

## PREVALENCE OF SMELL AND TASTE DISORDERS IN PATIENTS RECOVERING FROM COVID-19

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### ABSTRACT

**Introduction:** The COVID-19 outbreak has spread extensively around the world. Loss of smell and taste have emerged as main predictors for COVID-19. Patients with sudden loss of smell should initiate social distancing and home isolation measures and be tested for SARS-CoV-2 diagnostic test when available. Olfactory training is recommended when smell does not come back after 1 month but can be started earlier. **Keywords:** Smell and taste dysfunction, Anosmia, SARS-CoV-2, COVID-19. **Methodology:** The study was done by "Google Form" on 613 of public of Nineveh Governorate which include a special questionnaire about COVID-19 infection and loss of senses of taste and smell. **Result:** The results are based on 613 persons, (480)78% of them is infected with COVID-19. \*\*The results show (368)77% of infected people had lost their sense of taste or smell (285)78% to them lost both sense of taste and smell. (333) 90% of infected people regained their sense after infection. \*\*69% (331) of infected people didn't develop parosmia while 31% (149) of them had parosmia. **Conclusions:** The loss of smell or taste is among the most common and persistent symptoms of COVID-19 in patients with mildly symptomatic disease.

### 1.1. INTRODUCTION

The special senses of smell and taste provide critical information about the environment, known collectively as the "chemical senses" because of their ability to detect chemical stimuli and encode them into neural stimuli, these special sensory systems supply essential information about environmental dangers, such as fires and spoiled foods, although in modern times humans have become visually dominant, these senses remain important, for certain occupations, such as gourmet chefs, wine tasters, firefighters, and natural gas.<sup>[1]</sup>

You may experience loss of smell following your COVID infection. We do not have long-term data for COVID patients about recovery of smell. We know from studies of loss of smell caused by other viruses that sense of smell can return quickly within a couple of weeks whilst others can take many months to recover. Recovery can sometimes be slow. From what we know so far, about 1 in 10 cases of smell and taste problems persist after COVID infection; we know from other viruses that about 1 in 3 people will see recovery of their sense of smell over 3 years.<sup>[2]</sup>

Loss of smell (both good and bad odors) will affect how well you can detect flavors. When we eat, the flavor of food is the combined experience of smell and taste together. We have five basic tastes sweet, sour, salty, bitter and 'savory' (called umami) which are not normally affected when we lose our sense of smell because they are detected with the tongue. However, there is evidence that in COVID true taste can be affected as well as smell.<sup>[2]</sup> The medical term for a change in smell or taste is "parosmia." Parosmia is a common symptom of COVID-19 infection. In one review of more than 3,500 people with COVID-19, almost half reported a change in their sense of smell or taste. This symptom usually goes away on its own within a few weeks. But it can last much longer for some people. Scientists are still trying to figure out why this symptom affects some people more than others.

Parosmia is an unpleasant odor perception. Anosmia is the loss of smell. Both parosmia and anosmia are types of olfactory dysfunction, or problems with sense of smell, that can occur in COVID-19 infection.<sup>(3)</sup> Taste and smell are closely linked, so people experiencing trouble with their sense of smell can also have trouble with taste. The smell system is comprised of three major

