

## Original Article

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# Frequency of COVID-19 Infection in Patients with Sudden Loss of Smell

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### Abstract:

**Background:** The novel human corona virus disease (COVID-19) is the fifth documented pandemic in history since the 1918 flu pandemic. Along with other clinical features, loss of smell has been reported as a prime symptom in COVID-19 positive patients. The aim is to determine the frequency of COVID-19 infection in patients who came with a history of the sudden development of loss of smell.

**Materials & Methods:** This study was done in Uttara Crescent Hospital, a private hospital in Dhaka, Bangladesh. Data were collected retrospectively from hospital records in between 01 April 2020 and 30 November 2020, total 48 patients were included in this series. All the patients came with history of fever, sore throat, cough, loss of smell and altered taste, proper history were taken and examined. The patient with suspected COVID-19 infection was sent for RT-PCR testing. About 24 patients were included in the study with the history of loss of smell with or without other symptoms from the recorded data.

**Results:** Among the 48 patients male were 34 and female 14. The age of the patients was in between 13 and 64 years. COVID-19 infection was confirmed in 34 patients (70.83%) in RT-PCR testing.

**Conclusion:** Loss of smell is a significant symptom of COVID-19 infection, along with other symptoms. In the current study, the prevalence of COVID-19 infection is 70.83% in patients with history of sudden loss of smell. It does not reflect the country's actual picture because of a minimal number of study populations. Further study is needed find out prevalence in Bangladesh.

**Keyword:** COVID-19, loss of smell, SARS-CoV-2, Corona virus.

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**Introduction:**

The novel human corona virus disease COVID-19 is the fifth documented pandemic in history since the 1918 flu pandemic<sup>1</sup>. Corona virus disease 2019 (COVID-19) is a highly contagious disease which affect respiratory and vascular system<sup>2</sup>. The disease is caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2)<sup>3</sup> is a novel corona virus.

The disease was first identified in December 2019 in Wuhan, China and the virus first isolated from three people with pneumonia connected to the cluster of acute respiratory illness cases in Wuhan<sup>4</sup>. Since then the whole world is infected subsequently. The Chinese authorities gave the name novel corona virus (nCoV)<sup>5</sup>. On 11 February 2020 WHO announced the name of the disease as Corona virus disease-19 (COVID-19) and the name of virus as Severe acute respiratory syndrome corona virus 2 (SARS-CoV-2)<sup>5</sup>.

Fever, cough, fatigue, shortness of breath or breathing difficulties and loss of smell & taste are the most common symptoms<sup>6</sup>. Incubation period is ranging from one to fourteen days<sup>7</sup>. Mode of spread of the disease is thought to spread through respiratory route by both droplet and aerosol after infected person cough, sneezes, talks or breathes in close contact<sup>8</sup>.

Olfactory dysfunction following the upper respiratory tract infections may be allergic, bacterial or viral are common. Post-viral anosmia has been reported in previous studies<sup>9,10</sup>. Nasal mucosa damage and nervous system involvement are found as the probable causes, however, the exact pathogenesis remains unclear<sup>11,12</sup>.

Mao et al. initially reported on neurological symptoms of COVID-19 in February 2020<sup>13</sup>. Since then different authors have reported that a recent increase in patients presenting with anosmia in COVID-19 pandemic<sup>14</sup>. New-

onset olfactory or gustatory dysfunction in conjunction with other well-established symptoms of COVID-19 infection<sup>14</sup> has been reported by different authors. Because of increasing awareness olfactory and taste dysfunction as potential early symptoms of COVID-19 infection CDC recently added "new loss of taste or smell" to its list of symptoms that may appear 2 to 14 days after exposure to COVID-19<sup>15</sup>.

The mucosa of nasal and paranasal sinus cavities is increasingly recognized for COVID 19 infection and transmission<sup>16</sup>. It may be a major site of infection by SARS CoV 2, where susceptibility of genes required for infection are expressed at high levels and may be modulated by environmental and host factors<sup>16</sup>.

