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Original research article

Study on loss of smell and taste sensations in Covid 19 patients

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Abstract

Loss of smell and taste are common complaints in patients with the COVID-19 disease. These symptoms may present alone or with other symptoms. It is of utmost importance to know their rates of occurrence for better controlling of the infection. This study was done to assess the features of loss of smell and taste sensations in Covid 19 infected subjects. Subjects above age of 18 years who were infected with covid 19 virus and recovered from Covid 19 infection were included in this study. This was questionnaire based study. Questions regarding features of loss of smell and taste sensations in covid 19 patients were asked with help of Google forms.102 subjects participated in this study. 48.03 % subjects had loss of smell sensation. 29.41% subjects had loss of taste sensation, whereas 22.54 % subjects had loss of both smell and taste sensation. 31.37 % subjects had regain of smell earlier than taste sensation. 36.27 % had regain of taste sensation earlier than smell. 32.35 % subjects had regain of smell and taste sensation at same time. 27.77 % subjects had parosmia. . The acute anosmia or ageusia need to be recognized as important symptoms of the COVID-19 infection. Anosmia can serve as a free and specific diagnostic tool for developing countries currently affected by the pandemic.

Keywords: COVID-19**,** Loss of Smell; Anosmia; Loss of Taste; Ageusia

Introduction

On the last day of the year 2019, 41 patients with pneumonia of unidentified cause were detected in Wuhan City, Hubei province in China [1]. The identification of the causative microorganism was reached from the examination of the throat swab samples from the Chinese Centre for Disease Control and Prevention (CCDC) on 7th January, 2020. The causative agent was named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The World Health Organization (WHO) in February 2020 named the disease as COVID-19 [2]. During the outbreak of COVID-19 infection, there were millions of infected people and hundreds of thousands dead all over the world, and it remains a global threat [3]. The attention worldwide focused mainly on the infected cases and those with direct contact with patients. The asymptomatic carriers were not being tested because of the shortage in testing kits including all the suspicious cases even in developed countries with a good health system like the US and the UK [4]. So, it is of utmost importance to evaluate the number of predictive symptoms of this disease in order to make a decision for a self-isolation and prevent the spreading of the infection. At the initial times of COVID-19 disease, the symptoms of the inpatient cases in China included fatigue, fever, dry and productive cough,

shortness of breath, chest compression, myalgia, diarrhea, vomiting, anorexia, headache, sore throat, dizziness, palpitations, and, chest pain [5, 6]. After that, there have been an increment in the scientific studies from various parts of the world about the significant increase in the cases number presenting with loss of smell alone. Gilani et al. from Iran reported 8 patients with anosmia, 5 of them were confirmed cases of COVID-19, and the remaining 3 cases were not tested owing to the shortage of testing kits in the pandemic period [7]. An European multicenter study concluded that olfactory (85.6%) and gustatory (88%) abnormalities are prevalent symptoms in European confirmed COVID-19 cases, who may not have other nasal complaints [8]. However, these cases do not meet the criteria of self-isolation or testing [9]. Anosmia and/or ageusia might present alone or in mild confirmed cases of COVID-19. It is therefore necessary to test or quarantine those individuals with these complaints.

Anosmia induced by COVID-19 infection was most probably linked to damage to the neuroepithelium rich in ACE2 receptor (especially stem cells).[10] In this regard, Gupta et al performed a bioinformatic analysis of single-cell expression profiles underscored selective expression of angiotensin-converting enzyme2 (ACE2) in a subset of horizontal basal cells and sustentacular cells of the olfactory mucosa in humans. They evaluated the
expression of ACE2 transcript in 3906 olfactory mucosa originated single cells from the recent report by Durante et al and suggested that loss of smell in the infected patients is most unlikely due to the direct impairment of the olfactory sensory neurons; in particular the sustentacular cells and the horizontal basal cells are the potential cell types that are highly susceptible to viral entry.[11] Moreover, multiple non-neuronal cell types present in the olfactory epithelium express 2 host receptors, ACE2 and TMPRSS2 proteases, that facilitate SARS-CoV-2 binding, replication, and accumulation (Butowt and Bilinska).[12] In this study, we aim to describe the prevalence and features of loss of smell (anosmia) and loss of taste (ageusia) in COVID-19 patients.