components – brain, nerves and receptors. Although each portion of this system can exhibit pathology which can inhibit smell, the major component through which pathology occurs is through pathogenesis in the olfactory receptors. Olfactory receptors are unique since they do not contain blood vessels, lymphatics or exhibit mitosis. These receptors, which turn over frequently, as often as every 24 h, depend upon stem cells which respond to growth or transcription factors secreted into nasal mucus from nasal serous glands. These growth factors then activate stem cells to mature and generate the olfactory receptors by which the smell response is initiated. Indeed, nasal mucus secreted from serous glands in the nasal cavity is the critical fluid through which these receptors grow and mature to maintain smell function. Indeed, failure to produce nasal mucus or salivary secretions (saliva), as occurs in Sjogren's syndrome, causes loss of sensory receptors with subsequent loss of smell and taste. Restoration of these secretions is associated with the restoration of the sensory receptors and subsequent return of sensory function.<sup>[4]</sup> In order to understand the nature of these nasal mucus growth factors a total protein analysis of the components of nasal mucus was undertaken. This analysis demonstrated the presence of several moieties which can be considered as the growth factors that stimulate these stem cells. These moieties include cyclic AMP and cGMP and sonic hedgehog. Inhibition of secretion of these growth factors is associated with inhibition of stem cell activity with subsequent inhibition of stimulation of olfactory receptor cells and subsequent loss of smell. While the immune and other systems may eventually inhibit the general viremia associated with Covid-19 infection, the Covid-19 virus attacks the nasal serous glands directly and inhibits secretion of these growth factors which are necessary for stem cell activation.<sup>[4]</sup> Since these olfactory receptors turn over rapidly, they require continued stimulation by these growth factors. If this stimulation is inhibited these receptors do not grow or mature leading to smell loss. Even transient inhibition of these growth factors causes inhibition of receptor development with subsequent loss of smell. This common transient loss of growth-factor secretion may relate to the transient loss of smell observed in many patients after Covid-19 infection. Persistent secretion loss causes continued inhibition of stem cell activity with resulting loss of receptor growth with persistent loss of smell. It's not known exactly why COVID-19 leads to parosmia. It's believed most people who experience this symptom also experienced a loss of taste and smell while they were sick. It's also unknown how long it lasts. One study suggests the condition can last up to six months, but the average duration is around three months.<sup>[5]</sup> Patients with COVID-19 often complain of smell and taste disorders (STD). STD emerge early in the course of the disease, seem to be more common in SARS-CoV-2 infection than in other upper respiratory tract infections, and could in some cases persist for long after resolution of respiratory symptoms. Current evidence suggests that STD probably result from a loss

of function of olfactory sensory neurons and taste buds, mainly caused by infection, inflammation, and subsequent dysfunction of supporting non-neuronal cells in the mucosa. However, the possible occurrence of other mechanisms leading to chemosensory dysfunction has also been hypothesized, and contrasting data have been reported regarding the direct infection of sensory neurons by SARS-CoV-2. In this mini-review, we summarize the currently available literature on pathogenesis, clinical manifestations, diagnosis, and outcomes of STD in COVID-19 and discuss possible future directions of research on this topic.<sup>[6]</sup>

## 1.2. Objective

Coronavirus disease 2019 (COVID-19) is associated with several known signs and symptoms, including olfactory disturbances leading to anosmia and parosmia. This study aimed to evaluate the clinical features of the emerging symptoms of COVID-19 loss of smell and taste and to report the outcome of commonly used Cross sectional study.

## Chapter (2)

### 2. Methodology

#### 2.1 Study design

Cross sectional study

#### 2.2 population and sample

We take 613,(211) 65% females and (394) 35% male from public of Nineveh Governorate.

#### 2.3 Time and place

This study begin from (19/February/2022) To (13/April/2022)

The study was done by "Google form" on public of Nineveh Governorate.

#### 2.4 Instrument of the study:

Public question in google The questionnaire items include

The gender, age, smoker or not, infected with covid or not date of infection, severity of infection, how they diagnosed their infection, are they lost their sense of smell and taste or only one of them, are they suffered from smell strange odor, if they from chronic diseases of nose, or any other chronic disease, did they go to hospital when symptoms appeared, what treatments did they use, when they lost their senses of smell and taste, if there were any improvement after treatment,, did they get the covid vaccine, infection end date, did their senses of smell and taste return after the infection...

#### 2.5 Data collection

A special questionnaire (electronic) which was validated in previous studies.

#### 2.6 Statistical analysis

All the data collected was entered and analyzed with

excel software 2010.

