aramco Healthcare, Dhahran, KSA
[3]Division of Infectious Diseases, Department of Medicine, Indiana University School of Medicine, Indianapolis, IN, USA
[4]Division of Infectious Diseases, Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD, USA
[5]Department of Otorhinolaryngology, North Medical Tower, Arar, KSA

DOI: 10.36348/sjmps.2023.v09i09.014 | **Received:** 02.08.2023 | **Accepted:** 06.09.2023 | **Published:** 30.09.2023

***Corresponding author:** Dalia Alarfaj
Department of Otorhinolaryngology Head and neck Surgery, King Fahad Specialist Hospital, Dammam, KSA

Abstract

Introduction: Allergic rhinitis is one of the most common chronic conditions affecting all age group and it is characterized by sneezing, nasal congestion, and rhinorrhea. In some cases, conjunctivitis also occurs up on expose to a variety of irritants like pollen, duct, perfumes, and weather changes. ***Aim****:* This study evaluates the impact of COVID19 pandemic and quarantine on patients with allergic rhinitis sign and symptoms. ***Results*****:** The study was conducted in the Kingdome of Saudi Arabia and 740 participants returned the online questionnaire. of those, 596 (80.5%) identified dust and weather changes as the main irritants to their symptoms, and 440 (59.5%) experienced sneezing as the main symptoms before COVID-19 pandemic. Only 89 (12%) reported symptoms relief by 90-100% during lockdowns and curfew periods. There was a significantly lower rate of medication use during the pandemic (28.32%) compared to the time before the pandemic (50.93%). During the COVID-19 pandemic, of the respondents 271 (36%) reported no improvement, 179 (23.8%) had mild improvements, 131 (17.4%) reported a moderate improvement, and 171 (22.7%) reported a significant improvement. ***Conclusion*****:** The study showed that 40% of the participants had moderate to significant symptomatic relief during the periods of lockdowns and curfew of the COVID-19.

Keywords: Allergic rhinitis, nasal congestion, perfumes, COVID19 pandemic.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) was initially reported in Wuhan, China, in December 2019 and was related to the Huanan Seafood Market, South China [1, 2]. The World Health Organization (WHO) declared a public health emergency of international concern (PHEIC) of the COVID-19 on 30th of January 2020 [3], and as a pandemic on March 2020 [4]. The pandemic had caused significant international impacts including travel restriction, curfew and lockdowns. The Kingdom of Saudi Arabia implemented multiple preemptive measures to slow the spread of SARS-CoV-2 transmission [5, 6] including quarantines and curfews [7].

The impact of the COVID-19 pandemic had been studied extensively. Allergic rhinitis is one of the most common types of chronic rhinitis and may affect 10-29% of the population [8]. The occurrence of rhinosinusitis is expected to be lower during lockdowns following COVID-19 pandemic if these symptoms are related to outdoor irritants. One study showed that the score of sinonasal outcome test was lower during the COVID-19 lockdown than previous years [9]. On the other hand, another study showed that patients with dust mite allergy had exacerbation of symptoms during lockdowns and staying at home [10]. Thus, we took this study to evaluate the impact of the lockdowns and curfew in KSA on symptoms and use of medications in patients with chronic allergic rhinitis.

METHODS

This is a questionnaire-based study and participants were invited to participate across KSA through an online questionnaire distributed through social media between May 1st and July 31st, 2020. Participants were asked to answer the questionnaire if they experienced recurrent sinonasal symptoms or had

been diagnosed with allergic rhinitis. The questionnaire contained sociodemographic data, and level of education, precipitating factors of symptoms, attributed symptoms, seasonality, profile of allergic rhinitis during the pandemic in relation to symptoms and use of medications and any improvement of symptoms.

Ethical Considerations

All data kept confidential and was only used for the purpose of the study and the collected data were anonymous with no identification characteristics.

