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RESEARCH NOTE

Impact of quarantine and face masks on ragweed-induced oculorhinits during the COVID-19 pandemic in Northern Italy

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KEYWORDS
allergy, ambrosia, lockdown, pollen, rhinitis, SARS-CoV-2

INTRODUCTION

Common ragweed (Ambrosia artemisiifolia) represents a growing threat to European sensitive atopic patients. In fact, during the last two decades, the prevalence of this allergy has increased in heavily ragweed colonized areas (Eastern France, Northern Italy), afflicting as much as 12% of the general population.[1,2] Furthermore, ragweed pollen-induced symptoms (oculorhinitis, asthma) significantly impair quality of life (QoL), leading to considerable healthcare costs and relevant economic burdens.[3] After the start of the Coronavirus Disease 2019 (COVID-19) pandemic, near-universal face-masking policies were adopted on a global scale. Moreover, social-distancing and work-from-home policies drastically decreased outdoor human activities.[4] It is conceivable that these profound changes may have variously affected atopic patients. However, to the best of our knowledge, no study has been conducted so far to specifically assess the impact of anti-COVID-19 measures on ragweed-induced oculorhinitis. Therefore, the present survey study was designed to investigate the effects of quarantine and face-masking policies on nasal and ocular symptoms in a pool of patients suffering from ragweed allergy.

METHODS

Between November 2020 and December 2020, 124 patients (61 males and 63 females, mean age 48.2 years, standard deviation ± 15.9 years, age range 18–72 years) formerly diagnosed with ragweed-related allergic oculorhinitis were consecutively recruited. Specifically, patients undergoing ragweed-specific immunotherapy and COVID-19 patients were excluded. Geographic location (Lombardy, Northern Italy) was verified for each participant. All patients confirmed to have always used face masks (surgical masks or N95 masks) in the outdoors after the declaration of the pandemic by the World Health Organization (March 2020). Clinical-demographic data were collected electronically. For symptom assessment, patients were instructed to answer referring to the symptom diary of the whole

TABLE 1 Clinical-demographic characteristics of the enrolled 124 participants during the 2019 and the 2020 ragweed seasons in Northern Italy

Variable	2019	2020	Trend (%)	*p*-value
Overall self-perceived burden				
VAS (mean ± SD)	5.6 ± 2.1	4.3 ± 2.2	−22.9%	**0.006**
Nasal symptoms				
Sneezing (mean ± SD)	3.3 ± 1.4	2.0 ± 1.5	−38.0%	**<0.001**
Rhinorrhea (mean ± SD)	3.5 ± 1.3	2.2 ± 1.6	−37.4%	**<0.001**
Nasal obstruction (mean ± SD)	3.2 ± 1.4	1.9 ± 1.6	−40.0%	**<0.001**
Nasal itching (mean ± SD)	3.2 ± 1.4	1.9 ± 1.5	−39.3%	**<0.001**
Ocular symptoms				
Watering eyes (mean ± SD)	2.5 ± 1.6	2.6 ± 1.6	+4.2%	0.607
Swollen eyes (mean ± SD)	2.6 ± 1.7	2.7 ± 1.8	+4.1%	0.725
Eye itch (mean ± SD)	2.6 ± 1.9	2.6 ± 1.7	−1.4%	0.998
Tired or sore eyes (mean ± SD)	2.6 ± 1.8	2.6 ± 1.8	0.0%	0.963
Over-the-counter anti-allergic medications (total number of days of therapy)				
Oral H1 antihistamines (mean ± SD)	15.1 ± 10.2	8.6 ± 8.0	−43.4%	**0.033**
Steroid nasal sprays (mean ± SD)	12.6 ± 10.4	7.1 ± 8.3	−43.2%	**0.047**
H1 Antihistamine Eye Drops (mean ± SD)	9.6 ± 9.4	9.5 ± 9.3	−0.4%	0.906

Abbreviations: VAS, Visual Analogue Scale; SD, Standard Deviation.