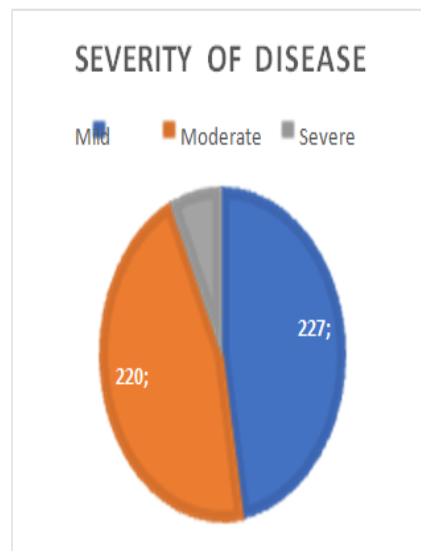
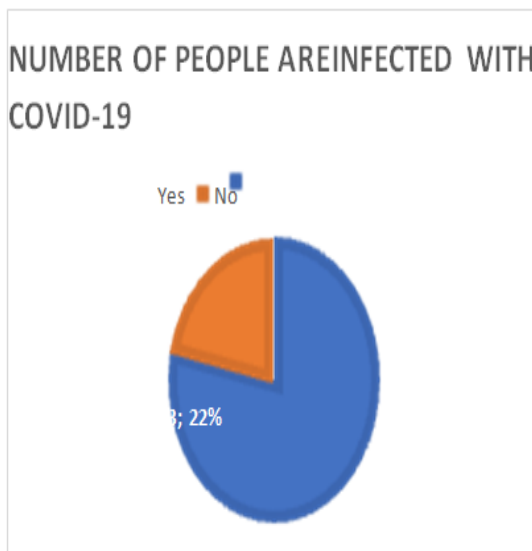
**2.7 Ethical consideration**

This study was done respecting all ethical consideration and nature and objective of study were explained clearly to the participants.

**3. RESULTS**

**Table (1): Sociodemographic Characteristics.**

Age	Number	Percentage (%)	Total
17-25	514	84	613
26-35	61	10	
36-45	21	3	
46-55	14	2	
55-65	3	1	
Gender	Number	Percentage (%)	Total
Male	211	35	613
Female	394	64	
Not Answered	8	1	
Occupation	Number	Percentage (%)	Total
Students	489	80	613
Officer	64	11	
Free earner	21	3	
Unemployed	38	6	
Address	Number	Percentage (%)	Total
Urban	572	93	613
Rural	41	7	
Smoking	Number	Percentage (%)	Total
Yes	96	16	613
No	517	84	



**Charts (1,2):** These charts show that 78% of people are infected with Covid-19 and about 93% of infected people was mild to moderate in severity.

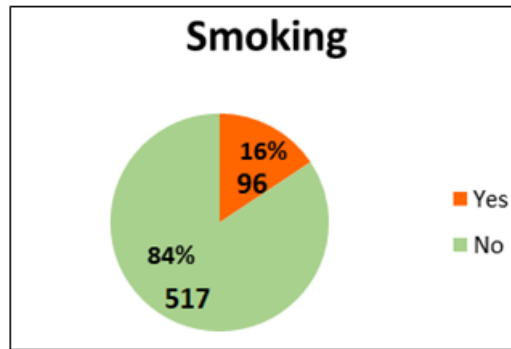


Chart (3): (16% only of people is smoking).

Table (2): Showing number of people are suffer from chronic diseases innose or any chronic diseases.

2.1 Do you suffer from any problem or chronic diseases in the nose?	Number	Percentage (%)	Total
Yes	107	20	613
No	428	80	
Not answered	78	---	
2.2 Do you suffer from any chronic diseases?	Number	Percentage (%)	Total
Yes	73	13.2	613
No	480	86.8	
Not answered	60	---	

Table 2.1 about 80% (428) of people doesn't have any problems or chronic diseases in the nose while 20% (107) of people have.

Table 2.2 about 88.9% (480) of people doesn't have any chronic diseases while 11.1% (73) have chronic diseases.