Statistical Analysis

Data analysis was performed using Statistical Package for the Social Sciences, SPSS 23rd version. Frequency and percentages were used to display categorical variables. Mean and standard deviation were used to present continuous variables. McNamar test and chi-square test was used to test for the presence of association between categorical variables. ANOVA test was also used to test for association. ANOVA test was followed by Tukey post-hoc test to determine where the exact difference between groups exist. Level of significance was set at 0.05.

RESULTS

A total of 752 participants completed the study and 317 (42.2%) were males, and 734 (97.6%) were Saudi (Table 1). The mean age and SD were 35.84 (12.33) years. Of the participants, 148 (19.7%) were students, 124 (16.5%) had education-career, 140 (18.6%) had health-sector, 46 (6.1%) had field work, and 294 (39.1%) had governmental / private work. The majority 561 (74.6%) were from the eastern region.

Table 1: Socio-Demographic and Academic Profile of the Participants, (n = 752)

Demographical Characteristics	No.	%
Male	317	42.20
Female	435	57.80
Nationality		
Saudi	734	97.60
Non-Saudi	18	2.40
Occupation		
Student	148	19.70
Education-career	124	16.50
Health-sector	140	18.60
Field work	46	6.10
Other Governmental / private jobs	294	39.10
Region		
Eastern	561	74.60
Western	114	15.20
Northern	7	0.90
Southern	5	0.70
Central	65	8.60

The most common causes of allergic symptoms were dust and weather changes as reported by 604 (80.3%). Other precipitating factors were as follow: perfumes in 207 (27.5%), pollens in 201 (26.7%), animal dandruffs in 122 (16.2%), and job-related allergens in 74 (9.8%)

