

## A Study Of Anosmia In Covid-19 Patients

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**Abstract:** Background: Clinical features of COVID infection are varied and sometimes non-specific. Anosmia is one such clinical feature, for which limited evidence is available. Material And Methods: Subjects were contacted via telephonic interviews and data was collected regarding their perceptions about COVID infection. Result: Prevalence of anosmia in our study was 12.8% overall but significantly more (18%) in hospitalised patients/symptomatic. More than 30% of patients were having anosmia as their first symptom. Anosmia was more in patients having co morbidities. Conclusion: Loss of smell is one of the important clinical features of COVID infection. Anosmia may be the sole or first symptom in COVID. [Gandhi S Natl J Integr Res Med, 2021; 12(6): 53-58]

**Key Words:** Anosmia, COVID- 19, Symptom

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**Introduction:** COVID-19 outbreak is major pandemic affecting millions all across the world affecting health and economy at large<sup>1</sup>. COVID-19 is having variety of clinical presentations<sup>2</sup>, typically it presents with, a high fever and dry cough; in some cases, resulting in shortness of breath particularly if pneumonia develops<sup>2,3</sup>. Other Common symptoms include muscle ache (myalgia), confusion, headache, sore throat, rhinorrhoea, chest pain, diarrhoea, nausea/vomiting, conjunctival congestion, nasal congestion, sputum production, fatigue (malaise), haemoptysis, and chills<sup>2,4-7</sup>. A literature review revealed a few published articles on the importance of anosmia as symptoms of COVID-19<sup>8-11</sup>.

Fever with respiratory symptoms is now established symptoms<sup>4</sup>. Absence of fever may be more frequent in patients of COVID 19 as compared to SARS-CoV and MERS-CoV 12. Thus, if case definition focuses on fever then there is a chance that surveillance team may miss out certain patients<sup>13,5</sup>. It is interesting to note that many expressions of covid are non-specific. Anosmia is one of the nonspecific clinical symptoms among other in covid<sup>1</sup>.

Smell and taste disorders are related to a wide range of viral infections<sup>15,16</sup>. Viral damage due to respiratory infection can cause acute onset anosmia<sup>16</sup>. Influenza A virus, herpesviruses, poliovirus, rabies virus, parainfluenza virus, adenoviruses, and Japanese encephalitis virus

can enter the central nervous system by using olfactory nerve route<sup>15</sup>. In mouse models, SARS-CoV demonstrated trans neuronal penetration through the olfactory bulb and resultant infection in connected area of brain in Mouse models<sup>17</sup>.

Olfactory nerve damage during invasion and multiplication of SARS-CoV-2 can be the aetiology explaining anosmia observed in the early stage of COVID-19<sup>18</sup>.

Limited evidence is available regarding anosmia, as a symptom in COVID patients. Hence, this study was undertaken to study anosmia in Covid 19 patients which can aid in effective management of Covid patients. Objective of this study was to study the proportion of anosmia, its recovery, association with taste disturbance, its relation with comorbidities, effects of steroid on recovery and association of anosmia with disease recovery.

**Material & Methods:** The longitudinal based study was undertaken in dedicated covid hospital and dedicated covid care centre after approval from institutional review board.

Study Population included all admitted patients (In hospital Or Health care centre) during April 2020 to Jun 2020 with following criteria:

Inclusion Criteria: All covid positive patients who are greater than 18 years of age. Those who gave consent for telephonic interview.

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**Exclusion Criteria:** Patients below 18 years of age. Critically ill patients of HDU and IC. Those who have not given consent for telephonic interview Those who have become non-compliant later on. Total 1333 patients were included in our study. Subjects were contacted via telephonic interviews for asking details regarding their COVID infection.

All demographic details of included patients were taken and they were asked regarding new onset loss of smell/decrease in perception/change in perception of smell immediately few days before or after their diagnosis of covid. They were also asked regarding self-awareness of these symptoms or only became aware when asked.

Duration of symptoms was also noted along with all other symptoms of covid. It was also noted whether anosmia appeared before, along with or after other symptoms. Whether anosmia caused any taste disturbance was also asked. All patients who reported anosmia as a symptom were