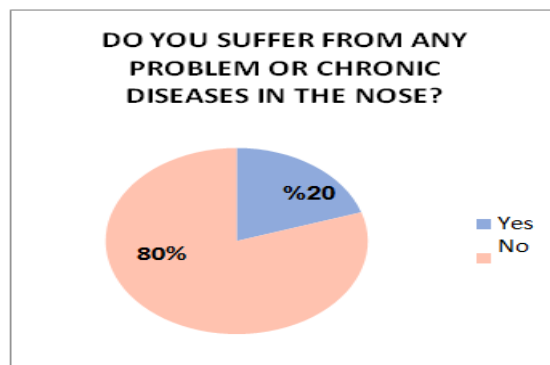


Chart (4) Showing 80% of people don't have any problems or chronic diseases in the nose.

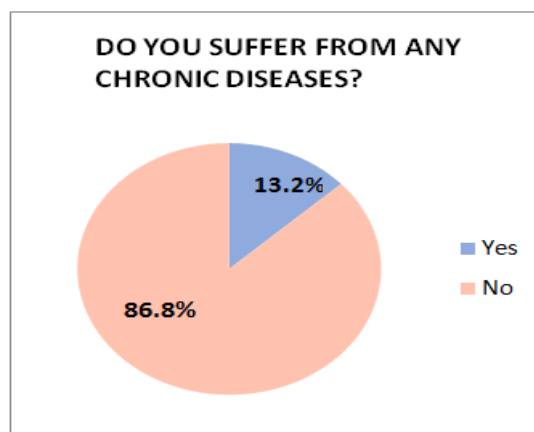


Chart (5): Showing 86.8% of people don't have any chronic diseases.

**Table (3): Diagnostic Methods.**

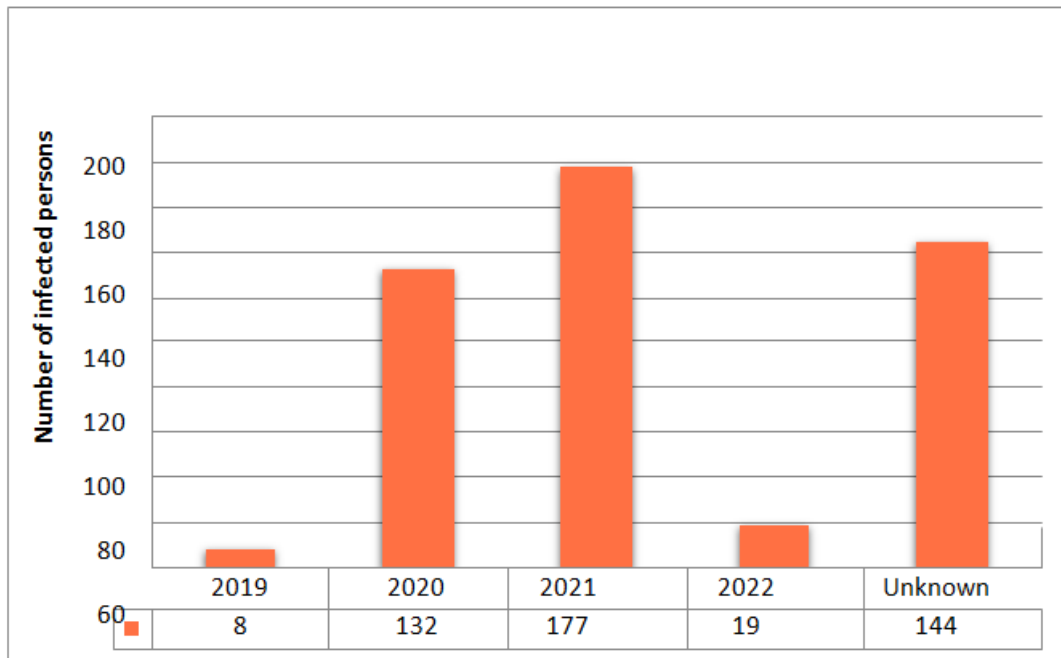
How were you diagnosed with corona?	Number	Percentage (%)	Total
Contact with infected patients	106	22	613
From symptoms	291	61	
Blood test IgM ,IgG	29	6	
PCR	54	11	
Not infected	133	---	

These show most people diagnosed the disease without investigation depending on the symptoms or contacting

an infected person, 61% they diagnosed disease from symptoms only.

