

Evaluating burnout among health workers routinely screened for SARS-CoV-2.

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Abstract

Background: Healthcare workers (HW) are a vulnerable group to develop burnout during the COVID-19 pandemic. The aims of this study were to evaluate the perception of HW about the antibody test, and, secondarily, the prevalence of burnout and factors associated with burnout among HW who took the test.

Methods: In this cross-sectional study, we evaluated burnout among HW in a 600-bed building entirely dedicated to COVID-19 inpatients care at Hospital das Clinicas (HC), located in São Paulo, Brazil. The HW answered an online questionnaire that included questions on burnout, a single-item scale based on the Maslach Burnout Inventory; demographic data, professional category, type of Protective Personal Equipment (PPE) used, distancing from social support; and emotional reactions to their serology result. Bivariate and multivariate analyses were done to evaluate the risk of burnout.

Outcomes: Among 4,417 HW tested, 528 (12.0%) were positive for SARS-CoV-2 and 1,945 answered the questionnaire. Burnout was reported by 308 (15.8%); anxiety, tenseness, and depression associated with COVID-19 were reported by 344 (17.7%); 292 (15.1%); and 181(9.3%) of the participants, respectively. The risk factors for burnout were: being a physician [adjOR:1.604;(95%CI 1.604-1.080;p=0.019)]; a physiotherapist [adjOR:2.047;(95%CI:1.285–3.261;p=0.003)]; perceiving a decrease in public safety[adjOR:1.983;(95%CI:1.229–3.199;p=0.005)]; anxiety [adjOR:2.721;(95%CI:1.812–4.085;p=<0.001)], and depression associated with COVID-19[adjOR:2.071;(95%CI:1.308–3.279;p=0.002)]; and having negative feeling towards had a previously negative SARS-CoV-2 serology[adjOR:1,989;(95%CI:1.484-2.664; p<0.001)].

Interpretation: Routine serological testing was one of the strategies used in our hospital to promote the well-being of HW. We observed that those who had negative feeling regarding testing negative to COVID-19 in previous serologies were at higher risk of burnout, suggesting that the risk of contracting the disease is a major stressor for HW.

Introduction

Since the Spanish flu, the world has not experienced a pandemic on the scale of the current COVID-19 pandemic. The number and severity of patients requiring treatment, the high rate of deaths among healthcare workers (HW), and the rapid transmission of the disease have led to increased burnout and psychiatric disorders.¹⁻⁶

Social distancing, the use of personal protective equipment (PPE) in the hospital and in the community, and overwork are factors that can increase the risk of burnout. Burnout is an occupational condition characterized by three primary symptoms. The first is a state of chronic emotional and physical depletion, referred to as emotional exhaustion; second, a sense of disconnection from coworkers and clients, or depersonalization; third, a negative sense of self-worth and ability, referred to as diminished personal accomplishment.⁷

A systematic review of burnout among physicians before the emergence of COVID-19 showed an overall prevalence ranging widely from 0% to 80.5%. The prevalence of emotional exhaustion, depersonalization, and low personal accomplishment ranged from 0% to 86.2%, 0% to 89.9%, and 0% to 87.1%, respectively.⁸

Despite the importance of burnout among HW, data on this issue in low and middle-income country have been scarce in the context of the COVID-19 pandemic.⁹ Our hospital provided serology for asymptomatic healthcare professionals who were tested every six weeks since the beginning of the pandemic. The first epidemiological survey showed that 14% of HW were positive for antibodies (data not shown). We noticed that the HW reported frustration with a negative result and anxiety to repeat the test.

Therefore, the aim of the present study was to evaluate the perception of HW about the antibody test, and, secondarily, the prevalence of burnout and factors associated with burnout among HW who took the test.

Methods

Study design

We performed a cross-sectional study to evaluate whether negative emotional reactions regarding having tested negative in previous SARS-CoV-2 serology were a risk factor for burnout. Secondarily, we evaluated the prevalence of burnout and the factors associated with it among HW in the COVID-19-dedicated clinical area of Hospital das Clinicas (HC), located in São Paulo, Brazil.