allergic season (August 2020–October 2020, the quarter of ragweed pollen season in Northern Italy). First, all participants were asked to rank the overall self-perceived burden of ragweed ochulorhinis on a Visual Analogue Scale (VAS) from 0 ("no impairment") to 10 ("worst impairment"). Subsequently, patients were asked to score the severity of nasal and ocular symptoms by filling out the corresponding sections of the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ)[5] (Table 1). Each item was rated on a seven-point Likert scale from 0 ("no impairment") to six ("severe impairment"). Furthermore, the frequency of use of common over-the-counter anti-allergic therapies was recorded by patients in a personal diary and reported as the total number of days of therapy (Table 1). Finally, to quantify the effects of quarantine and face-masking on ocular and nasal symptoms, data collected in 2020 were compared to that recorded for the same patients between November 2019 and December 2019 and referring to the 2019 ragweed pollen season (August 2019–October 2019) (Table 1). Wilcoxon matched-pairs signed rank test was performed for statistical analysis using the software Prism, version 9.0.0 (GraphPad Software, LLC, San Diego, CA), setting statistical significance level at $p < 0.05$.

RESULTS

The Annual Pollen Integral (API) was 120 grains/m^3 in 2019 and 84 grains/m^3 in 2020 (source: http://www.pollinieallergia.net/bollettino-pollini-riepilogo/2019/lombardia/compositae_ambrosia). During the 2020 ragweed season, the self-reported overall burden of ragweed oculorhinitis decreased significantly (-22.9%, $p = 0.006$), and all screened nasal symptoms (sneezing, rhinorrhea, nasal obstruction, nasal itching) improved significantly ($p \leq 0.001$). Contrariwise, all ocular symptoms (watering eyes, swollen eyes, eye itching, tired or sore eyes) reported no significant variation in comparison with the previous year ($p > 0.05$). With regards to common anti-allergic medications, a significant reduction in use of oral H1 antihistamines and steroid nasal sprays was found ($p < 0.005$). Conversely, the use of eye drops resulted unchanged ($p = 0.906$).

DISCUSSION

Inhaled allergens can trigger IgE-mediated immunological responses in sensitive patients, causing conjunctivitis, and rhinitis. The diameter of ragweed pollen grains usually ranges from 15 to 25 μm. Standard surgical masks can filter particles larger than 3 μm,[6] while N95 respirators can filter even smaller particles.[7] Therefore, in addition to reducing transmission of pathogens, face masks can potentially lower the burden of other inhaled airborne particles including allergens and air pollutants.[8,9]

The findings of the present study demonstrated a significant reduction of both the overall burden of ragweed oculorhinitis and all screened nasal symptoms after the adoption of anti-COVID-19 face-masking measures.

Nevertheless, despite a reduction of the pollen count in 2020, ocular symptoms showed no improvement. As suggested by Dror and collaborators, this mismatch between lower nasal symptoms and unchanged ocular symptoms is consistent with the intended function of face masks in protecting the airways from inspiratory particles, while the conjunctiva of the eye remains exposed to provoking allergens.[10] Significantly, this finding is also corroborated by the fact that patients' records on anti-allergic medications highlighted a reduction in the use of oral antihistamines and nasal sprays, while the consumption of antihistamine eye drops remained comparable to the pre-COVID-19 scenario.

It is possible to surmise that other containment measures, such as work-from-home policies, may have contributed to the overall reduction of allergic symptoms. However, the isolated improvement in nasal symptoms without significant changes of ocular symptoms still underlines the beneficial role of face masks on nasal symptoms.

In conclusion, this preliminary report supports the hypothesis that massive face masks usage during the COVID-19 pandemic may have acted as an effective preventive measure in patients allergic to ragweed with severe rhinitis symptoms. Further studies on other allergens, on a larger scale and with control groups are therefore advisable and necessary in order to better investigate the pathophysiology behind face masks and personal protective equipment in allergic oculorhinitis.

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Nothing to disclose.

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