

# Navigating the intersection of Post-COVID olfactory dysfunction and mental Health: A biopsychosocial case study

Avni Gupta<sup>1</sup>, Ananya Mahapatra<sup>2</sup>, Dinesh K Tyagi<sup>3</sup>, Pankaj Kumar<sup>4</sup>

1. Senior Resident (Psychiatry), Dr. Baba Saheb Ambedkar Hospital & Medical College, New Delhi

2. Specialist (Psychiatry), Dr. Baba Saheb Ambedkar Hospital & Medical College, New Delhi

3. Specialist & Head (Psychiatry), Dr. Baba Saheb Ambedkar Hospital & Medical College, New Delhi

4. Specialist (E.N.T), Dr. Baba Saheb Ambedkar Hospital & Medical College, New Delhi

## Abstract

### Background:

Olfactory Dysfunction (OD) post-SARS-CoV-2 infection can manifest in various forms, including qualitative impairments such as parosmia. We describe a 26-year-old woman's trajectory from anosmia following COVID-19 infection to parosmia, which evolved into severe depression. This young woman from North India began perceiving a "garbage-like" odor from food items several months after recovering from COVID-19. Her distress from this condition, exacerbated by her family's lack of understanding, led to significant dietary restrictions, weight loss, and subsequent development of an episode of severe depression linked to the distress from her persistent olfactory dysfunction. A

combination of escitalopram, olanzapine, and carbamazepine was initiated alongside psychoeducation sessions for the family. Over the following months, her depressive and olfactory symptoms showed significant improvement. This case illuminates the complex relationship between sensory dysfunction and mental health post-COVID-19, emphasizing the need for an integrated biopsychosocial treatment approach and the crucial role of familial understanding and support.

### Keywords:

COVID-19, parosmia, depression

### \*Corresponding Author

Dr. Ananya Mahapatra

Department of Psychiatry

Dr. Baba Saheb Ambedkar Hospital & Medical College, New Delhi

Email: nnyaa09@gmail.com, Phone Number: +91-9717965014

## INTRODUCTION

Olfactory dysfunction (OD) has been frequently associated with the Respiratory Syndrome coronavirus-2 (SARS-CoV-2) infection<sup>1</sup>. These include quantitative impairments such as anosmia and hyposmia and qualitative impairments such as parosmia and phantosmia.<sup>2</sup>

Parosmia is characterized by a distorted perception of smell, wherein neutral-smelling substances are often perceived as "burned," "putrid," or "rotten" and are associated with significant psychological distress.<sup>3</sup> Approximately 40% of patients with anosmia during SARS-CoV-2 infection may develop parosmia.<sup>4</sup>

We present a case of a young woman with post-covid anosmia who develops parosmia followed by severe depression.

## CASE

### SOCIO-DEMOGRAPHIC DETAILS

A 26-year-old Hindu unmarried woman belonging to a three-generation family of middle socio-economic status, educated up to graduation and living in a semi-urban area in North India, was referred from the Ear Nose & Throat (ENT) department to the psychiatry out-patient department (OPD) of a district hospital with symptoms of persistent perception of foul smell from non-odorous sources along with low mood and crying spells.

History revealed that she had contracted COVID-19 infection in April 2021 with initial symptoms of fever, cough, generalized weakness, and complete anosmia. While recovering from the infection, the anosmia had initially persisted for 4-5 months, but after that, she regained her perception of smell. However, during this time (i.e., around August 2021), she noticed that she could perceive a "garbage-like" odor from various substances such as rice, potato, tomato, etc. While her symptoms of COVID-19 subsided completely, the "garbage smell" persisted, and she sought a referral from the ENT department of the same

hospital for this complaint. The detailed evaluation in the ENT department did not reveal any abnormality, and the patient was diagnosed with "post-COVID olfactory dysfunction." When the symptom persisted with severe distress for over six months, she was referred to the psychiatry OPD for further evaluation.

## CLINICAL SYMPTOMATOLOGY

### PAROSMIA

When the patient started to recover from complete anosmia, she noticed that she could perceive a foul odor from non-odorous substances, such as tomato, potato, and rice. These symptoms were persistent throughout the day, had a sense of disgust, and due to the altered smell, the patient would also find it difficult to eat food. She would experience nausea and gradually started avoiding these foods. She would restrict herself to only eating a few lentils and chapattis and altogether avoid foods like fruits, onions, spices, and other vegetables. She would have constant distress regarding the change in her dietary options, and she suffered from a weight loss of around 8-9 kgs (as reported by the patient and family members). Her family could not empathize with her symptoms and often criticized her for skipping meals. Previously, she would also assist her mother and sister-in-law in cooking but now she would avoid going to the kitchen, for which they would comment critically that she was "making up" her symptoms to avoid her share of household chores. This would cause significant distress to the patient and lead to frequent interpersonal conflicts with family members.