Material and Methods:

This study was done to assess the features of loss of smell and taste sensations in Covid 19 infected subjects. Subjects above age of 18 years who were infected with covid 19 virus and recovered from Covid 19 infection were included in this study. Patients with proven COVID-19 infection by realtime polymerase chain reaction (RTPCR) on nasopharyngeal and oropharyngeal swabs were enrolled in the current study. This was questionnaire based study. Questions regarding features of loss of smell and taste sensations in covid 19 patients were asked with help of Google forms. Informed consent was taken from subjects and participation in this study was voluntary. 102 subjects participated in this study. Both male and female adults were included in this study. Following questions were asked to subjects who had recovered from Covid 19.

1. Age in Years.
2. Covid 19 RTPCR test was positive or negative.
3. Covid 19 infection was symptomatic or asymptomatic.
4. Gender.
5. Did subjects had loss of smell, loss of taste or both.
6. Others symptoms of covid19.
7. How many days there was loss of smell, loss of taste sensation.
8. Did smell and taste regain at same time or earlier than other.
9. Was there altered smell sensation after recovering from covid 19 infection.

Data was analysed and expressed in tables as frequency and percentage.

Results:

102 subjects were included in this study. 51 were male and 51 female subjects.

Table 1: Number of Covid 19 subjects with loss of smell and taste sensation

	Total subjects n=102	Percentage
Loss of smell	49	48.03 %
Loss of taste	30	29.41 %
Loss of both smell and taste	23	22.54 %

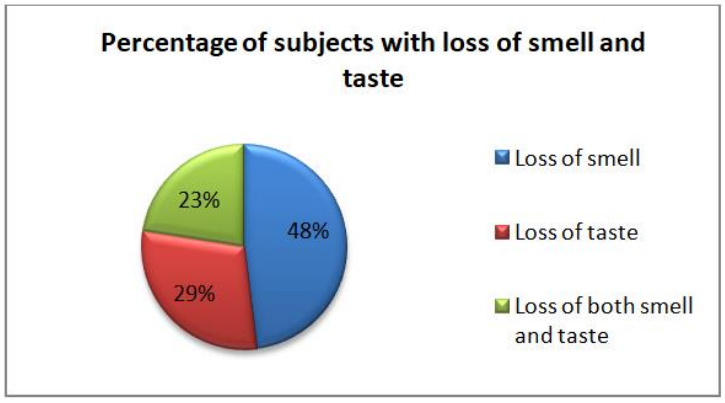

Diagram 1: Percentage of Covid 19 subjects with loss of smell and taste sensation.

Table 1and diagram 1 shows number of covid 19 subjects with loss of smell and taste sensation. 48.03 % subjects had loss of smell sensation. 29.41% subjects had loss of taste sensation, whereas 22.54 % subjects had loss of both smell and taste sensation.

Table 2 shows distribution of other symptoms of subjects. 78.43 % subjects had fever, 58.82% subjects had cough, 34.31 % subjects had shortness of breath, 44.11% had cold, 67.64% subjects had malaise and weakness, 14.7% subjects had loose motions. 55.88% had body pain.

Table 2: Covid 19 symptoms other than loss of smell and taste.

Covid 19 symptoms other than loss of smell and taste.	Number of subjects n=102	Percentage
Fever	80	78.43 %
Cough	60	58.82 %
Dyspnoea	35	34.31 %
Body pain	57	55.88 %
Cold	45	44.11 %
Headache	35	34.31 %
Loose motions	15	14.70 %
Malaise and weakness	69	67.64 %

Table 3: Duration of loss of smell and taste sensation

Duration in days	Loss of Smell n=72	Loss of Taste n=53
< 7 days	24 (33.33%)	16 (30.18%)
8-14 days	37 (51.38%)	31 (58.49%)
> 14 days	11 (15.27%)	06 (11.32%)

Table 3 shows duration of loss of smell and taste sensations in days. 51.38% subjects had loss of smell for 8 to 14 days. 15.27 % subjects had loss of smell for more than 2 weeks.33.33% subjects had loss of smell for less than 7 days. 58.49% subjects had loss of taste sensation for 8 to 14 days. 30.18 % subjects had loss of taste for less than 7 days. 11.32 5 subjects had loss of taste for more than 2 weeks.

Table 4: Regain of smell and taste sensation

	Number of subjects n=102	Percentage
Regain of smell earlier	32	31.37 %
Regain of taste earlier	37	36.27 %
Both at same time	33	32.35 %

Table 4 shows regain of smell and taste sensation. 31.37 % subjects had regain of smell earlier than taste sensation. 36.27 % had regain of taste sensation earlier than smell . 32.35 % subjects had regain of smell and taste sensation at same time.