**Table (4): show date of infection.**

Date of infection	Number	Percentage (%)	Total
2019	8	2	613
2020	132	27	
2021	177	37	
2022	19	4	
Unknown	144	30	
Not infected	133	---	



**Chart (6): A lot of patients are infected during 2020 and 2021, 27% is infected during 2020, 37% is infected during 2021.**

**Table (5): The loss of sense.**

5.1 Did you loss your sense of taste or smell during infection?	Number	Percentage (%)	Total
Yes	368	77	613
No	112	23	
Not infected	133	---	
5.2 Did you loss?	Number	Percentage (%)	Total
Sense of smell only	63	17	613
Sense of taste only	20	5	
Sense of both	285	78	
No infected , no loss	245	---	

**6.1 :** Showing about 77% (368) of infected people had lost their sense of smell or taste.

**6.2 :** Showing about 78% (285) lost both senses of taste and smell.

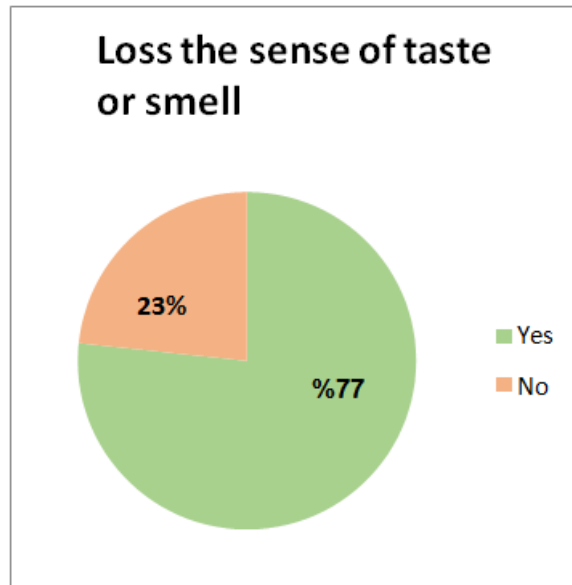


Chart (7.1): About (368) loss the sense (yes),while (112) don't loss (No).

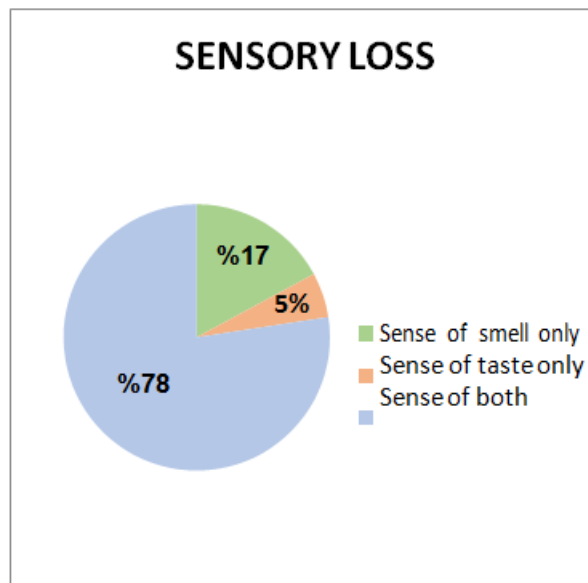


Chart (7.2): About (285) of infected peoplelost the sense of taste and smell.

Table (6): Table (7): showing (333) of infected people returned their sense of taste andsmell after the infection.