## CLINICAL SYMPTOMATOLOGY

### DEPRESSION

Around six to seven months after the onset of the symptom of parosmia (i.e., around March 2022), the patient started to develop persistent low mood and repetitive crying spells. She would become fatigued quickly and complain of low energy. She preferred to remain alone and did not express interest in interacting with others. Her appetite was further reduced, and she also complained of sleep disturbance. She also said that her parosmia would never improve and that "her life will never be the same again, and she should die." Previously, she was preparing for interviews for a government job, but now she stopped doing it. These symptoms persisted for another four months. Until now, she has repeatedly sought consultation in the ENT department because of the persistent signs of parosmia. However, due

to severe mental distress, she was referred to the psychiatry OPD for the first time in July 2022.

## CLINICAL EVALUATION

On detailed history taken from the patient and her family members, the patient was found to be suffering from severe depression without psychotic symptoms (6A70.1) for the past two months. She had persistent low mood, decreased energy, fatigability, anhedonia, low self-esteem, and ideas of guilt, hopelessness, helplessness, and worthlessness. She reported that she felt her symptoms of parosmia would not improve, and she would have to "live with it." She expressed distress over the inability to eat food of her choice and the negative comments of her family members. Although she did not express suicidal ideations, she felt that with the current symptoms, "life was not worth living." There was no past or family history of any psychiatric illness, and she denied substance use. Her pre-morbid personality appeared to be well-adjusted.

On mental status examination, the patient was conscious, oriented, and cooperative for examination. She was well-kempt and dressed according to the social and cultural norms. Eye-to-eye contact was made and maintained, and rapport could be established. Her psychomotor activity was reduced, and her speech was slow with reduced rate, tone, and volume. Her affect was sad. She reported hopelessness concerning the foul smell that she perceived. She also had ideas of helplessness and worthlessness. There were bleak ideas about the future and preoccupation with the olfactory symptoms. Her HAM-D Score at the time of the presentation was 36.

## DIAGNOSTIC CONSIDERATION

Based on a detailed history and clinical and mental status examination, she was diagnosed with Severe Depressive episodes without psychotic symptoms (6A70.1) according to ICD 11. Conceptually, it was considered to emerge in reaction to the significant psychological distress associated with the persistent "Post COVID-19 olfactory dysfunction". Her routine blood investigations were regular. Her thyroid function tests did not reveal any abnormalities. She had no past or clinical history suggestive of seizures, head injury, or loss of consciousness. There were no positive signs on detailed neurological, ENT, ophthalmological findings, or any signs of raised ICP. Given the resource constraints of our treatment settings during the COVID pandemic and the precise onset of her symptoms with COVID-19 infection, the patient was not referred to a higher center for neuroimaging.

## INTERVENTION AND FOLLOW-UP

The patient was initially started on escitalopram 5 mg in July 2022, further optimized to 20 mg over the next six weeks. Additionally, olanzapine 5 mg was added as an augmenting agent. However, the patient had difficulty tolerating olanzapine beyond 5 mg, and its dose was not further increased. Over the next six weeks, the patient had mild improvement in her depressive symptoms (HAM-D score reduced to 18), but the sign of parosmia was persistent. During the outpatient visits, the family members were psycho-educated regarding the symptoms of depression and parosmia. Psychoeducation sessions with the family were taken to reduce expressed emotions (especially critical comments). Family members were encouraged to redistribute chores at home so that she was assigned work outside of the kitchen, which triggered her parosmia symptoms. This was perceived as relieving by the patient and improved interpersonal conflicts.

Based on the findings from the report by Vasconcelos et al. 2022 (6), Carbamazepine was initiated because of the symptom of olfactory dysfunction. It was initially started at 100 mg and gradually increased to 200 mg. Along with it, escitalopram was continued at 20 mg. Vitamin B12 1500 mcg was also added. Since the addition of carbamazepine, over the next 8-10 weeks, the patient reported a decrease in parosmia symptoms and subsequent attenuation of depressive symptoms. The patient's appetite improved significantly, and she could gradually reintroduce food items she previously avoided due to foul odor.

By December 2022, her HAM-D Score reduced to 8. The patient reported 80-90 % improvement in her depressive and olfactory symptoms. Olanzapine was gradually withdrawn, and the patient maintained well on escitalopram and carbamazepine. From January 2023 to July 2023, her escitalopram was reduced from 20 mg to 10 mg. However, carbamazepine was maintained at 200 mg. The patient is currently maintaining well, with remission of depressive symptoms and 80-90% resolution of olfactory symptoms. Her biological functions are stable, and her overall socio-occupational functioning is satisfactory.

## DISCUSSION

The presented case study underscores the complexities of managing post-COVID-19- olfactory dysfunction, specifically parosmia, and its profound psychological impact.

A study found that the median onset of parosmia is around 2.5 months after the loss of smell.<sup>4</sup> Patients often report a perceived recovery in their sense of smell following an initial loss, only to develop the secondary intrusion of parosmia. In the presented case, parosmia symptoms developed after the initial four months of anosmia, followed by partial recovery of smell.