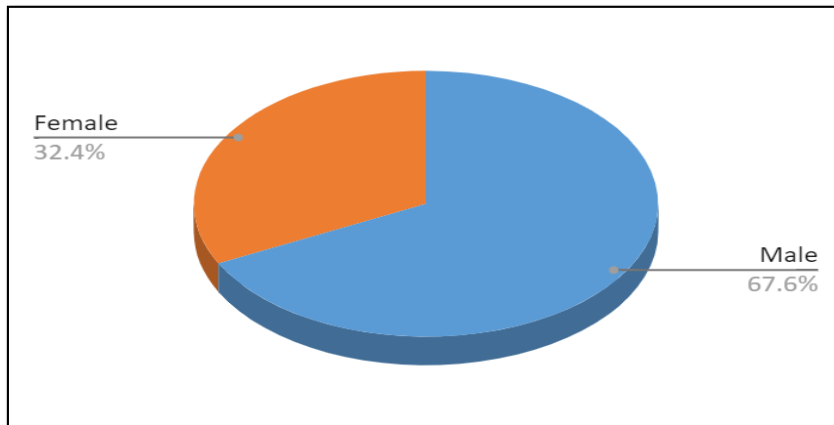
followed every week and questions regarding recovery of anosmia were asked and noted, it was done on a weekly basis up to one month and time of recovery of anosmia was noted.

Questions were also asked regarding any pre-existing comorbidities like HT, DM, TB, Anaemia etc. and noted.

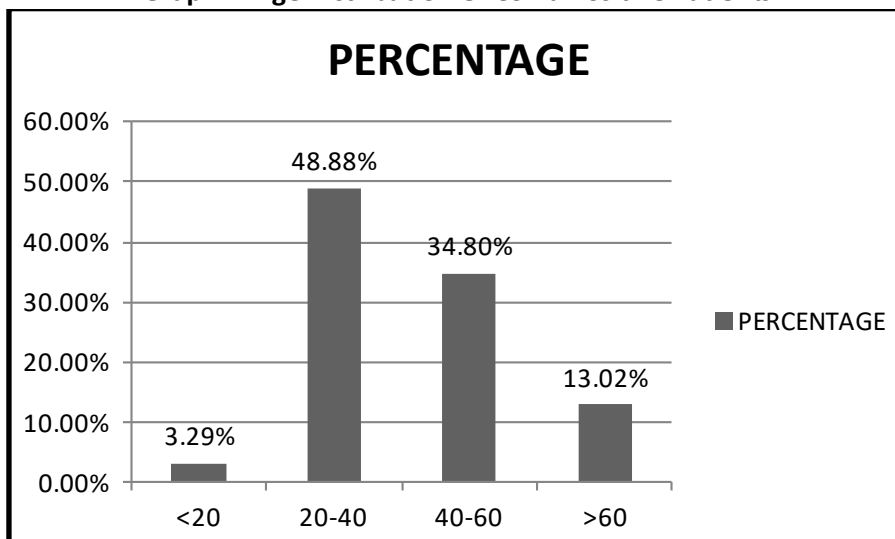
Patients' indoor case records were studied and investigations like CRP (Highest if more than one) and NLR was recorded. Whether oral steroids were given or not were also noted from indoor case records and if yes duration was also noted. Collected data was analysed using SPSS and microexcel.

**Results:** Total 1333 patients were taken into our study fulfilling our criteria in 3 months duration time. More than 65% of covid patients were male in our study which correlates with findings that male are more affected due to covid(GRAPH-1).

**Graph 1: Sex Ratio Of Covid Positive Patients**



**Graph 2: Age Distribution Of Covid Positive Patients**



As depicted on the above Graph 2, all age groups are being affected but almost half the population is among the younger age group (20-40) of people. Out of 1333 patients in our study 698 patients were in hospital and 635 patients were in care centre making it almost equal proportion.

Those patients having minimum symptoms with stable vitals and normal investigations profile without comorbidities were kept in care centre while others were treated in hospital.

**Table 1: Incidence of Anosmia**

	No	Percentage
Patients Having Anosmia	171	12.82%
Patients Not Having Anosmia	1162	87.18%

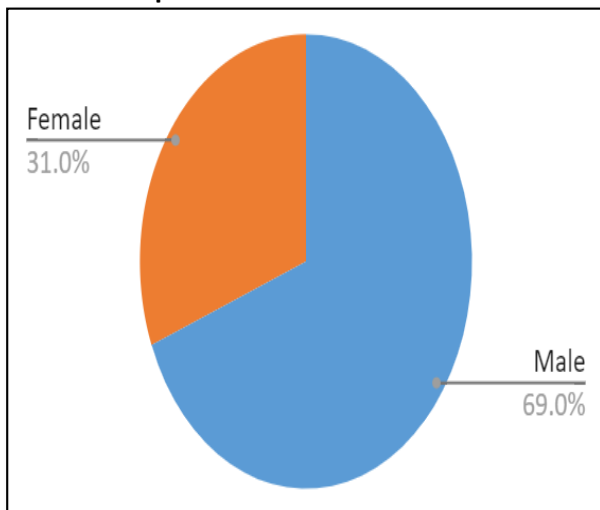
Our study showed incidence of anosmia to be in almost 13% of patents as a whole (Table 1).