Participants

Serology was offered to all HW in the COVID-19-dedicated clinical areas between 14th and 28th May, 2020. These HW were requested to answer an online questionnaire.

Setting

Hospital das Clinicas is a public teaching hospital located in São Paulo. It comprises seven buildings with 2,200 beds and 22,000 employees. The Central Institute is an 11-floor building with 6,000 HW, and was designated to receive severe COVID-19 cases in the city of São Paulo. It included an emergency department, 300 ICU beds, and 500 beds in regular wards. The entire building was dedicated to COVID-19 care. Between 30th March 2020 and 6th July, 3,483 patients with COVID-19 had been hospitalized in the Central Institute.

PPE was made available to all HW who were instructed to use N95 respirators or surgical masks according to the type of contact with patients. HW who provided direct patient care wore N95 masks and scrubs during their entire shifts. When examining or touching patients they added disposable gloves and a gown. When performing aerosol generating procedures, they added a gown, gloves, and a face shield. HW were trained to don and doff PPE in face-to-face sessions and with videos and posters.

HC offers SARS-CoV-2 RT-PCR to all HW with respiratory symptoms. Symptomatic HW are evaluated at a dedicated HW health service (located in a separate building) and, if indicated, nasopharyngeal swabs are collected for SARS-CoV-2 RT-PCR.¹⁰ If positive, the HW receives paid leave during 14 days from the onset of symptoms.

A mental health support program was implemented for HW during the pandemic using a hotline and clinical evaluation when necessary.

Definitions

A HW was considered to have been infected if he/she presented a positive serology result. A HW was considered to have had oligo/asymptomatic COVID-19 if his/her serology was positive and he/she had never been previously tested for SARS-CoV-2 by RT-PCR, even if he/she had presented mild symptoms.

Burnout

To access burnout symptoms for the present study, we used a non-proprietary, single-item burnout measure based on the Maslach Burnout Inventory (MBI).⁷ The MBI is the most accepted measure of burnout, widely used as a self-survey measure.⁷ The inventory comprises three scales: 1) emotional exhaustion (nine items), a state of chronic emotional and physical depletion; 2) depersonalization (five items), a sense of disconnection from coworkers and clients; and 3) diminished personal accomplishment (eight items), a negative sense of self-value and ability.^{7,11} West and colleagues¹² validated a single item from the MBI emotional exhaustion (MBI:EE) as a standalone burnout measure, which we used in the present study. Dolan and colleagues⁷ compared this scale to the validated single-item from the MBI:EE and focused their analyses on different occupations such as physicians, nurses and administrative clerks. They found that the scale used in this study is a reliable substitute for the one-item MBI:EE across occupations, with a high Pearson correlation and area under the curve.⁷ Besides, the single-item burnout measure has logistical advantages over the one-item MBI:EE validated by West and colleagues, because it is non-proprietary and easy to interpret, when compared with the one-item MBI:EE.

⁷ For the present study, we used a free translation of this item into Portuguese.

The non-proprietary single-item burnout measure instructs respondents to define burnout for themselves: "Overall, based on your definition of burnout, how would you rate your level of burnout?" Responses are scored on a five-category ordinal scale, ranging from 1 = "I enjoy my work. I have no symptoms of burnout," to 5 = "I feel completely burned out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort of help." This scale is often dichotomized as ≤ 2 (no symptoms of burnout) versus ≥ 3 (1 or more symptoms). Scores 3 ("I am definitely burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion"), 4 ("The symptoms of burnout that I'm experiencing won't go away. I think about frustration at work a lot"), and 5 ("I feel completely burned out and often wonder if I can go on. I am at the point

where I may need some change or may need to seek some sort of help”) were considered to be mild, moderate, and severe burnout, respectively.

