



# Olfactory and taste disorders in healthcare workers with COVID-19 infection

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## Abstract

**Purpose** Severe acute respiratory syndrome caused by COVID-19 has spread globally for the last few months. Healthcare workers (HCW) are overexposed and infection rates are higher than in the rest of the population. Strict clinical assessment is paramount to detect suspicious cases. In this context, olfactory or taste dysfunction (OTD) appears as an early and frequent symptom. Evaluating its presence in early stages plays an important role nowadays.

**Methods** We performed a descriptive observational single-center study among 256 HCW at Hospital Universitario de Fuenlabrada affected by COVID-19 and confirmed using RT-PCR. A telephonic interview was performed, after obtaining oral informed consent.

**Results** OTD was present in up to 70% of the cases as an early symptom, including mild-to-severe cases. The extent of these sensory deficits lasted an average of 11 days. In 26% of the patients, these sensory alterations persisted for over a month.

**Conclusion** OTD is reported as an early symptom among HCW with SARS-CoV-2 infection. Its strong association with test positivity is useful in the management of the infection and should be enough to indicate preventive isolation. We consider that OTD needs to be included in clinical screening questionnaires in HCW.

**Keywords** Healthcare workers · Anosmia · Ageusia · Olfactory and taste disorders · COVID-19

## Introduction

During the course of the coronavirus pandemic (COVID-19), several countries have raised concerns about this emerging condition as an occupational disease [1]. With the increasing number of cases and the subsequent higher requirement of medical attention, healthcare workers (HCW) have been recognized as a “high-risk group” for potentially acquiring the infection and subsequently COVID-19, not to mention the risk of only developing an incomplete form or becoming an asymptomatic carrier [2].

Moreover, HCW have a disproportionate risk of acquiring the infection compared to the general population [3,4]. To

protect and prevent nosocomial transmission, health institutions have to provide HCW the best personal protective equipment (PPE) and an easy access to screening tests providing HCW an early diagnosis of their coronavirus status, thus offering them strict surveillance and early treatment when needed. These tests would also serve to designate the ideal time to return to their jobs safely, not only for their well-being, but for the patients and other coworkers too [3,5].

The sudden partial or complete loss of smell and/or taste has been described as a predictor of COVID-19, appearing either as an initial and solely symptom or within the full clinical disease [6–10]. Recently, the WHO has included these symptoms as part of the spectrum of COVID-19, and it has also been included in the Spanish Epidemiologic Surveillance system.

In this prospective cohort, we aimed to identify the prevalence of olfactory or taste dysfunction (OTD) in HCW affected by COVID-19, to correlate symptoms associated with test positivity that may guide to an early detection of

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the SARS-COV-2 infection, as well as to evaluate the prognosis of these symptoms in HCW.

## Methods

We performed a descriptive observational single-center study among HCW at a University Hospital in Spain. As of April 25th 2020 from a total of 2948 HCW, 256 subjects (8.68%) had a positive Reverse Transverse-Polymerase Chain Reaction (RT-PCR) for SARS-CoV2 and thus tested positive for COVID-19 infection. RT-PCR was performed according to the WHO instructions on nasopharyngeal and throat swabs, once HCW had clinical suspicion of COVID-19, following WHO recommendations [1].

The study was approved by the Bioethics Hospital Committee (CIE APR 20/15) and informed consent of all participants was obtained. HCW were recruited from April 25th to May 2nd. A phone interview was performed, after oral informed consent was obtained.

## Results

Out of the 256 HCW recruited, five subjects were excluded for having the previous anosmia and 21 patients could not be reached by phone, leaving us with a valuable sample of 230 HCW.

Participants were surveyed with a symptom questionnaire related to their possible loss of smell and taste and responses were graded in a modified visual analog scale (VAS) from 0 to 10 (0 being no alteration; normal sense perception, and 10 being complete loss of the sense) as reported by Lechien et al. [11]. They were also asked about the evolution of these symptoms. Patients were followed up for at least a month after the first symptoms appeared.

The duration (in days) of changes in smell and/or taste was registered, as well as their onset along the disease (before, at the same time as other symptoms, or after). Other variables included: age, sex, work category, and other ENT symptoms such as nasal congestion, mucous discharge, odynophagia, nasal dryness, hearing loss, and tinnitus. Systemic symptoms that were accounted for COVID-19 included: headache, fever, cough, difficulty breathing, digestive symptoms (diarrhea, vomiting or nausea), myalgias, and general discomfort. Furthermore, HCW professional category and physician's specialties were also documented (Table 1).