The exact mechanism by which SARS-CoV-2 affects the sense of smell is still being investigated. Still, it appears to be related to the virus's affinity for the angiotensin-converting enzyme 2 (ACE2) receptor, which is expressed in non-neuronal cells of the olfactory epithelium rather than the olfactory neurons themselves, suggesting that the olfactory dysfunction is possibly not due to direct infection of olfactory neurons, but rather due to damage to the supporting cells that maintain the olfactory epithelium's function.<sup>5</sup> Because of Carbamazepine's established role in stabilizing hyperexcited neuronal membranes and treating trigeminal nerve neuralgia, it has been recently tried in managing COVID-19-related olfactory dysfunction with promising results.<sup>6</sup> In the present case, the symptoms of parosmia markedly subsided after the initiation of carbamazepine.

This clinical course draws attention to the complex interplay between sensory dysfunction and mental health. It emphasizes the importance of conceptualizing a biopsychosocial case formulation and adopting an integrated and comprehensive approach to treatment. The lack of knowledge, misconceptions, and critical comments of family members regarding the symptom of parosmia was perceived as highly distressing by the patients, which perpetuated her depressive cognitions. While anosmia has been reported as one of the cardinal symptoms of COVID-19, parosmia or phantosmia has a limited evidence base.<sup>7</sup> However, its manifestation can be severe, and food items often emit rancid odor. Patients cannot bear the smell of food, leading to severe weight loss, social withdrawal, and depression.<sup>7</sup> Subjective descriptions of parosmia by patients in social forums and patient groups have been reported to be highly isolating and destabilizing, especially since it alienates those suffering from others. One of the patient descriptions of parosmia from the AbScent online forum (<https://abscent.org/>) reported: "I'm struggling, and it's so hard when no one around you understands; the thought of it going on this bad for months on end is unimaginable" Another critical aspect of the psychological burden associated with parosmia is that the olfactory distortions affect the social interactions and hedonistic

values ascribed to food. Food is often central to physical, psychological, and sociocultural identity.<sup>8</sup> Further patient accounts on the AbScent forum described: "The horrible thing about parosmia is that it isolates you. It makes you feel like you are not human anymore. You constantly are hungry and feel defeated because everything is so gross tasting."<sup>9</sup> Qualitative analysis of over 600 similar responses posted by patients suffering from post-COVID parosmia reveals a significant psychological burden that can potentially give rise to syndromal psychiatric disorders,<sup>9</sup> as is demonstrated in the reported case.

In our present case, following psychoeducation sessions, the family became supportive and engaged in the treatment process. This sheds light on the family's dual role in exacerbating and alleviating the patient's anxiety. Initial misunderstanding by the family intensified the patient's symptoms, but later, their support became an essential aspect of her recovery. This underscores the vital role of family engagement in management.

This case offers essential insights into treating COVID-19-linked olfactory dysfunction complicated by a severe mental health condition. The intricate nature of the case advocates for greater awareness, swift recognition and referral, and an integrated care approach for these interconnected issues.

## CONFLICT OF INTEREST

None

## ACKNOWLEDGEMENT

None

## FUNDING

None

## References

1. Burges Watson DL, Campbell M, Hopkins C, Smith B, Kelly C, Deary V. Altered smell and taste: Anosmia, parosmia and the impact of long Covid-19. *PloS one*. 2021 Sep 24;16(9):e0256998.
2. Le Bon SD, Konopnicki D, Pisarski N, Prunier L, Lechien JR, Horoi M. Efficacy and safety of oral corticosteroids and olfactory training in the management of COVID-19-related loss of smell. *European Archives of Oto-rhino-laryngology*. 2021 Aug;278:3113-7.
3. Leopold D. Distortion of olfactory perception: diagnosis and treatment. *Chemical senses*. 2002 Sep 1;27(7):611-5.
4. Hopkins C, Surda P, Vaira LA, Lechien JR, Safarian M, Saussez S, Kumar N. Six month follow-up of self-reported loss of smell during the COVID-19 pandemic. *Rhinology*. 2021 Feb 1;59(1):26-31.
5. Gary JB, Gallagher L, Joseph PV, Reed D, Gudis DA, Overdevest JB. Qualitative olfactory dysfunction and COVID-19: an evidence-based review with recommendations for the clinician. *American Journal of Rhinology & Allergy*. 2023 Jan;37(1):95-101.
6. Vasconcelos CC, Hammerle MB, Sales DS, Rueda Lopes FC, Pinheiro PG, Gouvea EG, Alves MC, Pereira TV, Schmidt SL, Alvarenga RM, Pires KL. Post-COVID-19 olfactory dysfunction: Carbamazepine as a treatment option in a series of cases. *Journal of NeuroVirology*. 2022 Apr;28(2):312-8.
7. Walker A, Kelly C, Pottinger G, Hopkins C. Parosmia—a common consequence of covid-19. *Bmj*. 2022 Apr 27;377.
8. Parker JK, Kelly CE, Smith BC, Kirkwood AF, Hopkins C, Gane S. Patients' perspectives on qualitative olfactory dysfunction: Thematic analysis of social media posts. *JMIR formative research*. 2021 Dec 14;5(12):e29086.
9. Kelly CE. Parosmia and altered taste in patients recovering from Covid 19. *Clinical Nutrition Open Science*. 2023 Apr 1;48:1-0.