Did your sense of smell and taste return after the infection?	Number	Percentage (%)	Total
Yes	333	90	613
No	35	10	
Not Infected, Not Lost	245	---	

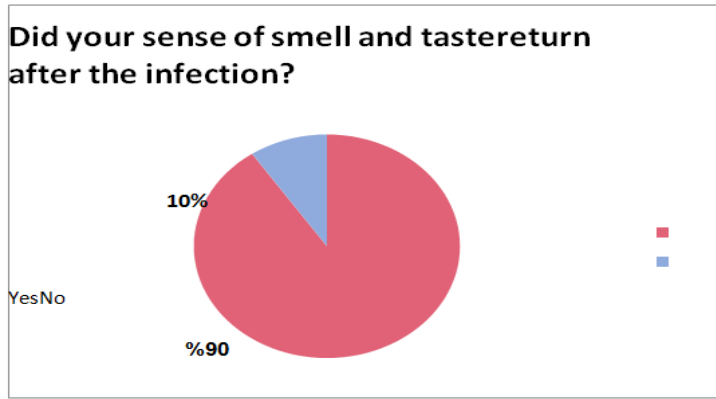


Chart (8): Showing 90% (333) of infected people regained their sense of taste and smell after infection; while only 10% (35) didn't have return their senses yet.

Table (7): Duration of Loss.

Duration of Loss	Number	Percentage (%)	Total
(1-6) days	65	11	613
(7-13) days	100	16	
(14-29) days	70	11	
1 month	39	6	
2 months	26	4	
3 months	10	2	
4 months	7	1	
(5-6) months	9	2	
8 months - 1 year	8	1	
Unknown	279	46	

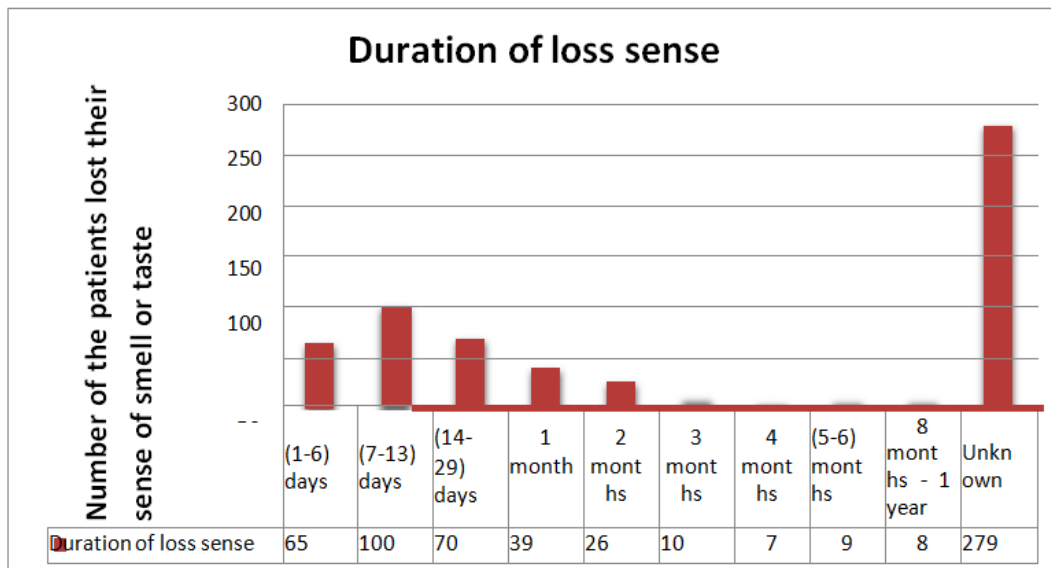
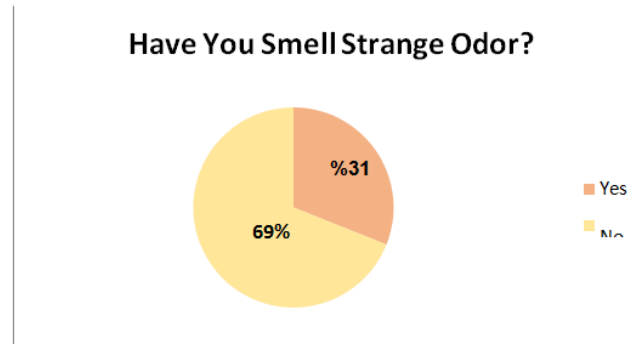