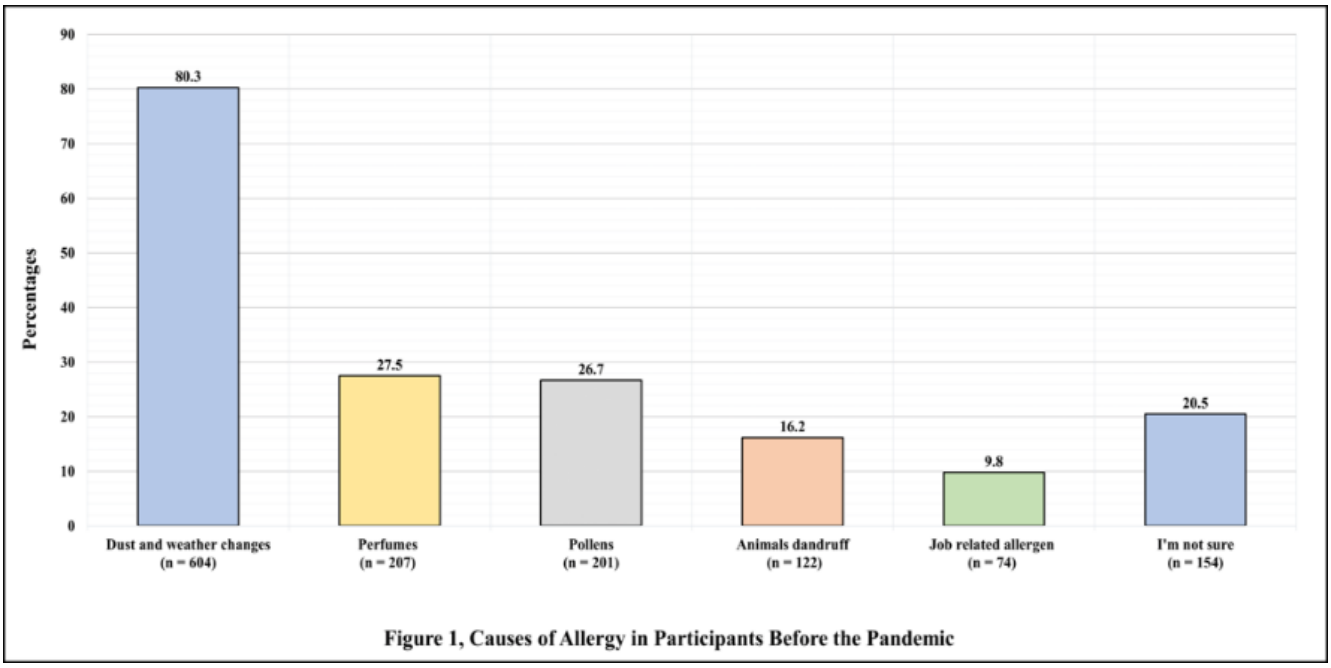

Figure 1: Causes of Allergic symptoms among participants before the pandemic

Figure 2 displays allergic symptoms experienced by patients before the COVID-19 pandemic. The most reported symptoms were sneezing in 447 (59.4%), and nasal congestion/obstruction in 366 (48.7%). The least commonly reported symptom was facial congestion in 134 (17.8%).

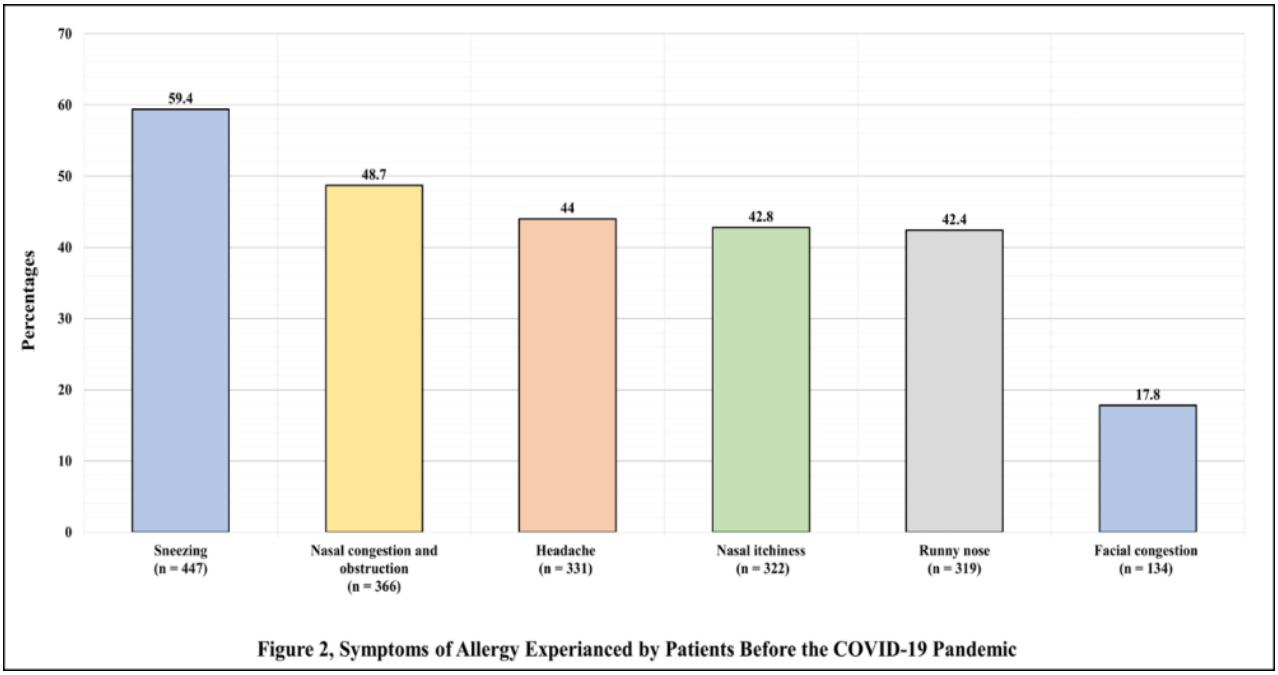

Figure 2: Most common symptoms as reported before the COVID-19 pandemic

The seasonality of allergic rhinitis was as follows: 564 (75%) no specific season, 50 (6.6%) in the Fall, 50 (6.6%) Summer, 55 (7.3%) Winter, and 33 (4.4%) Spring.

