

# The prevalence and outcome of covid-19 smell problems at Kurdistan Iraq

Samar Abdul-Hamid Ibrahim (MBChB)<sup>1</sup>, Abdulkhaliq Emin (PhD)<sup>2</sup>  
<sup>1,2</sup> College of Medicine, Hawler Medical University, Erbil, Iraq

## Abstract

### OPEN ACCESS

**Correspondence Address:** Samar Abdul-Hamid Ibrahim

College of Medicine, Hawler Medical University, Erbil, Iraq

**Email:** [yusmoh333@gmail.com](mailto:yusmoh333@gmail.com)

**Copyright:** ©Authors, 2022, College of Medicine, University of Diyala. This is an open access article under the [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/) license

(<http://creativecommons.org/licenses/by/4.0/>)

**Website**

[:https://djm.uodiyala.edu.iq/index.php/djm](https://djm.uodiyala.edu.iq/index.php/djm)

**Received:** 13 June 2022

**Accepted:** 1 August 2022

**Published:** 25 December 2022

**Background:** In December of 2019, a new form of coronavirus was discovered in Wuhan, China. Signs and symptoms of it include tiredness, cough, and fever. Another common symptom of this respiratory disease is the loss of smell.

**Objective:** To find the frequency of anosmia in COVID-19 patients in our community in relation to other communities and to determine the clinical outcome of patients affected by COVID-19.

**Patients and Methods:** This is a cross-sectional study at Kurdistan Iraq conducted during the period from January 2021-January 2022. The 460 cases were admitted to quarantine centers 320 were positive for COVID-19. The sample size is (260) cases of smell affection with proven COVID-19 disease.

**Results:** The percentage of smell affection patients were 81% of the sample size, they were as follows, the percentage of bad odor smell was 9%, alteration of smell was 21%, partial loss of smell was 24% and complete loss of smell was 27%. The female percentage of all patients were 55% while male percentage was 45%.

**Conclusion:** Olfactory dysfunction is one of cardinal symptoms of COVID-19 disease. Females are slightly more affected than males with olfactory dysfunction. 4<sup>th</sup> and 5<sup>th</sup> decades patients are more affected with bad odor and alteration of smell while partial loss and complete loss of smell happened within 6<sup>th</sup> decade patient mostly.

**Keywords:** Anosmia, hyposmia, bad odor smell

## Introduction

In December of 2019, a new form of coronavirus (COVID-19 or SARS-CoV-2) was discovered in Wuhan, China. In the subsequent months, COVID-19 gradually spread across the world. Investigations by the Chinese authorities revealed that human cases with COVID-19 signs and symptoms were identified in early December 2019 [1].

Most early cases had linked the disease to a food market in Wuhan. This is because most

initial patients were regular customers, market employees, or stall owners.

In January of 2020, SARS-CoV-2 was identified. In the same month, its genetic sequence was also made available to the people. What is more, all available evidence indicated that COVID-19 was not genetically engineered or constructed in a laboratory.

COVID-19 is mainly spread from one individual to another. Also, one can get the virus by inhaling respiratory droplets from an

infected individual. Signs and symptoms of this SARS-CoV-2 include tiredness, dry cough, and fever, chest pain, shortness of breath. Another common symptom of this respiratory disease is the loss of smell (anosmia) [2]. The loss of smell has puzzled most patients and researchers.

SARS-CoV-2 is a respiratory disease. Several signs and symptoms accompany this condition, and their severity varies from one individual to another. Apart from signs such as shortness of breath and dry cough, SARS-CoV-2 patients can exhibit other symptoms. One of them is smell loss. Anosmia is the loss of sense of smell, either temporarily or permanently.

Common conditions such as flu can lead to temporary anosmia. Anosmia is not usually a serious condition. However, it tends to affect one's quality of life. Moreover, people struggling with anosmia cannot taste food either. Because of this, they lose interest in eating [3].

A loss of smell regularly characterizes respiratory infections such as flu and common cold [4]. Research has revealed that temporary loss of smell is witnessed in about 60% of patients struggling with sinus infections and flu [5]. An individual's sense of smell and taste are closely linked. When an individual is experiencing a loss of smell, even their sense of taste is affected. Anosmia is also usually present even without a stuffy nose. According to a particular survey involving 11,054 COVID-19 patients, the results revealed that loss of smell occurred before other symptoms manifested [6].

