

# Association of Chronic Rhinosinusitis with Risk of COVID-19 Infection

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## ABSTRACT

Chronic inflammatory diseases that affect the upper respiratory tract may be a risk factor for COVID-19 infection. The current descriptive study is to investigate the existence of a relationship between chronic Rhinosinusitis disease (CRS) and infection with Covid 19. A descriptive study was conducted on 1125 participants who came to the specialized outpatient clinic of otolaryngology in Kirkuk (Iraq), for the period between August and October of 2021. The results confirmed that the incidence of CRS among the participants was 11%, while the co-infection with COVID-19 was developed in 18% of CRS patients. The incidence of hyposmia was 24 (18.0%) in CRS with COVID-19 patients versus 9 (6.0%) in non-Covid-19 patients. On the other hand, the proportion of nasal polyps was 41% among CRS patients infected with COVID-19. It was concluded that there is a risk relationship between chronic nasal inflammation and infection with Covid 19, so we recommend paying attention and conducting more accurate studies on this topic.

**Key words:** Chronic rhinosinusitis, Otolaryngology, COVID-19

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## METHODS AND PATIENTS

This study was conducted on 1225 individuals who attended the specialized outpatient clinic of the ear, nose and throat for the specialist consultant, Dr. Tunjai Namiq Faiq, in the center of Kirkuk governorate in northern Iraq. The study period extended from the first day of August to the end of October 2021. The diagnosis of chronic rhinosinusitis was confirmed by a specialist physician, and patient data were recorded after obtaining their consent to participate in the study. The diagnosis of chronic rhinosinusitis was confirmed by a specialist physician, as for the diagnosis of Covid 19 infection, it was through a polymerase chain reaction (PCR) procedure for a throat swab that was conducted in the public health laboratory in the governorate center. Data of patients were recorded after they agreed to participate in the study. Inclusion criteria for individuals were as follows: the youngest age 10 and the oldest 70 years old, males and females. As for the exclusion criteria for individuals, they were as follows: Those with serious diseases that made it difficult for them to answer. CRS patients were divided into two groups: a group of CRS patients with covid 19 infections and the other group of CRS patients without covid 19. A comparison was made between the two groups in terms of demographic factors such as gender, age, and dwelling places. In addition to the following symptoms: runny nose, rhinal obstruction, sneezing, olfactory disorders, and nasal polyps (NPs). A descriptive statistics method was used to display the results with the use of SPSS program version

## INTRODUCTION

Pathological disorders in the nasal cavity may seriously lead to lower airway diseases because it is the gateway to the respiratory system. Chronic Rhinosinusitis (CRS) is a prevalent nasal disorder, affecting up to 12% of the adult population [1,2]. CRS is a long-standing inflammatory condition of the nose and sinuses that is recognized by the existence of the following symptoms, a stuffy nose, nasal discharge with or without facial pain, and disorders of sense of smell [3,4]. Generally CRS is markedly categorized as CRS associated with nasal polyps and unassociated with nasal polyps, depending on the results of nasal endoscopy [5]. In simple terms, COVID-19 is a risky disease that affects the respiratory tract, causing severe pneumonia and potentially life-threatening complications such as multiple organ failure and death [6-9]. The nasal cavity has a substantial role in the infection of COVID-19 [10,11], and it has been shown that sino-nasal signs are often in the severe phase of an upper respiratory infection like COVID-19 are caused by generalized myxedema [12]. In general, there is a hypothesis that individuals who develop pre-existent upper airway infection are more susceptible to infection with COVID-19 [13,14], so this study was conducted to verify this hypothesis.

25. Chi-square test was conducted, and the values were considered statistically significant at  $P < 0.05$ .

**RESULTS & DISCUSSION**

In this study, we found that 150 (11%) of the participants had chronic rhinosinusitis (Figure1), and 27 (18 %) of the total patients, had a positive COVID-19 test, as illustrative in Figure 2.

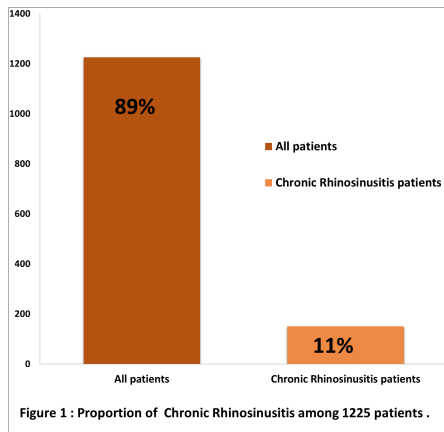
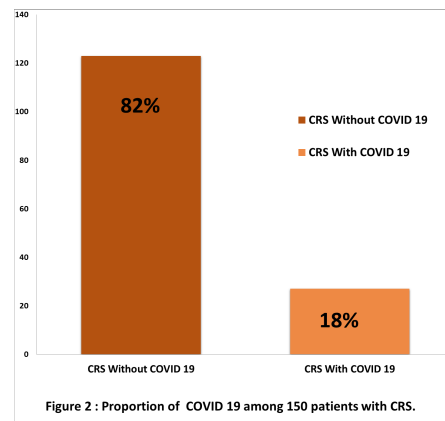


Figure 1 : Proportion of Chronic Rhinosinusitis among 1225 patients .