Table 2 Illustrates the profile of allergic rhinitis status and care during the COVID-19 pandemic, only 94 (12.5%) reported visiting a doctor for their allergic rhinitis. As for the participants use of medication for allergic rhinitis before the pandemic, 76 (10.1%) used only antihistamine, 114 (15.2%) used only steroid nasal spray, 193 (25.7%) used both antihistamine tablets, and steroid nasal spray, while 369 (49.1%) did not require any medications. As for the participants use of medication for allergic rhinitis during the pandemic, 57 (7.6%) reported using only antihistamine, 83 (11%) reported using only steroid nasal spray, 73 (9.7%) reported using both antihistamine tablets, and steroid nasal spray, while 539 (71.7%) reported not using medication at all. Following rules and guidelines during the pandemic, 673 (89.5%) reported compliance, 11 (1.5%) did not follow, and 68 (9%) reported following at sometimes.

Table 2: Profile of Allergic Rhinitis Status and Care During the Pandemic, (n = 752)

Question	No.	%
Q1/ Did you visit any allergy / ENT doctor During the pandemic for your nasal allergy		
Yes	94	12.5
No	658	87.5
Q2/ Did you use nasal steroid spray or antihistamine tablet before the pandemic for your nasal allergy		
Yes, only antihistamine tablets	76	10.1
Yes, only nasal steroid spray	114	15.2
Yes, nasal steroid spray and antihistamine tablet	193	25.7
No	369	49.1
Q3/ Did you use nasal steroid spray or antihistamine tablet during the pandemic for your nasal allergy		
Yes, only antihistamine tablets	57	7.6
Yes, only nasal steroid spray	83	11
Yes, nasal steroid spray and antihistamine tablet	73	9.7
No	539	71.7
Q4/ Have you followed the rules and guidelines of the pandemic (Wearing face mask, washing, and sanitizing your hands, social distancing)		
Yes	673	89.50
No	11	1.50
Sometimes	68	9.00

Table 3 shows allergic rhinitis status during the pandemic, where participants have reported the frequency of experiencing allergic rhinitis symptoms.

Table 3: Allergic Rhinitis Status During the Pandemic, (n = 752)

Question	No.	%
Runny nose		
(1) Did not at all	354	47.1
(2) Occasionally	174	23.1
(3) Sometimes	146	19.4
(4) Frequently	41	5.5
(5) Daily	37	4.9
Nasal congestion		
(1) Did not at all	323	43
(2) Occasionally	143	19
(3) Sometimes	117	15.6
(4) Frequently	86	11.4
(5) Daily	83	11
Nasal itchiness		
(1) Did not suffer at all	340	45.2
(2) Occasionally	139	18.5
(3) Sometimes	142	18.9
(4) Frequently	70	9.3
(5) Daily	61	8.1
Sneezing		
(1) Did not at all	228	30.3
(2) Occasionally	213	28.3
(3) Sometimes	161	21.4
(4) Frequently	83	11
(5) Daily	67	8.9
Facial congestion		
(1) Did not at all	519	69
(2) Occasionally	77	10.2
(3) Sometimes	77	10.2
(4) Frequently	48	6.4
(5) Daily	31	4.1
Headache		
(1) Did not at all	270	35.9
(2) Occasionally	148	19.7
(3) Sometimes	155	20.6
(4) Frequently	78	10.4
(5) Daily	101	13.4
Swollen eyelids, allergic shiners		
(1) Did not at all	481	64
(2) Occasionally	78	10.4
(3) Sometimes	79	10.5
(4) Frequently	57	7.6
(5) Daily	57	7.6
Halitosis		
(1) Did not at all	520	69.1
(2) Occasionally	88	11.7
(3) Sometimes	83	11
(4) Frequently	30	4
(5) Daily	31	4.1
Dental pain		
(1) Did not at all	510	67.8
(2) Occasionally	103	13.7
(3) Sometimes	85	11.3
(4) Frequently	23	3.1
(5) Daily	31	4.1

Participant self-assessment of allergic rhinitis improvement during the COVID-19 pandemic showed that 271 (36%) reported no improvement, 179 (23.8%) reported a mild improvement, 131 (17.4%) reported a moderate improvement, and 171 (22.7%) reported a significant improvement. A comparison of using medication for allergic rhinitis before and during the COVID-19 pandemic showed a significantly lower rate

during the pandemic (28.3%) compared to before the pandemic (50.93%) (P value < 0.001).