Also, a loss of smell is an indicator of a docile SARS-CoV-2 infection. According to a particular report, a loss of smell can be

healed through outpatient care. Individuals with a loss of smell could recuperate since the COVID infection for some patients was not severe. Hence, they did not require hospital admission [7].

Generally, this disease is highly contagious. In some instances, it takes the lives of humans. Therefore, it is essential to pay attention to symptoms to contain this disease. One way of detecting that COVID-19 has hit an individual is through sudden olfactory dysfunction (OD). The human sensory process is comprised of touch, taste, smell, sight, and hearing. At present, the sense of smell is not fully understood. Even so, scholars are working to solve this mystery [8].

The perception of odor comprises of retronasal smell (found within the oropharynx) and orthonasal smell (as a result of sniffing). The area covered by the olfactory neuroepithelium is about 10cm<sup>2</sup> and comprises the middle and upper turbinates as well as the cribriform plate [8].

In general, one odor can activate numerous receptor types. Normally, olfactory sensory neurons convert this odor "message" into nerve impulse frequencies. In the end, the olfactory glomeruli receive the impulse message sent by these sensory neurons. This bulb is responsible for processing and integrating the received information. The olfactory bulb mitral cells possess axons that cross across the olfactory tract and olfactory peduncle repeatedly [8].

One theory explains that the virus uses the ACE2 (Angiotensin-converting enzyme 2) receptors to attach to host cells [9]. The Angiotensin-converting enzyme 2 is a metalloprotease present in the olfactory

tissues. TMPRSS2, a protease that aids in viral uptake, together with Angiotensin-converting enzyme 2, found in the olfactory tissue, are expressed in multiple types of cells. This gene expression in the olfactory tissues reveals that the olfactory cells are sensitive to COVID-19. Thus, this explains why the Food and Drugs Association approved ACE inhibitors are linked to smell and taste loss [10].

The olfactory nerve is primarily comprised of the olfactory sensory neurons. Moreover, this nerve tends to connect the central brain with the nasal cavity. When viruses gain entry into the brain, they are aided by this nerve. When viruses attack the olfactory nerve, neuronal death is witnessed [11].

Loss of hearing resulting from COVID-19 can also be linked to the infection of non-neural olfactory cells. According to a certain study, the researchers found a high expression of trans membrane protease serine 2 (TMPRSS2) and Angiotensin-converting enzyme 2 in the olfactory epithelium. They also discovered less expression of TMPRSS2 and Angiotensin-converting enzyme 2 in olfactory sensory neurons. Generally, the cells present olfactory epithelium aid in smell detection. Also, the olfactory sensory helps in neuron metabolism. Thus, the olfactory epithelium cells' impairment resulting from the virus can contribute to olfactory dysfunction [12]. The researchers reviewed 51 studies. These reports included 11,074 patients with COVID-19. Of the 51 studies, 21 of them included control groups with 3425 patients. The prevalence rate of smell loss was recorded at 52 percent. Usually, olfactory dysfunction is an underreported sign and symptom of SARS-CoV-2 infection.

Sometimes, it acts as the only presenting symptom in COVID patients. Thus, smell loss is a common COVID-19 symptom and should be included as a vital symptom when screening populations [13].

Researchers have conducted numerous investigations to prove that smell loss is a typical COVID symptom. The familiar clinical manifestation includes fatigue, myalgia, coughing, and fever. Nonetheless, anosmia presents itself as a typical symptom of COVID-19. Generally, SARS-CoV-2 infection damages gustatory and olfactory receptors [14].

Mayo clinic also conducted its study to prove that taste and smell loss are common symptoms of SARS-CoV-2 infection. This research aimed to estimate the frequency rate of olfactory dysfunction amongst individuals with COVID-19. When the SARS-CoV-2 respiratory syndrome hit the world, early observations revealed that symptoms included fever, myalgia, tiredness, and dry cough. When the SARS-CoV-2 pandemic started spreading across all four corners of the globe, medical professionals began noticing a particular trend.

