



Trend of Allergic Rhinitis Post COVID-19 Pandemic: A Retrospective Observational Study

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Received: 7 September 2020 / Accepted: 12 October 2020 / Published online: 20 October 2020
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Abstract To study, compare and analyse the trend of allergic rhinitis incidence post COVID-19 pandemic in a tertiary care hospital in Patna Bihar. This is a retrospective observational study done at Patna medical college from January to June 2020. The number of patients with signs and symptoms of allergic rhinitis post pandemic (March–July 2020) were compared to preceding three months (Jan 2020–March 2020). Chi square test was employed to know and infer whether the change in trend of incidence is statistically significant. There is decrease in trend of allergic rhinitis in our study at our centre. $P < .01$. Decrease in pollution due to lockdown and increased use of mask and increase indoor activities may be the reason for decreasing trend of allergic rhinitis.

Keywords Allergic rhinitis · Pandemic · ARIA guideline · Pollutant · PM2.5

Introduction

Allergic rhinitis is the most common manifestation of allergy in the body worldwide [1, 2]. Rhazes first described the condition, Clemens Von Pirquet explained the mechanism of immune reaction and Charles Blakeley discovered pollens as cause of hay fever. The diagnostic criteria of allergic rhinitis is vague. Symptom score consisting of QOL score, sleep score used to assess subjective severity. Objective measurement are acoustic rhinometry, rhinomanometry, peak expiratory flow meter. The skin prick test

(48.7%) has more positive predictive value as an epidemiologic test than then RAST Ig E test. (38.6%). The earlier classification of seasonal/perennial rhinitis is replaced by intermittent/persistent rhinitis. Various association with hygiene, immunisation, rural environment, infection have an inverse relationship with allergic rhinitis. The most common cause of hay fever are pollens from trees [Alder, Birch, Cider, Pinus] grass and weeds. These are wind pollinated pollens and remains in air for longer time owing to its light weight. Hay fever only contributes to what was earlier termed as seasonal allergic rhinitis. Other causes which cause perennial rhinitis include animal dander, dust mites, and moulds. The prevalence of AR varies in various studies and ranges from 10–20% in America and Europe. About 500 million people are by allergic rhinitis of which 200 million are patient with comorbid asthma. The prevalence of seasonal allergic rhinitis is 1–40% and perennial rhinitis is 1–13%. Seasonal allergic rhinitis is more common in children while perennial rhinitis in adult.

Theories of Pathogenesis of AR

Hygiene theory: early infection and sensitisation of allergen shift Th2/Th1 towards Th1 and its cytokine pathway [3].

Immunisation: vaccination with BCG shifts the cytokine pathway towards Th1 [4].

Urban/rural residence: rural tend to be less allergic [5].

Probiotics use and antibiotic misuse [6].

Stress and physical exercise.

Genetic predisposition and family history.

Hypersensitivity and immune dysregulation: IgE mediated type 1 hypersensitivity.

Pollutant and mites exposure [7].

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Materials and Methods

This is a retrospective observational study done at Patna medical college from January to June 2020. The number of patients with signs and symptoms of allergic rhinitis post pandemic (March–July2020) were compared to preceding three months (Jan 2020–March2020). Allergic rhinitis is monitored by skin prick test, IgE, S. eosionophilia. ARIA guidelines were employed to grade the severity of symptoms. Chi square test was employed to know and infer whether the change in trend of incidence is statistically significant (Table 1; Fig. 1).

Result

The number of patients of allergic rhinitis have shown a decreasing trend since the inception of pandemic and lockdown imposition by nearly quartered as compared to immediate preceding three months (Fig. 2).

Chi square test shows that there is statistically significant change in trend of number of cases during the months of April–June [Table 2].

Discussion

Korsgaard et al. have studied the relation of air pollutant and allergic rhinitis [8–11]. They pointed air pollutant as major cause of allergic rhinitis [12]. The cases of allergic rhinitis seem to have decreasing trend in our study. Many reasons can be sought of to explain such result. There is decrease in level of particulate matter and pollutant in atmosphere owing to complete lockdown in midst of the pandemic. There is a monumental shift in behaviour of our population in using face mask to protect themselves from SARS CoV 2. The AQI of PATNA in lockdown period remained below 50 on an average throughout lockdown. PM2.5 concentration dropped by 43%, PM10 by 31%, 10% in CO, 18% in NO₂ and negligible change in SO₂. Ozone increased 10–20% in rest of India except eastern India which saw exponential 89%increase compared to previous

Table 1 Age wise change in incidence of AR during pandemic

Age group	Pre-pandemic	Post pandemic	P value
5–20	20	6	.05
21–35	48	12	.05
36–50	34	8	.05
51–65	26	4	.05
Total	128	30	

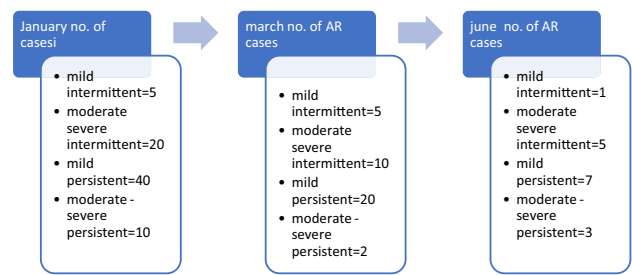


Fig. 1 ARIA classification downgrading of stage

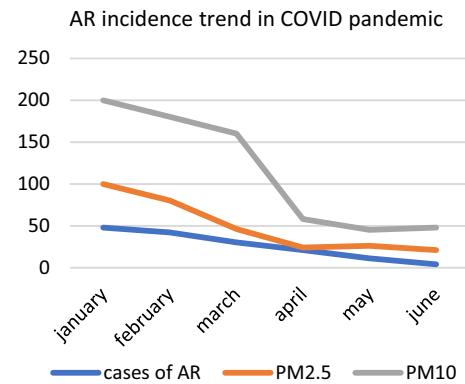


Fig. 2 Trend of pollutant and AR incidence during pandemic

Table 2 Chi square test on changing trend of AR

Grade	Observed cases in April–June	Expected cases in April–June	$X^2 = [O - E]^2/E$	p
Mild intermittent	12	24	144/24 =	.05
Moderate-severe intermittent	7	56	49 ² /56	.05
Mild persistent	10	28	18 ² /28	.05
Moderate-severe persistent	1	20	19 ² /20	.05

years. Apart from decrease in pollutant level regular mask use has prevented all allergen to enter and react to nasal mucosa. There is probably some role of decrease junk food consumption during lockdown and improvement in overall general health. The decreasing trend in incidence in these months is not common every year. Grass pollen is common between May to July, tree pollen February to June, and weed between June to September. So indoor activities due to lockdown have drastically cut the number of hay fever cases. This trend need to be studied in bronchial asthma too which will further substantiate our study. However results in our study may not be generalised pan India as the data collected by us is over short period, less sample size and

Table 3 American AQI

AQI Range	Level	Description
0–50	Good	Little or no risk
50–100	Moderate	
100–150	Unhealthy for sensitive groups	Sensitive groups affected
150–200	Unhealthy	Everyone is affected
200–300	Very unhealthy	Emergency condition
300–500	Hazardous	Health alert

patients of limited geographic distribution of few cities adjoining Patna. Many patient might have not been able to reach hospital owing to lack of transportation due to lockdown. Thus further studies at other centre is required to confirm this trend to be at national or even global level (Table 3).

Conclusion

There is decreasing trend of allergic rhinitis in current pandemic lockdown period in our study. Further studies with larger sample over larger demography over longer period is required to substantiate it.

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