Table 4 illustrates factors associated with improvement in symptoms of allergic rhinitis. Occupation was significantly associated with improvement (p = 0.007), highest rate of improvement was seen in participants with education-related jobs (30.6%), while the lowest rate of improvement was seen in health-related jobs (45%) and field jobs (43.5%). Age was also significantly associated with improvement of allergic rhinitis symptoms (p < 0.001). Significant improvement was associated with higher mean of age compared to other groups (p < 0.05). Gender, nationality, and following the rules and guidelines of pandemic were not associated with improvement.

Table 4: Factors Associated with Improvement of Allergic Rhinitis Symptoms

Parameters	**Allergic Rhinitis Rate of Improvement**				**P-Value**
	No improvement	**Mild improvement (10% - 40%)**	**Moderate improvement (40% - 70%)**	**Significant improvement (70 - 100%)**	
Gender (n, %)					0.424
Male	109 (34.4%)	71 (22.4%)	56 (17.7%)	81 (25.6%)	
Female	162(37.2%)	108 (24.8%)	75 (17.2%)	90 (20.7%)	
Nationality (n, %)					0.139
Saudi	265 (36.1%)	174 (23.7%)	131 (17.8%)	164 (22.3%)	
Non-Saudi	6 (33.3%)	5 (27.8%)	0 (0%)	7 (38.9%)	
Occupation (n, %)					0.007*
Student	56 (37.8%)	47 (31.8%)	19 (12.8%)	26 (17.6%)	
Education related jobs	37 (29.8%)	28 (22.6%)	21 (16.9%)	38 (30.6%)	
Health-related jobs	63 (45%)	35 (25%)	19 (13.6%)	23 (16.4%)	
Field work	20 (43.5%)	6 (13%)	9 (19.6%)	11 (23.9%)	
Governmental / private job	95 (32.3%)	63 (21.4%)	63 (21.4%)	73 (24.8%)	
Q4/ Have you followed the rules and guidelines of the pandemic (wearing face mask, washing and sanitizing your hands, social distancing)					0.100
Yes	240 (35.7%)	164 (24.4%)	117 (17.4%)	152 (22.6%)	
No	2 (18.2%)	3 (27.3%)	0 (0%)	6 (54.5%)	
Sometimes	29 (42.6%)	12 (17.6%)	14 (20.6%)	13 (19.1%)	
Age (mean + standard deviation)	34.16 ± 11.67	33.88 ± 11.83	36.44 ± 11.14	40.08 ± 13.68	< 0.001*
*Significant at level 0.05					

DISCUSSION

Allergic rhinitis (AR) is an inflammatory disorder of the upper respiratory track mucosa mediated by IgE and triggered by exposure to indoor or outdoor allergens. As a result, a series of symptoms may be observed such as sneezing, rhinorrhea, disturbance in sleep and in most cases nasal congestion [11]. Different factors lead to exacerbation of AR around such as: life style, presence of plants or pets at home, air conditioner, the degree of pollution exposure, geographic location and genetics [11]. In our study dust and weather changes were the most common situations that provoked AR symptoms followed by perfumes. Similarly in a study by Almehizia *et al*., the main trigger was dust and pollen [12].

The specific allergen that can exacerbate AR can be multifactorial, for example in some area of Saudi Arabia where hot and dusty-dry weather is predominant around the year, people tend to prefer indoor lifestyle of living, which decrease natural air ventilation and increase use of air conditioner which facilitate molds collection, and dust accumulation, and increase the effect of indoor allergen sensitization.