Kevin Jiang in 24 July 2020 published a paper in Harvard medical school webpage in research section the cause of loss of smell<sup>17</sup>. Renowned researchers led by neuroscientists identified that olfactory sensory neurons do not express the gene that encodes the ACE2 receptor protein<sup>17</sup>, which SARS-CoV-2 uses to enter human cells instead ACE2 is expressed in cells that provide metabolic and structural support to olfactory sensory neurons, as well as stem cells and blood vessel cells. The findings indicate that the novel corona virus changes the sense of smell in patients not by directly infecting neurons but by affecting the function of supporting cells and the loss of smell is temporary<sup>17</sup>.

In the consultation center patients used to come with impairment of smell with different causes. But during this pandemic period history is little different. So far in my knowledge I did not find any article on prevalence of COVID-19 infection in patients with anosmia in Bangladesh perspective. This study was conducted in a very small number of populations my private consultation center

which does not reflect the real scenario of prevalence of COVID-19 infection in patients with history of loss of smell of the country.

#### Materials and Methods:

This study was done in Uttara Crescent Hospital, a private hospital in Dhaka, Bangladesh. Data were collected retrospectively from hospital records in between 01 April 2020 and 30 November 2020. Patients came with history of different features like fever, sore throat, cough, loss of smell and altered taste, detailed history were taken and examined. All the patients with suspected COVID-19 infection were sent for RT-PCR testing. About 48 patients were included in the study with the history of loss of smell with or without other symptoms from the recorded data and analyzed.

#### Results:

Total number of patients in the study population was 48, male 34 and female 14. Lowest age was 13 years and highest 64 years. Among the 48 patients 34 (70.83%) were confirmed as COVID-19 infection by RT-PCR test of which male patients were 26 (54.17%) and female 08 (16.66%). Most of the patients had other common symptoms along with loss of smell. Only history of sudden loss of smell was found in five patients.

**Table I :**  
*Age distribution of patients (n=48)*

Age in Year	Total	Percentage
11 – 25	10	20.83%
26 – 40	18	37.50%
41 – 55	14	29.17%
56 – 65	06	12.50%

**Table II :**  
*Sex distribution of patients (n=48)*

Sex	Total	Percentage
Male	34	70.83%
Female	14	29.17%

**Table III :**  
*Patient's presenting symptoms, (n=48)*

Symptoms	Number of patients
Fever	48
Nasal blockage	34
Nasal discharge	38
Pain in the throat	48
Cough	22
Loss of smell	48
Loss of taste	38
Diarrhea	04

**Table IV :**  
*Patients presenting alteration of taste and smell (n=48)*

Findings	Male	Female
Anosmia with altered taste	22	10
Hyposmia with altered taste	04	04
Anosmia only	08	04
Altered taste only	01	01

#### Discussion:

The pandemic of Coronavirus Disease 2019 (COVID-19) has caused a vast disaster throughout the world. There is increasing evidence that olfactory dysfunction can present in COVID-19 patients. Anosmia can occur alone or can be accompanied by other symptoms of COVID-19, such as a dry cough, fever, breathing difficulty etc. However, the pathogenic mechanism of olfactory dysfunction and its clinical characteristics in patients with COVID-19 remains unclear.

Multiple cross-sectional studies have demonstrated that the incidence rate of olfactory dysfunction in COVID-19 patients varies from 33.9–68% with female dominance.

COVID-19 is the fifth documented pandemic in history<sup>1</sup>. COVID-19 infected cases in Bangladesh was 449,760 and deaths 6,416 as per report of DGHS, Bangladesh updated in the time frame of 23rd November 2020, now it is 1.55 million infected cases with 27,470 death on 30<sup>th</sup> September 2021.

Fever, cough, fatigue, shortness of breath or breathing difficulties and loss of smell & altered taste are the most common symptoms<sup>6</sup>. Post-viral anosmia has been reported in different studies<sup>9,10</sup>.

Mao et al initially reported on neurological symptoms of COVID-19 in February 2020<sup>13</sup>. Since then different authors have reported that a recent increase in patients presenting with anosmia in COVID-19 pandemic<sup>14</sup>. A recent study by Sungnak et al.<sup>18</sup> suggested that nasal epithelial cells show a high angiotensin converting 2 (ACE2) expression in SARS-CoV-2 infection, and thus this may allowing wide viral entry. Thus anosmia can be a possible a typical feature of COVID-19 patients.