**Table 2: Anosmia In Hospital Patients VS Care Centre Patients**

Patients Admitted	Total	Numbers	Percentage
Hospitalised Patients	698	128	18.33%
Covid Care Centre Patients	635	43	6.78%
Total	1333	171	

It was seen that anosmia was more in hospitalised patients than with covid care patients (Table 2).

**Graph 3: Sex Ratio In Anosmia**



Male had a high tendency for developing anosmia as compared to females (Graph 3).

**Table 3: Onset Of Anosmia In Relation To Other Symptoms**

	No	Percentage
Before Covid Symptoms	53	30.99%
With Covid Symptoms	85	49.70%
After Resolution Of Other Symptoms	23	13.45%

It was notably seen that around 30% of patients were having anosmia as the first symptom before onset of any other constitutional symptoms of Covid (Table 3).

**Table 4: Taste Disturbance With Anosmia**

	No	Percentage
Associated With Taste Disturbances	44	25.73%
Not Associated With Taste Disturbances	127	74.26%

Only one fourth of patients were having associated taste disturbances (Table 4).

Those patients who were admitted in hospital were also investigated and basic infective markers like CRP AND NLR were done, taking those markers in consideration we tried to see whether incidence of anosmia differs with high and normal infective markers (Table 5).

**Table 5: Incidence Of Anosmia In Relation To Markers In Hospitalised Patients**

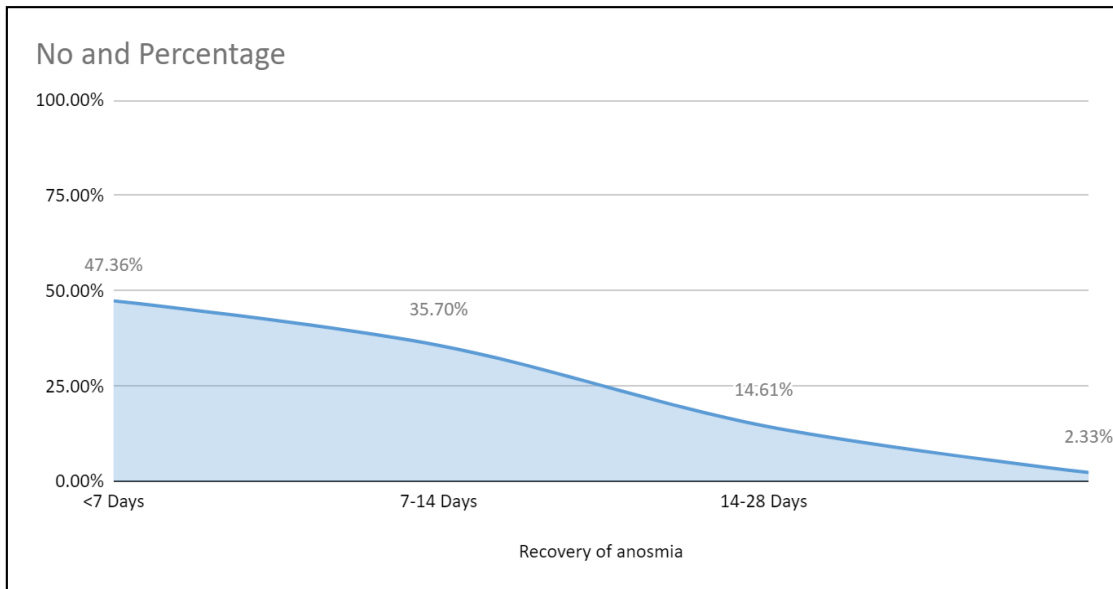
	High With Anosmia	Low Having Anosmia	Percentage
NLR	105	23	23.23
CRP	104	24	23.8
Overall Incidence In Hospitalised Patients: 18.33%			

Similarly patients having co- morbidities (HT,DM, Lung Conditions, Anemia, Thyroid diseases) were also compared for incidence of anosmia with overall incidence (Table 6).

**Table 6: Incidence Of Anosmia-Comparison With Comorbidities**

	No(Total)	Percentage
Patients Having 1 Co Morbidity	47(179)	26.25
Patients Having > 1 Co Morbidity	17(66)	25.75
Overall Incidence Of Anosmia Is 12.82%		

**Graph 4: Recovery Of Anosmia**



Majority of patients recovered from anosmia and more than 80% recovered in the first two weeks (Graph 4). Many patients were given steroids (Oral/Injectable) for their recovery, we tried to find out whether any effects of steroid in symptomatic recovery of anosmia as steroid is standard treatment for many anosmia patients due to other causes (Table 3).