Chart (9): showing about (100) 16% of the patients lost their sense of smell or taste for a period of one to two weeks, while (65) 11% patients lost their senses for few days only (1-6 days).

Table (8): Showing Number (149) of Infected People Developed Parosmia.

Have you smell strange odor?	Number	Percentage (%)	Total
Yes	149	31	613
No	331	69	
Not Infected	133	---	





**Chart (10):** Showing 69% (331) of infected people didn't develop parosmia; while 31% (149) of them had parosmia.

#### 4. DISCUSSION

This community based survey tried to evaluate the prevalence of smell and taste disorder in patients recovering from covid-19 by using a random sample of 613 participants.

The result of our study revealed that (84%) of the patients were between (17-25 years) of age compared with other study in Korea where age less than 60 years was (79.4%).<sup>[7]</sup> In our study the females had a higher prevalence than males about (64%) which were comparable with other study in Korea in which the females were (63.6%).<sup>[7]</sup> The major occupation of the patients in our study were students (80%) while in other study in Iraq the housewives were (59%).<sup>[8]</sup>

Most patients in our study living in urban region (93%). About (84%) of participants in our study were nonsmoker while in other study in Iraq the nonsmoker were (82.8%).<sup>[8]</sup> About chronic diseases (86.8%) of patients in our study did not suffer from any chronic disease while in other study in Italy (56.7%) were hypertensive patients.<sup>[9]</sup> In this study, (80%) of patients were not having chronic rhinosinusitis, this is comparable with other study in USA in which (95.98%) of patients were free from chronic rhinosinusitis.<sup>[10]</sup>

In our study (78%) of participants were infected with COVID\_19 and about (47%) of them had a mild infection in comparison with other study in Korea where the majority of the patients had asymptomatic to mild infection (83.9%).<sup>[7]</sup> In this study, (61%) of patients diagnosed their infection with COVID\_19 from their symptoms and (37%) of them got their infection in 2021.

In our study (77%) of patients infected with COVID -19 lost their smell(anosmia) or their taste(ageusia) during infection from those (78%) had both smell and taste loss this is not comparable with other study in Korea where the patients with smell or taste loss were (15.3%) from those(52%) had both smell and taste loss.<sup>[7]</sup>

Duration of loss of taste and smell was unknown for majority of patients in our study (46%) while in other

study in Korea most patients loss their smell and taste for approximately 3 week from their infection.<sup>[7]</sup> In our study, (90%) of patients returned their smell and taste after infection compared with other study in Italy where (62.9%) of patient returned their smell and (63.8%) of patient returned their taste after infection.<sup>[11]</sup> In our study, (69%) of patients smell a strange odor (parosmia) while in other study in USA (23.9%) of patients had parosmia after recovery from COVID19.<sup>[10]</sup>

#### 4. CONCLUSION

In our study we found that there is high prevalence of smell and /or taste disorders in covid19 infected patients.

However, the majority of those patients regain these senses after variable period of time. Most of the cases in our study were young females living in urban area and the degree of their infections were mild to severe. The study showed that smoking and chronic diseases were not considered as a factor affecting the development of smell and/or taste disorders.

#### Recommendation

As far as most of the patients recovering from covid 19 included in our study regain their senses of smell and taste after a variable period of time, the mainstay in their management is reassurance. We recommend a future study to assess the risks that may affect the patients because of anosmia and/or ageusia. Another study is recommended to find the best measuresto treat those with persistent disturbance of smell and taste disorders.

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