For instance, the Internet was flooded with people seeking smell related information. Also, some patients started seeking medical advice concerning smell loss. Thus, the American Academy of Otolaryngology and the British Association of Otorhinolaryngology concluded that anosmia is a sign of SARS-CoV-2 infection [15].

## Patients and Methods

This is a cross-sectional study done at Kurdistan Iraq and were conducted during the period from January 2021-January 2022. 460 cases were admitted to quarantine

centers 320 were +ve for COVID 19 .The sample size is (260) cases of smell affection with proven COVID-19 disease two centers were involved ( Rezgari hospital and Hawler teaching hospital ) patients were with third and fourth wave of disease , PCR tests were ( reverse transcriptase PRC{RT-PCR}) , interview with questionnaire including informed consent was taken and phone numbers for some patients also were taken for follow up .

All patients who were Covid-19 test positive and having mild to moderate symptom, not admitted in ICU, formed part of the study group. A written informed consent was taken from all the patients to be part of this study.To put on records all patients were willing to be part of study. Patients more than 12 years of age were included in the study.

Exclusion criteria consisted of patients with previous history of nasal surgery, known case of allergic rhinitis, sinusitis, nasal polyposis,

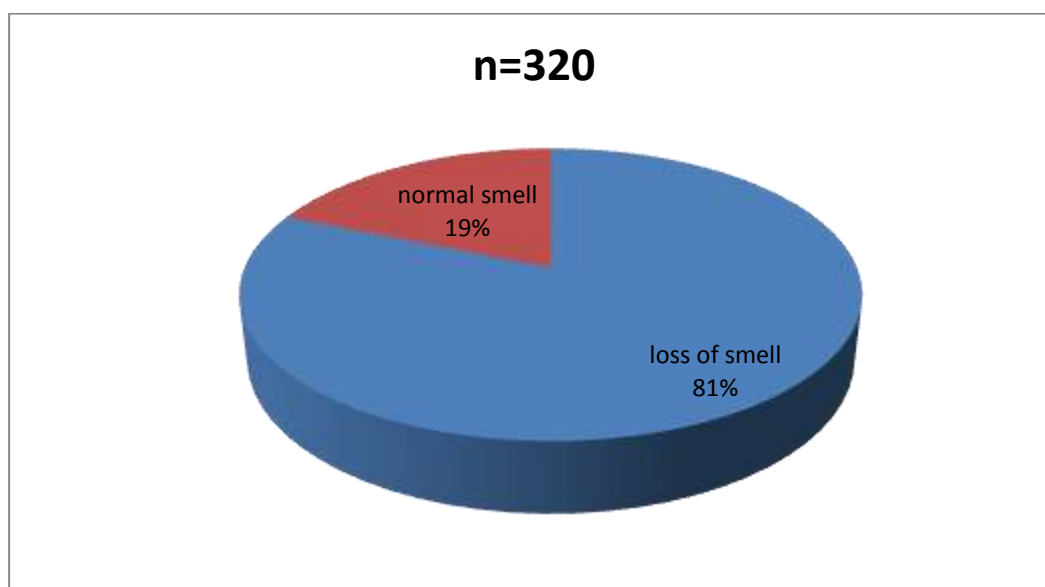
major head injury, or any chronic nasal disease. Patients having anosmia before the diagnosis of Covid-19 were also excluded. Besides the main complaints all patients were asked about presence or absence of anosmia (loss of smell). Our data collection patients ( covid +ve ) who had smell affection were monitored until they were negative for a period of 3 months and history of smell affection was elicited again.

### Statistical Analysis

Exel sheets and master tables are used for data analysis and bar lines and pie charts with SPSS program version 22 used for data presentation together with mean and standard deviation.

### Results

460 patients were admitted to quarantine centers and hospitals at Kurdistan Iraq, 320 of them proved to have COVID 19 infection by a swab, 260 of them were found to had a smell problem .