Table 5: Subjects with Parosmia after regaining smell sensation

Altered smell sensation after regaining smell sensation (Parosmia)	Number of subjects n=72	Percentage
Yes	20	27.77 %
No	52	72.22 %

Table 5 shows subjects who had altered smell sensation (parosmia) after regaining smell sensation. 27.77 % subjects had parosmia .72.22 % subjects had regained normal smell sensation.

Discussion:

Smell and taste disorders are related to a wide range of viral infections.[13,14] Infection of the upper respiratory tract can cause acute-onset anosmia or ageusia because of viral damage to the olfactory epithelium. Moreover, viruses that can use the olfactory nerve as a route into the central nervous system include influenza A virus, herpesviruses, poliovirus, rabies virus, parainfluenza virus, adenoviruses, and Japanese encephalitis virus. In mouse models, SARS-CoV demonstrated transneuronal penetration through the olfactory bulb and its infection resulted in the rapid, transneuronal spread of the virus to connected areas of the brain.[15] Damage to the olfactory nerve during invasion and multiplication of SARS-CoV-2 may explain anosmia observed in the early stage of COVID-19. Therefore, anosmia or ageusia may be more frequently observed in the COVID-19 patients than other respiratory viral infections. Ageusia may be a secondary result of olfactory dysfunction. However, the angiotensin-converting enzyme 2 receptor, which is the main host cell receptor of SARS-CoV-2 for binding and penetrating cells, is widely expressed on epithelial cells of the oral mucosa**.[**16] Damage of mucosal epithelial cells of the oral cavity may explain ageusia observed in the early stage of COVID-19. This evidence may explain the pathogenetic mechanism underlying anosmia and ageusia in COVID-19.High transmissibility of COVID-19 before and immediately after symptom onset was reported with a recent epidemic study**.[**17] Early diagnosis is important for the control of COVID-19, recognition of early signs such as anosmia or ageusia might be very helpful for the diagnosis COVID-19 and isolation of the patients.

In our study 101 subjects participated. 51 were male and 51 were female . 48.03 % subjects had loss of smell sensation. 29.41% subjects had loss of taste sensation, whereas 22.54 % subjects had loss of both smell and taste sensation. 78.43 % subjects had fever , 58.82% subjects had cough , 34.31 % subjects had shortness of breath , 44.11% had cold , 67.64%

subjects had malaise and weakness , 14.7% subjects had loose motions. 55.88% had body pain. 51.38% subjects had loss of smell for 8 to 14 days. 15.27 % subjects had loss of smell for more than 2 weeks.33.33% subjects had loss of smell for less than 7 days. 58.49% subjects had loss of taste sensation for 8 to 14 days. 30.18 % subjects had loss of taste for less than 7 days. 11.32 % subjects had loss of taste for more than 2 weeks. 31.37 % subjects had regain of smell earlier than taste sensation. 36.27 % had regain of taste sensation earlier than smell. 32.35 % subjects had regain of smell and taste sensation at same time. 27.77 % subjects had parosmia .72.22 % subjects had regained normal smell sensation. A better knowledge of the symptoms of COVID-19 is essential for several reasons. Firstly, to help with detection of a COVID-19 case, anosmia and dysgeusia are uncommon in influenza infection without nasal obstruction (Souty et al., 2019). [18] With a non-specific ILI, the presence of anosmia/dysgeusia can lead to suspect a case of COVID-19, especially when we do not have the notion of exposition in the beginning of an outbreak. On the other hand, to adapt prevention, during an outbreak of SARS-CoV2, consultation for acute anosmia and/or dysgeusia should lead to suspect a case of COVID-19, with the necessary hygiene measures to protect doctors and other patients being implemented.

Conclusion:

Anosmia and ageusia seem to be part of important symptoms and clues for the diagnosis of COVID-19, particularly in the early stage of the disease. The acute anosmia or ageusia need to be recognized as important symptoms of the COVID-19 infection. Among patients with asymptomatic-to-mild disease severity, the presence of anosmia or ageusia may be an important differential presentation for the suspicion and diagnosis of COVID-19. And these symptoms may recover within 3 weeks. Anosmia can serve as a free and specific diagnostic tool for developing countries currently affected by the pandemic .The mechanisms of COVID-19 anosmia seem not to directly involve nasal obstruction but rather seem to be related to damage the olfactory neuroepithelium.

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