In the current study male: female ratio is 2.42:1 and lowest and highest age of patients were 13 years and 64 years respectively. Among the 24 cases 17 patients (70.83%) confirmed as COVID-19 infection on RT-PCR test. So the prevalence of COVID-19 infection in sudden loss smell is 70.83% in Bangladesh. Prasun Mishra et al.<sup>19</sup> in a study found prevalence of anosmia 14.8% in COVID-19 patients. Prevalence of anosmia in other study showed by Klopfenstein et al<sup>20</sup> 47%, Lechien et al.<sup>21</sup> 86% and Seyed Hamid Reza Bagheri et al.<sup>22</sup> 7.3%. Studies in different COVID hospital in Dhaka city prevalence of anosmia found by Quazi Tarikul Islam et al.<sup>23</sup>

is 19.5% and by Syed Ghulam Mogni Mowla et al.<sup>24</sup> 10.10% but so far I studied I did not find study on prevalence of COVID-19 infection in the patients with history of loss of smell attended the hospital in Bangladesh.

According to a research group of Harvard Medical School, temporary loss of smell, or anosmia, is the main neurological symptom and one of the earliest and most commonly reported indicators of COVID-19. Studies suggest it 'better predicts' the disease than other well-known symptoms such as fever and cough, but the underlying mechanisms for loss of smell in patients with COVID-19 have been unclear. Now, the team of researchers led by neuroscientists at Harvard Medical School has identified the olfactory cell types in the upper nasal cavity most vulnerable to infection by SARS-CoV-2, the virus that causes COVID-19. There is a large study compilation by Endang Mutiawati and Marhami Fahriani et al, out of 32,142 COVID-19 patients from 107 studies, anosmia was reported in 12,038 patients with a prevalence of 38.2% (95% CI: 36.5%, 47.2%); Furthermore, the prevalence of anosmia was 10.2-fold higher (OR: 10.21; 95% CI: 6.53, 15.96,  $p < 0.001$ ) in COVID-19 patients compared to those with other respiratory infections or COVID-19 like illness<sup>25</sup>.

This evidence may be helpful in the present COVID-19 pandemic situation because the real-time reverse transcriptase polymerase chain reaction (RT-PCR) test has certain limitations for screening. This test becomes false negative in 30-40% cases. the manifestation of anosmia or hyposmia could be used as an early warning for practitioners or clinicians to build a rationale to reach a firm conclusion on patients with SARS-CoV-2 infection<sup>26</sup>. Additionally, a recent study reported that anosmia and dysgeusia are among the earliest symptoms observed in

COVID-19 patients<sup>27</sup>. However, in-depth analysis of this dysfunction and its relation to the pathogenesis, severity, and mortality of COVID-19 was not the aim of this small series but only find out frequency of Covid-19 patients among the patients of anosmia.

According to study of Brämerson A and Johansson L et al, Olfactory dysfunction is common: estimates of point prevalence in the general population before the covid-19 pandemic suggest that 19.1% of adults (80% in people over 75) suffer from complete or partial loss of smell<sup>28</sup>.

So many research, research paper are available now in the pandemic situation, but the study on frequency or incidence of Covid-19 in patients of anosmia is not available in world literature. This is another pitfall of this small study but can reflect the reality.

#### Limitations:

In the present review, the number of patient was very small at that time, as the number of Covid-19 was declined in the specific study period. In some cross-sectional studies, patients were identified by the reported questionnaire submitted by them, which were not verified by the researchers. For covering the latest knowledge, this review also uses data from several preprints literature that has not been undergone full peer review.

#### Conclusion:

Loss of smell is the significant symptom of COVID-19 infection along with other symptoms. In the current study prevalence of COVID-19 infection is 70.83% in patients with history of sudden loss of smell. It does not reflect the actual picture of the country because of a very small number of study populations. Further study is needed find out the prevalence in Bangladesh.

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