**Figure (1):** The occurrence of loss of smell in COVID 19 patients

**Table (1):** Types of smell disorder within COVID 19 patients

| Smell problem       | Number of patients |
|---------------------|--------------------|
| Bad odor            | 30 (9%)            |
| Alteration of smell | 66 (21%)           |
| Partial loss        | 78 (24%)           |
| Complete loss       | 86 (27 %)          |
| Total               | 81) %(260          |

The Table(1) showing that 30 patients had bad odor disease and 66 had alteration of smell and partial loss disease was founded

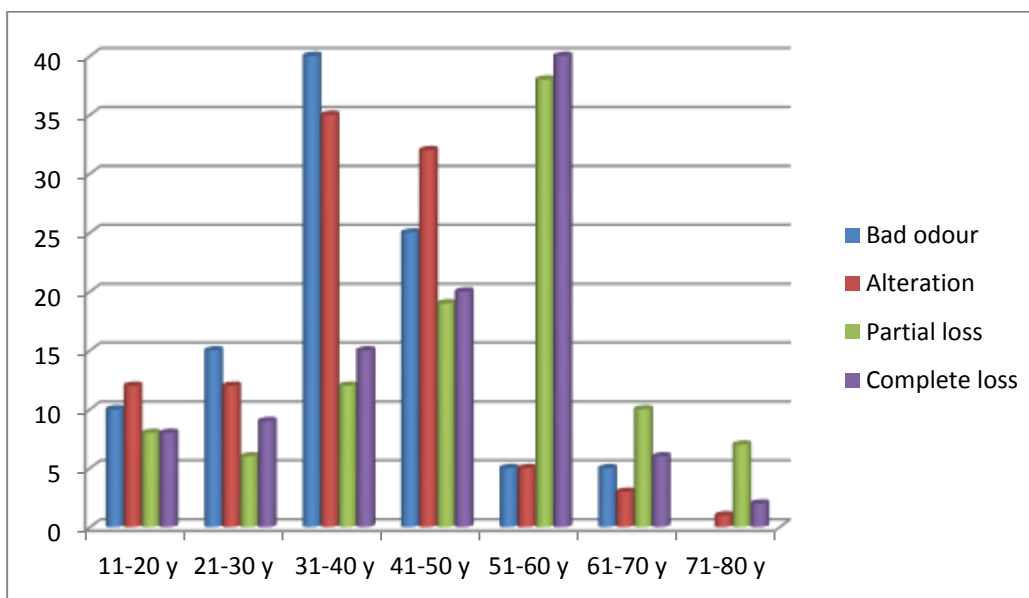
within 78 patients and total complete loss was founded in 86 patients.

**Table (2):** The demographic characteristics of the study group

|                                | Number          |
|--------------------------------|-----------------|
| Females                        | 143(55%)        |
| Males                          | 117(45%)        |
| Age (years)                    | 46.2±11.2 (S.D) |
| Time from positive swab.(days) | 8.2±4.8 (S.D)   |

Female percentage was 55% while male percentage was 45% . The mean age was

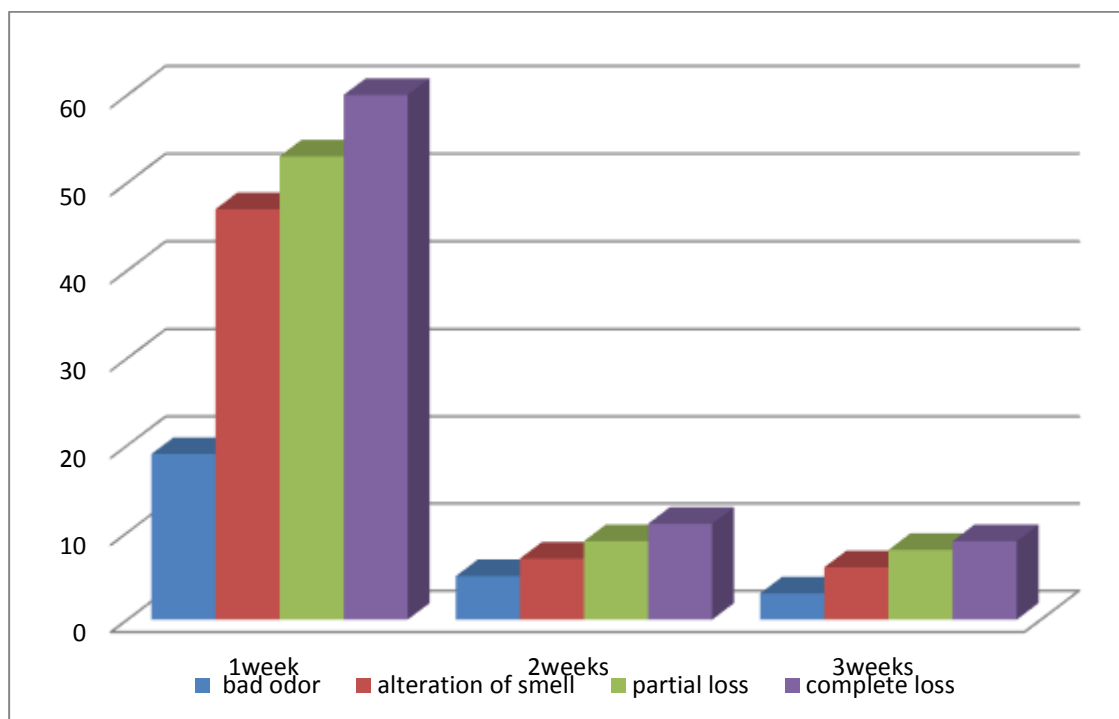
46.2±11.2 years and the mean of time from positive swab was 8.2±4.8 in days.



