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EDITORIAL

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COVID-19: When dust mites and lockdown create the perfect storm

Many specialist physicians are involved in the battle against Coronavirus Disease-19 (COVID-19). Depending on the stage of the infection, Primary Care Physicians and Infectious Disease Doctors are consulted, as well as Resuscitation Specialists.[1,2]

Although at the moment the role of the Allergists seems to be secondary to that of the other specialist physicians mentioned above, allergic rhinitis remains one of the most common diseases and will continue to affect about 10% to 40% of the world population varying according to the geographic area.[3]

There are many questions that Rhinologists together with Allergists should answer. For example, what effects are the lockdown and the quarantine imposed by all governments going to have on the course of the various allergic diseases?

With the present study, we aimed to answer this last question, focusing our attention on dust mite allergy. Particularly, we tried to understand if the course of the disease of patients suffering from dust mite allergy was negatively affected by the COVID-19 restrictions, which have been certainly important to fight the pandemic, but forced patients to stay at home for a long time.

Forty-five patients allergic to dust mites (23 males, 22 females; median age 32) visited at the Otolaryngology (ORL) Department of Foggia and Bari University Hospitals participated in this study. Out of this group, 13 (28.8%) individuals were allergic to multiple allergens, but, when the study was carried out, it was not the timing of their allergy season. As concerns the comorbidities, 13 (28%) subjects were asthmatic and 2 (4%) had aspirin sensitivity.

Fulfilling telehealth consultations in accordance with the guidelines from the Higher Institute of Health (ISS), patients attended phone interviews during COVID-19 lockdown and were questioned about their sinonasal symptoms from March 9th to April 9th, 2020, by answering the sinonasal outcome test (SNOT-22) questionnaire.[4,5]

This last questionnaire was selected as a statistically significant correlation ($P < .001$) was evidenced between SNOT-22 and Rhinitis Control Assessment Test (RCAT).[6,7]

Further data concerning the medications used to treat allergy and the number of days per month in which they were used were collected. Patients' responses about the COVID-19 lockdown were compared to those collected in our clinics during the same time frame of 2019. Patients in essential jobs (ie, health workers, security guards, policemen, transport workers) were excluded, as their level of exposure was potentially the same of 2019 due to their work duties. Additionally, patients with uncontrolled symptoms of asthma, as well as subjects who underwent immunotherapy and/or changed medications were not included. Moreover, nobody had a fever; about their history, they reported neither COVID-19 cases in their families nor suspected contacts, as they were quarantined at home according to the Italian regulations.

The assessment of significant differences across the means of continuous variables relied on the paired sample *t* test considering as significant values with *P* values <.05. To assess distribution of the variables, we used the Bartlett test. *P* values <.05 were considered significant. Data analyses were performed with STATA-MP software, version 15.

Our results confirmed that the lockdown ordered by the Italian government, although necessary, has negatively influenced the clinical history of patients with dust mite allergy. All SNOT-22 scores concerning the COVID-19 lockdown were higher than those of the previous year (Table 1); however, only some clinical parameters, such as "nasal obstruction," "runny nose," and "need to blow nose," were statistically significant ($P < .05$). Additionally, other four SNOT-22 parameters were statistically significant (ie, "difficulty falling asleep," "waking up at night," "frustrated/restless/irritable," "sad"). While potentially related to nasal allergy, these feelings and sleep disruption could be also related to the historic moment that we are all experiencing.[8]

Also, in regard to the treatment, results about COVID-19 lockdown were worse than those of 2019 (Table 2), although only two investigated drugs, such as "systemic antihistamines" and "nasal decongestants," reported statistical significance ($P < .05$). This is consistent with the symptoms and the behavior that patients with perennial allergic rhinitis usually have; in fact, most of the time, the chronic nasal obstruction is the expression of the "minimal persistent inflammation,"[9] which is very often responsible for the use of nasal decongestants.