In this study, 89% were committed to follow COVID-19 pandemic instructions including social distancing and face masking. The effect of the pandemic and quarantine on allergic rhinitis symptoms varies among our responders. There was no improvement in 36%. In one study, using face mask reduced allergic rhinitis symptoms severity in patient with chronic intermediate disease [13]. Face mask may filter allergens or modify the breathing air and make it humid and hot. Such modification decreases the mucosal response towards allergen [13].

During the COVID-19 pandemic, 87.5% of the participants did not seek medical advice for AR. In addition, 64% reported mild to significant improvement in symptoms. The use of medications was lower (28.32%) during the pandemic compared to 50.93% before the pandemic. In a previous study from Italy, the effect of COVID-19 lockdown was positive in reducing medication use [9]. Lockdown and facemask use decrease risk to outdoor allergens. One study showed significant reduction in nasal and ocular symptoms with the use of face mask including sneezing and nasal [14]. The use of face mask during the COVID-19 pandemic

provides an excellent opportunity to such such activity on the course and symptoms of allergic rhinitis [15]. And one study showed a reduction in symptoms with the use of face mask [16]. Thus, it was suggested that facemask should be considered as a non-pharmacologic intervention to decrease AR symptoms [17]. The use of nasal steroid was 15% before and 11% during the pandemic. However, it is interesting to note that the use of intra-nasal steroid had been linked with reduced COVID-19 disease [18].

This study has few limitations. It was a questionnaire and did not look specifically at the actual patients visits to the clinics. In addition, we did not measure the actual number of medications being used. The exact nature of allergic rhinitis was not defined.

CONCLUSION

This study showed that 40% of the participants had moderate to significant symptomatic relief during the periods of lockdowns and curfew of the COVID-19. Further studies are needed to explore additional factors associated with reduction in rhinitis and to replicate the findings in other regions/countries.