**Figure (2):** The distribution of smell disorder according to age groups

The highest percentage of patients presented with bad odor and alteration of smell patients were two age groups (31-40 y) and (41-50 y).

While for partial disease and total anosmia cases the main age group was (51-60).



**Figure (3):** The duration of loss of smell recovery in 90% of cases

This figure showing that in 4 different types of smell disorder, the recovery of smell was within 1 week mainly. (70% for bad odor {27total}, 78% for alteration of smell {60total}, 75% for partial loss of smell {70total} and 72% for total loss of smell {80total} recovery during the first week). The remaining 10% of patients are not recovered after 3 weeks of follow up.

### Discussion

In our study, the percentage of smell affection within COVID-19 patients was 81% in a comparison to one study at Mayo clinic, which stated that the percentage of olfactory impairment is 38% [15]. Times of India [16] reported that the percentage of smell affection is 40%. Henderson E. [17]. A study was done at UK showing that the percentage of smell affection was 60%.

Females are affected with smell problems more than males 55% in comparison to 45% which was very close to Mayo clinic study [15] in which female percentage was 58%.

The age incidence of smell affection was 46.2 y ±(11.2) (SD) of our study while it was 38 years at Akousa study [15], another study (Lee Y) states that the mean age was 44 [18].

Our study found that the higher percentage of bad odor and alteration of smell patients were two age groups (31-40 y) and (41-50 y). While for partial disease and total anosmia cases the main age group was (51-60), this agrees with one Irish study that was conducted at August 2020 which states the higher percentage of mild disease (alteration of smell) was between 30-40 years of age and that smell problems were encountered within about 50% of cases [19].

Another study (Giacomelli A *et al*) [20] conducted at Italy agrees with that young persons are involved more with smell problems than older persons and females are more affected than males and this agree with our study.

In our study the duration of loss of smell recovery for 90% of patients were as followed (as the remaining 10% were still not recovered after 3 weeks of follow up) for bad odor was 70% within 1 week and 18% within 2 weeks and 12% within 3 weeks and for alteration of smell was 78% within 1 week and 16% within 2 weeks and 6% within 3 weeks and for partial loss of smell it was 75% for recovery within 1<sup>st</sup> week, 15% was within 2 weeks and 10% within 3 weeks and lastly total loss of smell recovery was 72% within 1 week and 18% was recovered within 2 weeks and 10% was recovered within 3 weeks.

These findings agree with Meng *et al* [21] which states that the majority of smell problems are recovered within 4 weeks and that patients can lose their smell 4.4 days after contracting covid-19 up to 8.96 days after exposure, in comparison to our study which was 8.2 ±4.8 (SD), for the same study the percentage of smell problems with covid-19 patients was 85.6%.