**Table 7: Recovery of Anosmia With Steroid**

Within 7 days	58.34%
After 7 days	40.27%

**Discussion:** 67% of our covid positive patients were male which is easily explainable by males having more exposure to outside for occupational purposes. The similar finding of male preponderance was seen in study by Prasan Mishra et al<sup>1</sup>, though the sample size was very small (n=74). Interestingly female preponderance has been seen in Claire Hopkins et al<sup>19</sup> with 73% female share but it is not clarified whether it is a number of patients or number of responders in the study.

Nearly half numbers of patients were from the young age group (20-40) which is coinciding with Claire et al<sup>19</sup> with younger age having more preponderance with 64% share again explaining more active life of young people. Senior citizens were less in our study as we have excluded the patients with more oxygen requirements and those admitted in ICU.

Prevalence of anosmia in our study was 12.8% overall but significantly more (18%) in hospitalised patients/symptomatic patients

needing care and attention than those who were kept in Covid Centre having minimum requirements of care/minimum symptoms. Mishra et al<sup>1</sup> were having similar prevalence of 14.8% As compared to study by Klopfenstein the prevalence is less as they reported anosmia in 47% of their patients<sup>14</sup>. Also Lechien et al<sup>8</sup> reported anosmia in as high as 86% of their patients. (M) Yonghyun Lee et al<sup>18</sup> were having a similar prevalence of around 15% in their study.

Almost 70% of patients having anosmia were male in our study while females were having around 30% share in the anosmia group. We tried to find out the onset of anosmia in relation to other symptoms and more than 30% patients were having anosmia as first symptom this was more as compared to Lechien Jr et al<sup>8</sup> who was having anosmia as first symptom in 11.8% but similar to our finding were seen in Kaye et al with same score of 26.6%. This number definitely indicates that anosmia as the sole symptom in the affected area should not be ignored at all.

Taste is having an intimate relation with smell so patients of anosmia may have taste disturbance too and same thing was asked for but surprisingly only one fourth patients were having it which was seen in three fourth of patients in study by Yan et al<sup>20</sup>.

We also tried to find out the association of anosmia in relation to severity of disease by comparing the incidence of it in patients of high NLR, CRP with that of normal CRP, NLR (in hospitalised patients in whom investigations were done) which was only marginally higher in

patients with high NLR, CRP (around 23%) as compared to overall incidence of anosmia in hospitalised patients (18%).

All patients (Covid Centre and Hospital admission) were asked regarding having pre-existing comorbidity (HT, DM, IHD, etc.) And incidence of anosmia was noted in patients having comorbidity which was significantly higher in that group (25%) as compared to overall number of 12%.

As far as the recovery of it was concerned almost 80% of patients recovered within 2 weeks with only 2 % of patients not recovered after 1 month which is similar to study by Yonghyn Lee et al<sup>18</sup> and Claire et al<sup>19</sup>. Usually recovery with post viral anosmia is low, in absence of active treatment, ranging from 32% to 67%<sup>13,21</sup>.

Steroids were given to some patients as a standard protocol guideline for recovery of parameters /symptoms other than anosmia. We tried to see whether it has any effect in recovery of anosmia and we found it may not have any effect as evident from table no. 7 in results.

**Conclusion:** Covid 19 infection presents with many different symptoms and loss of smell is one of the important indicators. Anosmia can be the sole symptoms in many patients before a full-blown picture of disease develops. Co morbidity may have something to do with Anosmia but deeper and large-scale study may be required for establishing its association. Majority of patients will have complete recovery from anosmia in 3 weeks. The mechanism of developing anosmia and whether any effective treatment modality is there or not still need to be answered.

**Limitations:** No olfactory tests were done as it may increase the chance of spread of virus. Recovery was based on patients' telephonic interview which may have subjective bias.

**Abbreviations:** Following are the abbreviation used above.

- HDU : High dependency unit
- ICU : Intensive care unit
- HT : Hypertension
- DM : Diabetes Mellitus
- TB : Tuberculosis
- CRP : C Reactive Protein
- NLR : Neutrophil-Lymphocyte Ratio

- No : Number
- IHD : Ischemic heart disease

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Conflict of interest: None
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Funding: None
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Cite this Article as: Gandhi S, Chaudhari R, Rathod K, Sinha R, Sheliya N. A Study Of Anosmia In Covid-19 Patients. <i>Natl J Integr Res Med</i> 2021; Vol.12(6): 53-58
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