**Figure 1: Proportion of chronic rhinosinusitis among 1225 patients.**



**Figure 2: Proportion of COVID19 among 150 patients with CRS.**

The characteristics and symptoms of patients with CRS are shown in Table 1.

The percentage of chronic rhinitis symptoms in patients with COVID-19 was as follows: 26 (17.3%) runny nose, 24 (18.0 %) hyposmia, 24 (16.0%) sneezing, and 14 (9.3%) rhinal obstruction.

**Table 1: Distribution of characteristics and symptoms among the subgroups of CRS patients.**

| Characteristics |           | All CRS       | CRS without Covid19 | CRS with Covid19 | P-value |
|-----------------|-----------|---------------|---------------------|------------------|---------|
|                 |           | 150 (100 %)   | 123 (82 %)          | 27 (18 %)        |         |
| Gender          | Male      | 71<br>47.30%  | 56<br>37.30%        | 15<br>10.00%     | 0.345   |
|                 | Female    | 79<br>52.70%  | 67<br>44.70%        | 12<br>8.00%      |         |
| Ages            | 10-30     | 77<br>51.30%  | 64<br>42.70%        | 13<br>8.70%      | 0.907   |
|                 | 31-50     | 61<br>40.70%  | 49<br>32.70%        | 12<br>8.00%      |         |
|                 | 51-70     | 12<br>8.00%   | 10<br>6.70%         | 2<br>1.30%       |         |
| Dwelling places | Urbanized | 128<br>85.30% | 105<br>70.00%       | 23<br>15.30%     | 0.981   |
|                 | Ruralized | 22<br>14.70%  | 18<br>12.00%        | 4<br>2.70%       |         |
| Runny nose      | Yes       | 129<br>86.00% | 103<br>68.70%       | 26<br>17.30%     | 0       |
|                 | No        | 21<br>14.00%  | 20<br>13.30%        | 1<br>0.70%       |         |
| Hyposmia        | Yes       | 41<br>27.30%  | 23<br>15.30%        | 18<br>12.00%     |         |
|                 | No        | 109           | 100                 | 9                |         |

|                    |     |        |        |        |       |
|--------------------|-----|--------|--------|--------|-------|
|                    |     | 72.70% | 66.70% | 6.00%  | 0.708 |
| Sneezing           | Yes | 130    | 106    | 24     |       |
|                    |     | 86.70% | 70.70% | 16.00% |       |
|                    | No  | 20     | 17     | 3      |       |
|                    |     | 13.30% | 11.30% | 2.00%  | 0.006 |
| Rhinal Obstruction | Yes | 45     | 31     | 14     |       |
|                    |     | 30.00% | 20.70% | 9.30%  |       |
|                    | No  | 105    | 92     | 13     |       |
|                    |     | 70.00% | 61.30% | 8.70%  |       |

While figures 3 and 4 represent the occurrence of nasal polyps in both CRS subgroups, as those who suffer from nasal polyps with Covid 19 co-infection amounted to about 11(41%) compared to 16 (59%) of them without polyps.

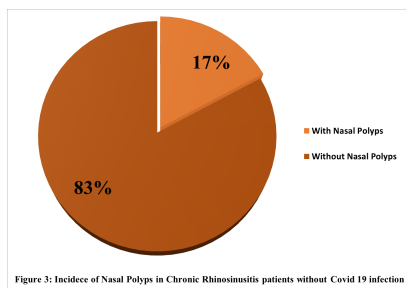


Figure 3: Incidence of Nasal Polyps in Chronic Rhinosinusitis patients without COVID-19 infection.

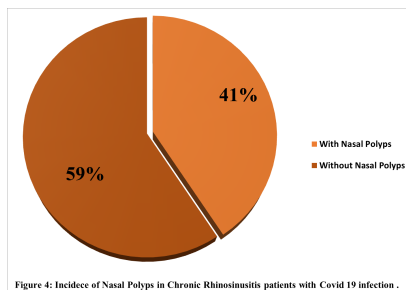


Figure 4: Incidence of Nasal Polyps in Chronic Rhinosinusitis patients with COVID-19 infection.

The corona virus that causes COVID-19, enters the body's cells via the angiotensin-converting enzyme 2 (ACE2) receptor [15,16]. This enzyme is extremely expressed in nasal epithelium, particularly in non-acidic tissues, and is down regulated by IFN- $\gamma$ , indicating that pro-existent type one inflammation may rise vulnerability to COVID-19 [17]. Previous studies confirmed a relationship between acute form of asthma and an augmentation risk of dying from COVID-19 [18-20]. Although a contrarian hypothesis asserts that altering ACE2 expression in recurrent inflammatory airway illnesses might modulate the risk of COVID-19 [21,22]. To date, there are few studies evaluating COVID-19 infection in patients who have CRS, so we conducted this current study. Findings of this study suggested that infection with COVID-19 in chronic rhinosinusitis patients was 18%. This is

consistent with Lee and colleagues' findings that 21% of CRS patients have serious COVID-19 comparison to the 13.3% non-CRS patients [23]. In addition, our findings are consistent with another previous study which confirmed that 67 (57.3%) suffer from decreased sense of smell (hyposmia) out of 117 patients infected with COVID-19 [24-26].

### CONCLUSION

We concluded that the co-morbidity of COVID-19 in chronic rhinosinusitis patients was 18%, which is a high rate of concern. Therefore, chronic rhinosinusitis can be considered to be related with the promotion of COVID-19 infection. This requires more studies on this topic.

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