These findings may suggest that being quarantined at home for weeks increased the exposure to dust mites in our study group.[10] Additionally, being the hospitals active only for urgency/emergencies, we cannot exclude the exacerbation of other preexisting comorbidities or the onset of new ones. Unfortunately the restrictions imposed by the lockdown, although necessary to fight the pandemic,

TABLE 1 Sinonasal outcome test (SNOT-22) responses during COVID-19 lockdown and during the same time frame in 2019

	Year 2019[a]		Year 2020[b]		
SNOT-22	Mean score ± SD	95% CI	Mean score ± SD	95% CI	*P*-value
Need to blow nose	2.6 ± 1.3	2.2-3.0	3.2 ± 1.5	2.8-3.7	**0.0201**
Sneezing	2.4 ± 1.4	2.0-2.8	2.9 ± 1.5	2.4-3.3	0.0558
Runny nose	2.0 ± 1.3	1.6-2.4	2.6 ± 1.8	2.1-3.2	**0.0266**
Nasal obstruction	1.8 ± 1.1	1.4-2.1	2.3 ± 1.4	1.9-2.8	**0.0211**
Loss of smell or taste	1.3 ± 1.4	0.9-1.7	1.5 ± 1.4	1.1-1.9	0.2476
Cough	0.7 ± 1.0	0.4-1.0	0.9 ± 1.2	0.5-1.2	0.2848
Post nasal discharge	1.2 ± 1.1	0.9-1.5	1.4 ± 1.5	1.0-1.9	0.2125
Thick nasal discharge	1.1 ± 1.0	0.8-1.4	1.5 ± 1.5	1.1-1.9	0.0798
Ear fullness	0.9 ± 1.0	0.6-1.2	1.2 ± 1.2	0.8-1.6	0.1347
Dizziness	1.0 ± 1.2	0.6-1.4	1.1 ± 1.4	0.7-1.6	0.3164
Ear pain	0.7 ± 1.0	0.4-1.0	0.7 ± 1.0	0.4-1.0	0.4576
Facial pain/pressure	0.9 ± 1.0	0.5-1.2	0.9 ± 1.3	0.5-1.3	0.3977
Difficulty falling asleep	0.8 ± 1.2	0.4-1.2	1.4 ± 1.7	0.9-1.8	**0.0327**
Waking up at night	0.7 ± 1.2	0.3-1.1	1.3 ± 1.6	0.9-1.8	**0.0186**
Lack of good night's sleep	0.9 ± 1.4	0.5-1.4	1.4 ± 1.7	0.9-1.9	0.0785
Waking up tired	1.0 ± 1.5	0.6-1.5	1.6 ± 1.8	1.1-2.2	0.0518
Fatigue	0.9 ± 1.3	0.6-1.4	1.4 ± 1.6	0.9-1.8	0.1001
Reduced productivity	0.8 ± 1.4	0.4-1.3	1.2 ± 1.5	0.7-1.6	0.1389
Reduced concentration	0.8 ± 1.4	0.4-1.2	1.3 ± 1.5	0.8-1.8	0.0563
Frustrated/restless/irritable	1.1 ± 1.2	0.8-1.5	2.0 ± 1.4	1.6-2.4	**0.0012**
Sad	0.5 ± 0.9	0.2-0.8	1.0 ± 1.4	0.06-1.4	**0.0290**
Embarrassed	0.5 ± 0.9	0.2-0.7	0.9 ± 1.6	0.4-1.4	0.0543

Abbreviation: CI, confidence interval.
[a]From March 9th to April 9th, 2019.
[b]From March 9th to April 9th, 2020.

TABLE 2 Medications to treat dust mites allergy and the number of days per month in which they were used during COVID-19 lockdown and during the same time frame in 2019

	Year 2019[a]		Year 2020[b]		
Medications	Mean days per month ± SD	95% CI	Mean days per month ± SD	95% CI	*P*-value
Systemic antihistamines	4.9 ± 7.3	2.7-7.1	9.1 ± 10.4	5.9-12.2	**0.0156**
Topical corticosteroids	3.1 ± 6.5	1.1-5.0	5.6 ± 8.6	3.0-8.2	0.0607
Steroid plus antihistamines nasal spray	0.9 ± 3.3	−0.1-1.9	1.8 ± 5.6	0.1-3.4	0.1789
Systemic corticosteroids	0.8 ± 2.6	0.0-1.6	1.2 ± 3.4	0.1-2.2	0.2916
Nasal decongestants	1.0 ± 3.0	0.1-1.9	3.1 ± 6.1	1.2-4.9	**0.0214**
Bronchodilators	0.3 ± 1.5	−0.1-0.7	1.0 ± 3.1	0.1-2.0	0.0841

Abbreviation: CI, confidence interval.
[a]From March 9th to April 9th, 2019.
[b]From March 9th to April 9th, 2020.

