

# Impact of COVID-19 on Human Senses

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## Key points

- Origin of COVID-19
- Highly variable clinical presentation
- Its impact on human senses (loss of taste and smell)
- Probable reasoning and explanation for this loss

## Introduction

COVID-19 was spread by the novel corona virus belonging from the family coronaviridae in Wuhan, China (workers at the Hua nan Seafood Market) in December 2019. It flared up and has spread globally with many adverse effects.<sup>1</sup> COVID-19 due to SARS-CoV-2 has fluctuating variable clinical manifestations in the affected people. The reason for this variability in signs and symptoms is intangible but to prevent the loss of many precious lives there is a dire need of proper investigation and survey to be done.<sup>2</sup>

## Variable symptoms

SARS-CoV-2 compared with SARS-COV-1 has shown variable symptoms. Acute respiratory distress, loss of speech, diarrhoea, cough, tiredness, fever and loss of taste or smell are the most common and devastating ones. Complete and partial loss of taste (ageusia) and anosmia (loss of smell) was observed in 45% COVID-19 patients. 27% showed these symptoms as the first symptoms of COVID-19 (even before other symptoms had appeared).<sup>3</sup> As COVID-19 had a world wide spread out, an overflowing amount of evidence was gathered in which it was observed that loss of appetite, malnutrition, smell disorders and depression were very common which had very strongly impacted the quality of life.<sup>4</sup>

In a study conducted in The City of Milwaukee Health Department Laboratory, United States 90 participants from 26 households were enrolled including 26 index cases and 64 household members. Overall, study participants were males (53%); belonging in the age group (range, <1–90

years] median, 31 years) among which (77%) were adults ( $\geq 18$  years of age); belonging from various colours and races/ethnicities among which (46%) were black non-Hispanic/Latino, (41%) were white non-Hispanic/Latino, and (13%) belonged from other races. 43% participants reported pre-existing medical conditions among which asthma or reactive airway disease, hypertension, and diabetes were the most common ones respectively. With cough (81%), headache (76%), fever ( $\geq 38.0^{\circ}\text{C}$  [ $\geq 100.4^{\circ}\text{F}$ ]) (64%), loss of taste and/or smell (62%), and nasal congestion (62%) were the most frequently reported symptoms. Among the participants with COVID-19 who reported loss of taste and/or smell, 58% of the cases had complete loss of taste (ageusia) while 72% had documented anosmia. When loss of taste and/or smell was added to the classic symptoms, 95% of participants with COVID-19 reported at least 1 of loss of taste and/or smell, fever, cough, and shortness of breath.<sup>5</sup>

## Possible causes of loss of smell and taste

Possible mechanisms for ageusia and anosmia in the course of COVID-19 are being explored but nothing has been proved till yet but there is a hypothesis that Renin-Angiotensin-Aldosterone System (RAAS) might be the cause of this. In human epithelial cells of the tongue Angiotensin converting enzyme-2 (ACE2) is found, and its expression is down regulated by SARS-CoV-2 infection. Metabolism of amino acids and flavour perception in food is regulated by Peptidases by releasing specific residues. ACE2 and APN, RAAS proteases expressed in tongue epithelium, aide in proteolytic cleavage of proteins and peptides. Hence, RAAS

proteases expressed in tongue epithelium may promote activation of taste receptors by releasing residues. Therefore, their insufficiency due to receptor internalization by coronaviruses infection on taste buds might result in ageusia and dysgeusia. Thus, taste perception might be impacted by proteolytic release of amino acids by RAAS peptidases.<sup>6</sup>

RAAS enzymes are also expressed in human olfactory epithelium. Because of which there has developed another hypothesis that probably protease activity of ACE2 and/or APN might be relevant to chemosensory recognition by participating in odorant processing that precedes receptor recognition. Because of which some postulates have come forward that local RAAS in nasal and oral tissue might drive loss of taste and smell after SARS-CoV-2 infection due to reduced protease activity.

## References

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