Overall, a total of 157/230 (68%) HCW described an olfactory alteration and 161/230 (70%) reported an alteration regarding their taste, with similar prevalence independently of age or sex. Average olfaction dysfunction was 8.2 in the modified VAS (range 2–10). Regarding taste alteration,

**Table 1** Prevalence regarding sex, pneumonia, hospitalization, ENT symptoms, systemic symptoms, as well as the prevalence of olfactory and taste dysfunctions in our study

Age/Median	43 years (18–62)		
		No of patients	Prevalence (%)
Sex	Women	196	85
	Men	34	15
Pneumonia	Yes	43	19
	No	187	81
Hospitalization	Yes	8	3.5
	No	222	96.5
ENT symptoms	Yes	161	70
	No	69	30
Systemic symptoms	Yes	207	90
	No	23	10
Olfactory alteration	Yes	157	68
	No	73	32
Taste alteration	Yes	161	70
	No	69	30

dysgeusia was predominant and is frequently described as a permanent bad taste in their mouths even while not eating.

Onset of olfactory and taste alterations occurred in a similar percentage, before any other COVID-19 symptom or simultaneously, but never later during the disease. In 3 cases (1.3%), OTD was the only symptom revealed, and led to the diagnosis of COVID-19 through PCR.

The duration of these sensory deficits ranged from 2 to 45 days (average of 11 days) before COVID-19 diagnosis was confirmed. In addition, in 43 patients (26%), OTD persisted for more than a month.

In our investigation, 43 patients (19%) were affected by pneumonia. Of these 43 patients, only 8 patients (18%) required hospitalization. In those who were hospitalized, olfactory alterations were found in 157 patients (68%) and taste disorders in 161 patients (70%) of them, similar as in out-patients.

Other ENT symptoms are listed in Fig. 1.

The most frequent systemic symptoms were general discomfort, dry cough, fever, and myalgias.

According to the professional category, most of the affected HCW were nurses, auxiliary nurses, and physicians. Furthermore, among physicians, emergency doctors and anesthesiologists were the most involved, followed by the pediatricians, internal medicine doctors, and otorhinolaryngologists (Fig. 2). According to professional category, the following HCW having COVID-19 presented anosmia: 100% of administrative personnel, 100% of the radiotherapy technologists, 100% of the stretcher bearers, 76% of auxiliary nurses, 71% of nurses, 75% of the radiologic technicians, and 57% of physicians.

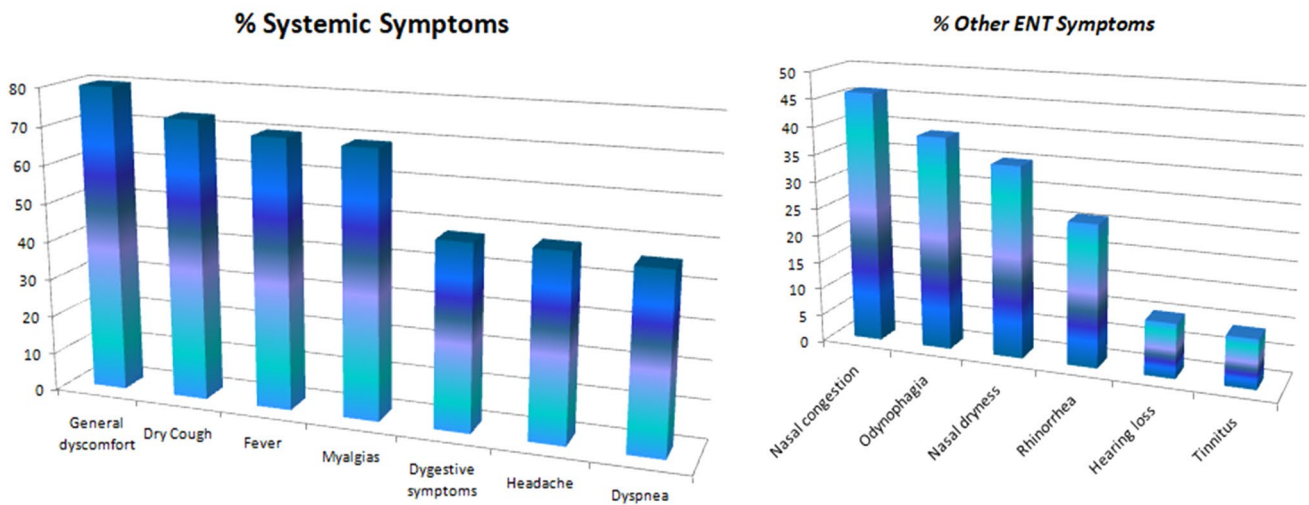


Fig. 1 Comparison of the most prevalent systemic and otolaryngologic symptoms in HCW with COVID-19

