SARS-CoV-2 screening among healthcare workers in a local Health Department of North-Western Italy

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Summary

Between October 2020 and December 2020, 1,466 healthcare workers were screened for the presence of SARS-CoV-2 infection in a local Health Department of the Piedmont region, North-Western Italy, using a real-time RT-PCR-based technique. Mean age was 46.1±11.3 years and females were 77%. We found 234 positive cases (16%): mean age was 45.9±11.1 years and 73% were female. The most common symptoms were cough, hyposmia and ageusia. Asymptomatic subjects were 57%. Our data further underline the importance of an active COVID-19 screening in the healthcare workers population regardless of symptoms or of a clear infection exposure.

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Introduction

On December 2019, an outbreak of severe pneumonia interested the Hubei Province, China (7). The cause was identified as the severe acute respiratory syndrome – coronavirus 2 (SARS-CoV-2), the 7th human coronavirus (CoV), and the disease was named COVID-19 by the World Health Organization (WHO) on February 2020. The outbreak of SARS-CoV-2 was declared as a global pandemic on March the 11th (www.who.int) (6). Since then, the disease has affected more than 84 million people over 222 nations worldwide, causing more than 1.8 million deaths (updated: January the 6th 2021 - https://www.who.int/emergencies/diseases/novel-coronavirus-2019) (6).

Coronaviruses are mainly transmitted through direct contact or respiratory droplets. Other mechanisms of transmission such as faecal-oral, contaminated surfaces, and intrauterine have been hypothesized and/or reported (2).

COVID-19 symptoms include headache, ageusia, anosmia and parosmia, dry cough, sore throat, coryza, fever, respiratory difficulty, myalgia, asthenia, gastrointestinal and ocular symptoms (5).

The gold standard for the diagnosis is a molecular test based on real-time polymerase chain reaction (RT-PCR) (National Institute of Health technical note *ad interim*, October the 23rd 2020, www.iss.it) (3).

Healthcare workers (HWs), whose role is crucial during a pandemic, have an increased risk of contracting the infection and spread it among colleagues and fragile patients. A rapid diagnosis of infected HWs is therefore critical to stop the infection from spreading, which could cause an increase of morbidity/mortality as well as compromise the efficacy of the healthcare system.

Type of study

We report the screening of SARS-CoV-2 among HWs in a Health Department in North-Western Italy during the second out-

break of COVID-19, between October the 1st and December the 31st, 2020.

Indications for testing were screening on a voluntary basis (irrespective of symptoms and/or contacts with positive cases), ascertained contact with a positive case, and recovery monitoring. Positive subjects were requested to fill a form to collect relevant symptoms of COVID-19.

Oropharyngeal swabs were collected using a universal transport medium (UTM) system (COPAN, Brescia, Italy). Molecular tests were performed with a real-time RT-PCR assay using either a CFX96 Optical Reaction Module on a C1000 thermal cycler (Bio-Rad, Hercules, USA) or an InGenius apparatus with a SARS-CoV-2 ELITe MGB Kit (ELITech, Puteaux, France), following manufacturers' instructions. RNA extraction was performed with the MagaBio plus Virus DNA/RNA Purification Kit II on a Gene Pure Pro NPA-32P system (Bioer, Hangzhou, China).

Data collection was performed in accordance to the General Data Protections Regulation (GDPR) 2016/679.

Results and Conclusions

Between October the 1st and December the 31st, 2020, 1,466 HWs were screened for COVID-19 (Table 1). A total of 2,501 molecular tests were performed for screening (n=1,546), contact with a positive case (n=651) and recovery monitoring (n=304). Each HW was subjected to one (n=724), two (n=527), three (n=155), four (n=46), five (n=10) or six (n=4) tests.

We identified 234 positive cases (16%). This data is significantly higher than that available form a detailed meta-analysis, reporting a prevalence of affected HWs identified by molecular screening of 11% (95% CI: 7, 15; Chi-square test, p<0.00001) (1). A possible explanation is that published data are from the first wave (before June 2020), during which the lockdown has been very strict and exposure for HWs happened mostly on the workplace. In the period we analysed, COVID-19 awareness was higher and more personal protection equipment was available, but the lockdown was considerably lighter and off-work exposure may have played a role in increasing the number of positive cases.

During the same period in the Piedmont region the ratio between positive subjects and molecular tests was 165,894/1,291,763 or 12,8% (Chi-square test, p=0.002). HWs are at increased risk of COVID-19 and are screened regularly. In the general population tests are usually performed on symptomatic subjects/close contacts, and people with few symptoms or asymptomatic may easily go underdiagnosed, explaining the higher prevalence of COVID-19 in HWs.

In accordance with published data, male to female ratio, mean age of affected subjects, and age stratification among positive subjects were not statistically different from those of the whole HWs population (Table 1 and published data: female HWs = 69.9%, mean age = 40±11; female positive HWs = 69%, mean age of positives = 40.1±12.3) (1).

Detailed clinical information were available for 185 HWs. Of them, 100 were asymptomatic (57%) and 85 showed between one and 11 symptoms (mean = 3) including cough (n=40, 50%), hyposmia (n=36, 45%), ageusia (n=30, 38%), fatigue (n=27, 34%), headache (n=20, 25%), rhinorrhoea (n=18, 23%), diarrhoea (n=17, 21%), pharyngodynia (n=14, 18%), dyspnoea (n=11, 14%), fever (n=10, 13%), arthralgia/myalgia (n=9, 11%), and gastrointestinal symptoms (n=5, 6%). In published data, the prevalent symptoms were fever and dry cough (57%), myalgia (48%) and malaise (43%), although anosmia was associated with one of the highest odds ratios of being affected (1). Given that 94 of our more severe symptomatic cases performed the first molecular test outside the hospital, it is possible that we are missing clinical data on a fraction of symptoms.

Over the three months analysed, no hospitalizations or deaths were reported. The mean time length of negativization was 19 days (range = 4 - 103, standard deviation = ±12, mode = 11). A prolonged viral shedding identified in nasopharyngeal swabs is not unprecedented and its association with an extended risk of transmission is still not clear (4). Among patients with a negativization time >30 days, 10 had an intermitting positive/negative test result: real-time RT-PCR cycle threshold (CT) values for all these patients were close to the sensitivity threshold of the instrument, increasing the risk of a false negative result (data not shown).

In conclusion, our data further underline the importance of an active COVID-19 screening in the HWs population in the absence of symptoms or of a proved exposure to infection, allowing the early identification of positive cases, and the subsequent contact tracing.

Table 1. COVID-19 screened subjects data.

	Subjects [N (%)]	
	Tested	Positive
Female	1122 (77%)*	170 (73%)*
Male	344 (23%)*	64 (27%)*
TOT	1466	234
Age statistics		
Mean±st.dev.	46.1±11.3**	45.9±11.1**
<40 yrs.	425 (29%)***	72 (31%)***
40-60 yrs.	937 (64%)***	144 (62%)***
>60 yrs.	104 (7%)***	18 (8%)***

*Chi-square test, p=0.20; **Z test for two means, p=0.80; ***Chi-square test, p=0.78.

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