REFERENCE

1. Zhou, F., Yu, T., Du, R., Fan, G., Liu, Y., Liu, Z., ... & Cao, B. (2020). Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The lancet*, *395*(10229), 1054-1062. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32171076.
2. Guan, W. J., Ni, Z. Y., Hu, Y., Liang, W. H., Ou, C. Q., He, J. X., ... & Zhong, N. S. (2020). Clinical characteristics of coronavirus disease 2019 in China. *New England journal of medicine*, *382*(18), 1708-1720.
3. Jee, Y. (2020). WHO international health regulations emergency committee for the COVID-19 outbreak. *Epidemiology and health*, *42*. Available from: https://pubmed.ncbi.nlm.nih.gov/32192278/.
4. Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta bio medica: Atenei parmensis*, *91*(1), 157-160. Available from: https://pubmed.ncbi.nlm.nih.gov/32191675/.
5. Al-Tawfiq, J. A., Leonardi, R., Fasoli, G., & Rigamonti, D. (2020). Prevalence and fatality rates of COVID-19: What are the reasons for the wide variations worldwide? *Travel medicine and infectious disease*, *35*, 101711. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1477893920301794.
6. Shi, H., Han, X., Jiang, N., Cao, Y., Alwalid, O., Gu, J., ... & Zheng, C. (2020). Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. *The Lancet infectious diseases*, *20*(4), 425-434.
7. Al-Tawfiq, J. A., Sattar, A., Al-Khadra, H., Al-Qahtani, S., Al-Mulhim, M., Al-Omoush, O., & Kheir, H. O. (2020). Incidence of COVID-19 among returning travelers in quarantine facilities: a longitudinal study and lessons learned. *Travel medicine and infectious disease*, *38*, 101901.
8. Greiner, A. N., Hellings, P. W., Rotiroti, G., & Scadding, G. K. (2011). Allergic rhinitis. *The Lancet*, *378*(9809), 2112-2122. Available from: https://aacijournal.biomedcentral.com/articles/10.1186/s13223-018-0280-7.
9. Gelardi, M., Trecca, E. M., Fortunato, F., Iannuzzi, L., Ronca, G., Quaranta, N. A., & Cassano, M. (2021). COVID-19 lockdown and seasonal allergic rhinitis: our experience in 40 patients. *Acta Bio Medica: Atenei Parmensis*, *92*(2), e2021215–e2021215Available from: https://mattioli1885journals.com/index.php/actabiomedica/article/view/10953.
10. Gelardi, M., Trecca, E. M., Fortunato, F., Iannuzzi, L., Marano, P. G., Quaranta, N. A., & Cassano, M. (2020). COVID-19: when dust mites and lockdown create the perfect storm. *Laryngoscope Investigative Otolaryngology*, *5*(5), 788-790. Available from: https://pubmed.ncbi.nlm.nih.gov/32838034/.
11. Mahnashi, T. A., Faqihi, M. A., Moafa, A. N., Basudan, A. A., Alhazmi, M. N., Khawaji, A. F., & Haddadi, Y. M. Y. (2019). Severity and prevalence of allergic rhinitis among school children, Jazan Region Saudi Arabia. *Journal of family medicine and primary care*, *8*(2), 663. Available from: https://pubmed.ncbi.nlm.nih.gov/30984691/.
12. Almehizia, A. A., AlEssa, R. K., Alwusaidi, K. M., Alzamil, K. A., AlJumah, M., Aljohani, S., ... & Salam, M. (2019). Allergic rhinitis: Disease characteristics and coping measures in Saudi Arabia. *PloS one*, *14*(6), e0217182. Available from: https://pubmed.ncbi.nlm.nih.gov/31242201/.
13. Dror, A. A., Eisenbach, N., Marshak, T., Layous, E., Zigron, A., Shivatzki, S., ... & Sela, E. (2020). Reduction of allergic rhinitis symptoms with face mask usage during the COVID-19 pandemic. *The Journal of Allergy and Clinical Immunology: In Practice*, *8*(10), 3590-3593. Available from: https://pubmed.ncbi.nlm.nih.gov/32889221/.
14. Mengi, E., Kara, C. O., Alptürk, U., & Topuz, B. (2022). The effect of face mask usage on the allergic rhinitis symptoms in patients with pollen allergy during the covid-19 pandemic. *American Journal of Otolaryngology*, *43*(1), 103206. Available from: https://pubmed.ncbi.nlm.nih.gov/34534761/.
15. Bakshi, S. S., & Bakshi, S. (2021). Use of face masks during COVID-19 pandemic â€“An opportunity to study the effect on the symptoms of allergic rhinitis. *Pan Arab Journal of Rhinology*, *11*(1), 70-70. Available from: http://www.pajr.eg.net/article.asp?issn=2090-7540;year=2021;volume=11;issue=1;spage=70;epa

ge=70;aulast=Bakshi.

16. Dror, A. A., Eisenbach, N., Marshak, T., Layous, E., Zigron, A., Shivatzki, S., ... & Sela, E. (2020). Reduction of allergic rhinitis symptoms with face mask usage during the COVID-19 pandemic. *The Journal of Allergy and Clinical Immunology: In Practice*, *8*(10), 3590-3593. Available from: http://www.jaci-inpractice.org/article/S2213219820308679/fulltext.
17. Bergmann, K. C., Kugler, S., Zuberbier, T., & Becker, S. (2021). Face masks suitable for preventing COVID-19 and pollen allergy. A study in the exposure chamber. *Allergo Journal International*, *30*, 176-182. Available from: https://link.springer.com/article/10.1007/s40629-021-00180-8.
18. Bousquet, J., Akdis, C. A., Jutel, M., Bachert, C., Klimek, L., Agache, I., ... & Brian, L. (2020). Intranasal corticosteroids in allergic rhinitis in COVID-19 infected patients: An ARIA-EAACI statement. *Allergy*, *75*(10), 2440-2444. Available from: https://pubmed.ncbi.nlm.nih.gov/32233040/.