Henderson E [17] study showing that 50% of cases regain full sense of smell within 40 days, on other hand 10% of covid-19 patients fail to show any recovery signs according to this study. Another study Times of India [16] showing that about half of cases are recovered within 1 week and the majority are within one month.

## Conclusions

From our study we can conclude the followings:

1. Olfactory dysfunction is one of the main cardinal symptoms of COVID 19 disease.
2. Females are slightly more affected than males with olfactory dysfunction.
3. 4<sup>th</sup> and 5<sup>th</sup> decades patients are more affected with bad odor and alteration of smell while partial loss and complete loss of smell happened within 6<sup>th</sup> decade patient mostly.
4. The majority of olfactory dysfunction cases are recovered within the 1<sup>st</sup> week of involvement.
5. No difference between bad odor and complete loss of smell cases regarding recovery.

## Recommendations

To college of medicine to make more collaborative work with other specialties for accurate patients assessment. To ministry of health for more time of follow up of patients and their data base to get more longitudinal studies.

**Source of funding:** The current study was funded by our charges with no any other funding sources elsewhere.

**Ethical clearance:** Ethical approval was obtained from the College of Medicine / University of Diyala ethical committee for this study.

## References

- [1] World Health Organization. Coronavirus disease 2019 (COVID-19) [Internet]. 1st ed. WHO; 2020.
- [2] CDC. Symptoms of Coronavirus (COVID-19) [Internet]. 1st ed. Atlanta: Centers for Disease Control and Prevention; 2021.

- [3] Healthline. What Is Anosmia? [Internet]. Healthline. 2021.
- [4] Healthline. Can a Loss of Taste and Smell Be a Symptom of COVID-19? [Internet]. Healthline. 2021.
- [5] Mullol J, Alobid I, Mariño-Sánchez F, Izquierdo-Domínguez A, Marin C, Klimek L et al. The Loss of Smell and Taste in the COVID-19 Outbreak: a Tale of Many Countries. *Current allergy and asthma reports*. 2020;20(10):61.
- [6] Samaranyake L, Fakhruddin K, Panduwawala C. Sudden onset, acute loss of taste and smell in coronavirus disease 2019 (COVID-19): a systematic review. *Acta Odontologica Scandinavica*. 2020;78(6):467-473.
- [7] Yan C, Faraji F, Prajapati D, Ostrander B, DeConde A. Self-reported olfactory loss associates with outpatient clinical course in COVID-19. *International forum of allergy & rhinology*. 2020;10(7):821-831.
- [8] Izquierdo-Domínguez A, Rojas-Lechuga M, Mullol J, Alobid I. Olfactory dysfunction in the COVID-19 outbreak. *Journal of investigational allergology & clinical immunology: official organ of the International Association of Asthmology (INTERASMA)*. 2020;30(5).
- [9] Jiang K. How COVID-19 Causes Loss of Smell [Internet]. Harvard Medical School. 2020.
- [10] Mathew D. Loss of Smell in COVID-19 Patients: Lessons and Opportunities. *Frontiers in Human Neuroscience*. 2020;14.
- [11] Baig A, Khaleeq A, Ali U, Syeda H. Evidence of the COVID-19 virus targeting the CNS: tissue distribution, host-virus interaction, and proposed neurotropic mechanisms. *ACS Chem Neurosci*. 2020;11:995–998.
- [12] Bilinska K, Jakubowska P, Von Bartheld C, Butowt R. Expression of the SARS-CoV-2 entry proteins, ACE2 and TMPRSS2, in cells of the olfactory epithelium: identification of cell types and trends with age. *ACS Chem Neurosci*. 2020;11:1555–1562.
- [13] Aziz M, Goyal H, Haghbin H, Lee-Smith W, Gajendran M, Perisetti A. The Association of "Loss of Smell" to COVID-19: A systematic review and meta-analysis. *The American Journal of the Medical Sciences*. 2020;20.
- [14] Mohamud M, Mohamed Y, Ali A, Adam B. Loss of Taste and Smell are Common Clinical Characteristics of Patients with COVID-19 in Somalia: A Retrospective Double Centre Study. *Infection and Drug Resistance*. 2020;13:2631-2635.
- [15] Agyeman A, Chin K, Landersdorfer C, Liew D, Ofori-Asenso R. Smell and Taste Dysfunction in Patients With COVID-19: A Systematic Review and Meta-analysis. [Internet] 2020 .
- [16] Times of India. Coronavirus: How loss of smell can be a good sign of recovery for many COVID patients [Internet]. *E Entertainment Times*. 2020 .
- [17] Henderson E. Treating post-infectious smell loss in COVID-19 patients [Internet]. *News Medical Life Sciences*. 2021 .
- [18] Lee Y, Min P, Lee S, Kim SW. Prevalence and duration of acute loss of smell or taste in COVID-19 patients. *J Korean Med Sci*. 2020;35(18):e174.
- [19] Chadwick J. Younger COVID-19 patients are MORE likely to lose their sense of smell and taste than older infected people. *Daily Mail [Internet]*. 2020 .