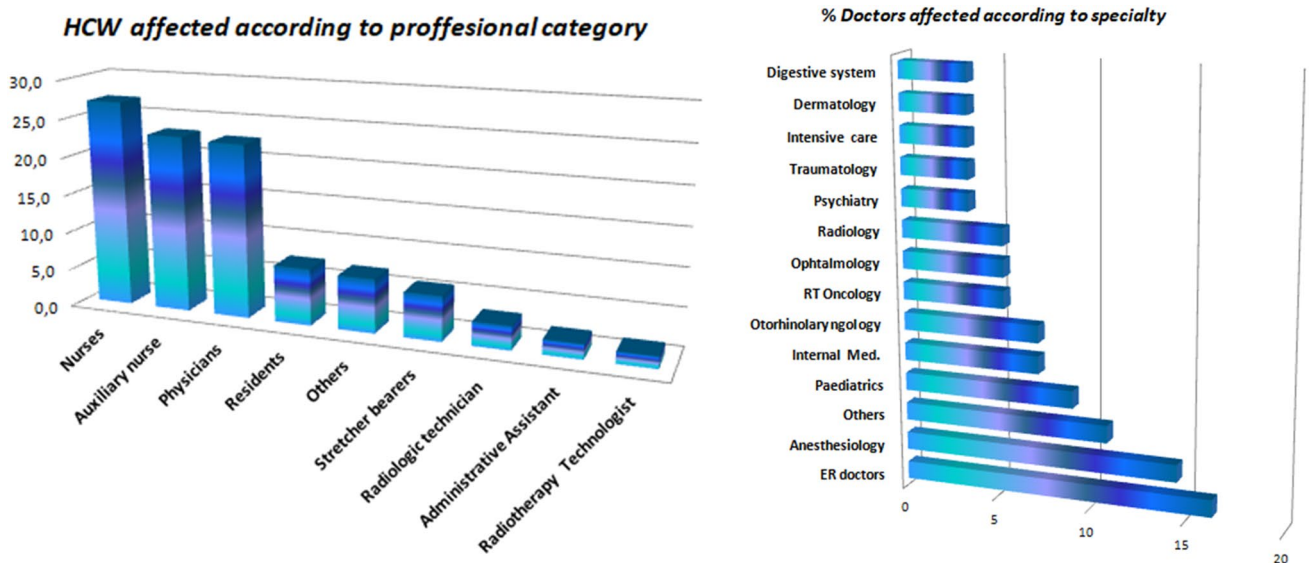


Fig. 2 Prevalence according to professional category of HCW with COVID-19 and to specialty regarding physicians

**Discussion**

Several articles from China, Iran, Italy, and Europe have shown OTD to be related to COVID-19 [6–16]. A recent meta-analysis could show a wide range of prevalence reported in relation to olfactory (5.14–98.33%) and taste (5.61–92.65%) dysfunctions [17].

Our study showed that most of the HCW with COVID-19 were paucisymptomatic cases, treated as out-patients, as reported by Yan et al. [18,19]. We found an incidence of 70% of OTD among HCW, as reported in patients in Europe by Lechien et al. [11] or in Italy by Spinato et al. [20].

In our series, in those HCW having OTD, anosmia was always present at the moment of diagnosis, showing how this symptom may help to early diagnose COVID-19, as a biomarker [21]. Indeed, in our series, three cases had their PCR done only because of their hyposmia as a unique and presenting symptom. Lechner et al. [22] outlined anosmia and ageusia as potential screening symptoms. We believe that olfactory and taste dysfunction may be found independently due to the fact that we have patients who presented with one or another symptom separately. Furthermore, when both of the symptoms were present, grading in the modified VAS for each was respectively very different leading to the idea of them being independent of each other. Nevertheless,

in some cases undoubtedly, dysgeusia could be secondary to olfactory loss.

As reported by Hopkins et al. [23] and Lee et al. [24], most cases recover smell and taste in the first 15 days. However, in our series, 43 subjects (26%) of HCW had persistent anosmia one month after onset and are now under treatment with intranasal steroids and following an olfaction rehabilitation program, as recommended by Izquierdo-Domínguez et al. [25]. We agree with Reitsma et al., indicating that healthcare workers are at extra risk of getting infected, nevertheless, they also emphasize the fact that they give us a unique opportunity to question about their symptomatology due to the circumstances. They also highlight, in any case, that anosmia as the only complaint, or anosmia combined with either fever and/or shortness of breath seems to be the best predictor of early COVID-19 infection [26].

Following our results, an early self-isolation from other household members and coworkers is highly recommended in HCW presenting with anosmia/hyposmia or ageusia/hypogeusia due to its high specificity [3].

## Conclusion

Alterations in smell and taste are frequently reported as early symptoms among HCW with COVID-19. We consider that routine screening in HCW with new-onset olfactory or taste disorders can improve case detection and prompt management during a COVID-19 outbreak. One out of four patients did not spontaneously recover olfaction and are thus in need of further treatment and rehabilitation.

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## Compliance with ethical standards

**Conflict of interest** No conflicts of interest to be declared.

**Ethical approval** Study approved by the Bioethics Hospital Committee (CIE APR 20/15).

**Informed consent** Informed consent of all participants was obtained prior to interview.

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