were not in accordance with the indications suggested by the ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines,[11,12] according to which avoiding contact with the allergen in both indoor and outdoor environments is the most effective primary preventive measure in patients with respiratory allergies. When this is not possible as at present, a "perfect storm" occurs and the role of "counseling" through phone calls and telehealth is crucial. Our results evidenced the necessity of an integrated strategy, which includes environmental cleanup and therapeutic plans according to the international guidelines. Lastly, allergen-specific immunotherapy, when clinically indicated, remains now the only treatment, which is able to change the natural history of allergic diseases. However, in many localities worldwide, most

patients undergoing immunotherapy were forced to stop this treatment due to government restrictions on nonessential healthcare. These subjects, especially those affected by asthma, may have exacerbations that require them to seek care with increased utilization of personnel and personal protective equipment (PPE) during a critical time when these resources are potentially scarce and needed for different purposes. Therefore, specific guidelines for allergy patients during a pandemic should be drafted to mitigate resource utilization while maintaining safety and high-quality care.

CONFLICT OF INTEREST

The authors disclose no conflicts of interest

ETHICS STATEMENT

This research was conducted in accordance with Guideline for Good Clinical Practice and the ethical principles originating in the Declaration of Helsinki.

INFORMED CONSENT

Informed consent to participate in this study was obtained by all participants.

DATA AVAILABILITY STATEMENT

Data are available upon request to the corresponding author at any time.

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BIBLIOGRAPHY

1. Koks S, Williams RW, Quinn J, et al. COVID-19: time for precision epidemiology. *Exp Biol Med*. 2020;245:677-679. https://doi.org/10.1177/1535370220919349.
2. Tobías A. Evaluation of the lockdowns for the SARS-CoV-2 epidemic in Italy and Spain after one month follow up. *Sci Total Environ*. 2020;725:138539. https://doi.org/10.1016/j.scitotenv.2020.138539.
3. Wise SK, Lin SY, Toskala E, et al. International consensus statement on allergy and rhinology: allergic rhinitis. *Int Forum Allergy Rhinol*. 2018;8(2):108-352. https://doi.org/10.1002/alr.22073.
4. Hopkins C, Gillett S, Slack R, Lund VJ, Browne JP. Psychometric validity of the 22-item sinonasal outcome test. *Clin Otolaryngol*. 2009;34(5):447-454. https://doi.org/10.1111/j.1749-4486.2009.01995.x.
5. Fokkens WJ, Lund VJ, Hopkins C, et al. European position paper on rhinosinusitis and nasal polyps 2020. *Rhinol J*. 2020;0:1-464. https://doi.org/10.4193/Rhin20.600.
6. Hoehle LP, Speth MM, Phillips KM, et al. Association between symptoms of allergic rhinitis with decreased general health–related quality of life. *Am J Rhinol Allergy*. 2017;31(4):235-239. https://doi.org/10.2500/ajra.2017.31.4444.
7. Nathan RA, Dalal AA, Stanford RH, et al. Qualitative development of the rhinitis control assessment test (RCAT), an instrument for evaluating rhinitis symptom control. *Patient Patient-Centered Outcomes Res*. 2010;3(2):91-99. https://doi.org/10.2165/11318410-000000000-00000.
8. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry*. 2020;66:317-320. https://doi.org/10.1177/0020764020915212.
9. Canonica GW, Compalati E. Minimal persistent inflammation in allergic rhinitis: implications for current treatment strategies. *Clin Exp Immunol*. 2009;158(3):260-271. https://doi.org/10.1111/j.1365-2249.2009.04017.x.
10. Hart BJ. Life cycle and reproduction of house-dust mites: environmental factors influencing mite populations. *Allergy*. 1998;53:13-17. https://doi.org/10.1111/j.1398-9995.1998.tb04990.x.
11. Day M. Covid-19: European officials warn that exiting lockdown will be "very long" and will require cooperation. *BMJ*. 2020;369:m1549. https://doi.org/10.1136/bmj.m1549.
12. Bousquet J, Schünemann HJ, Togias A, et al. Next-generation allergic rhinitis and its impact on asthma (ARIA) guidelines for allergic rhinitis based on grading of recommendations assessment, development and evaluation (GRADE) and real-world evidence. *J Allergy Clin Immunol*. 2020;145(1):70-80.e3. https://doi.org/10.1016/j.jaci.2019.06.049.