- [20]Giacomelli A, Pezzati L, Conti F, Bernacchia D, Siano M, Oreni L, Rusconi S, Gervasoni C, Ridolfo AL, Rizzardini G, Antinori S. Self-reported olfactory and taste disorders in patients with severe acute respiratory coronavirus 2 infection: a cross-sectional study. *Clinical Infectious Diseases*. 2020 Jul 28;71(15):889-90.
- [21] Meng X, Deng Y, Dai Z, Meng Z. COVID-19 and anosmia: A review based on up-to-date knowledge. *American journal of Otolaryngology*. 2020; 41(5).

## انتشار وحصيلة حالات تآثر الشم ضمن مرضى كورونا في كردستان العراق

سمر عبد الحميد ابراهيم<sup>١</sup> ، د. عبد الخالق امين<sup>٢</sup>

## الملخص

**خلفية الدراسة:** في ديسمبر من عام ٢٠١٩ ، تم اكتشاف شكل جديد من فيروس كورونا في ووهان الصين . تشتمل علامات واعراض الاصابة به على التعب والسعال والحمى . من الاعراض الشائعة الاخرى لهذه الاصابة هو فقدان الشم .  
**اهداف الدراسة:** للعثور على تواتر فقدان حاسة الشم لدى مرضى كوفيد-١٩ في مجتمعنا فيما يتعلق بالمجموعات الأخرى ولتحديد النتيجة السريرية للمرضى المتأثرين بـ كوفيد-١٩ .

**المرضى والطرائق:** هذه الدراسة مقطعية في كردستان العراق اجريت خلال الفترة من كانون الثاني ٢٠٢٠ حتى كانون الثاني ٢٠٢٢ ، حيث تم ادخال ٤٦٠ حالة في الحجر الصحي وكانت ٣٢٠ حالة ايجابية للاصابة بكوفيد١٩ ويبلغ حجم العينة ٢٦٠ حالة اضطراب الشم.

**النتائج:** بلغت نسبة مرضى اضطراب الشم ٨١% من حجم العينة ، وكانت عالحو التالي نسبة من يعانون من شم رائحة كريهة ٩% ، وهلوسة الشم ٢١% ، والفقد الجزئي للشم ٢٤% ، والفقدان التام للشم بنسبة ٢٧% . كانت نسبة الاناث من جميع المرضى ٥٥% (٤٣ حالة) بينما نسبة الذكور ٤٥% (١١٧ حالة).

**الاستنتاجات:** ضعف حاسة الشم هو احد الاعراض الاساسية لمرض كوفيد ١٩ . تتأثر بنسبة طفيفة اكثر من الذكور الذين يعانون من ضعف الشم . يتأثر مرضى العقدين الرابع والخامس اكثر بشم رائحة كريهة وهلوسة الشم ، بينما يحدث فقدان الشم الجزئي وفقدان الشم التام لدى مريض العقد السادس من العمر.

**الكلمات المفتاحية:** فقدان شم ، فقدان شم جزئي ، شم روائح كريهة

البريد الالكتروني: [yusmoh333@gmail.com](mailto:yusmoh333@gmail.com)

تاريخ استلام البحث: ١٣ حزيران ٢٠٢٢

تاريخ قبول البحث: ١ آب ٢٠٢٢

<sup>٢١</sup> كلية الطب – جامعة هولير الطبية - اربيل - العراق