Questionnaire

Besides the scale described above, the participants also answered questions regarding major domains of the HW experience and well-known factors associated with burnout, namely exposure, workload, and, especially, given the focus of the present study, questions about the emotional reactions to the results of previous serology. More specifically, we asked whether they had negative feelings (outraged, angry, more anxious, sad, or depressed), positive feelings (less anxious or happy) or felt indifferent about testing negative in the previous SARS-CoV-2 serology. These questions were validated by experts in infectious diseases and clinical psychiatry.

The questionnaire also included investigation about demographic data, professional category, type of PPE used, previous diagnosis of COVID-19, and the occurrence of respiratory symptoms since the beginning of the pandemic, distancing from family/friends who were their social support; loss or change of routine; decrease in public safety; anxiety, tenseness, and depression associated with COVID-19; and perception about their serology.

The questionnaire was hosted on the Survey Monkey platform and was offered to all subjects who participated in the study. Response was voluntary. The questionnaire was made available using a quick response code that was sent by email or WhatsApp, placed on posters throughout the hospital, and at the site of blood collection.

SARS-CoV-2 serology

Serology was offered to all HW including contractor services such as cleaning, security, and laundry. Blood collection was performed from 6 a.m. to 5:30 p.m. on different floors to facilitate access during work shifts. Posters explaining the methodology and meaning of serology results were made available, as well as a telephone hotline. HW were instructed to seek the HW health service if they presented respiratory symptoms.

Chemiluminescence

The chemiluminescence test (CIT) (DiaSorin-Italy) used in the present study detects SARS-CoV-2 IgG antibodies. The serological method used was chemiluminescence with IgG. According to the manufacturer, IgG levels lower than 12.0 AU/mL were considered non-reactive. Between 12.0 and less than 15.0 AU/mL were considered inconclusive while levels equal to or greater than 15.0 AU/mL were considered reactive. This serology assay has sensitivity of 91.6 (72.7 to 98.2) and a specificity of 98.4 (94.8 to 99.7).¹³

Data analysis

Categorical variables were presented as absolute numbers and percentages, and continuous variables as median and interquartile range [IQR], because all continuous variables showed skewed distributions. The bivariate associations between clinical/sociodemographic characteristics and burnout symptoms was initially assessed using simple logistic regression. We subsequently built a multivariable logistic regression model based on the statistical significance ($p < 0.1$) in the bivariate analyses. The inclusion of age and sex was decided a priori. Variables that were associated with the presence of burnout symptoms in the bivariate analysis were also included in a multiple logistic regression model to predict the presence of severe burnout symptoms, along with the inclusion of gender and age as independent variables in this model. Age was analyzed as a continuous variable and each professional category and hospital unit of work was analyzed as a dummy variable. Statistical tests were two tailed, with a significance level of 0.05. The software SPSS (version 17.0) was used for the analyses.

Ethical approval

This study was approved by the Brazilian national ethics review board (CONEP), protocol number 30701920200000068.

Results

Among 4,417 HW tested, 528 were positive (12.0%). The 1,948 HW who answered the questionnaire were included in this study. Their characteristics are presented in Table 1. Women were the majority. Nurses and physicians, were the main professional categories. ICU (729; 37.9%) and inpatient wards (319; 16.6%) were the clinical areas of the hospital with most participants.

Loss or change in routine (1,066; 54.7%), and distancing from family/friends who are their social support (1,039; 53.3%) were the most frequently reported consequences of COVID-19 on the HW's personal lives. Burnout symptoms were reported by 308 (15.8%) HW; anxiety associated with COVID-19 by 344 (17.7%); tenseness associated with COVID-19 by 292 (15.1%); and feelings of depression associated with COVID-19 by 181 (9.3%). Physicians, nursing assistants, and physiotherapists reported more burnout symptoms compared to other professional categories.

Negative feeling towards previous negative SARS-CoV-2 serology was a risk factor for burnout, both in the bivariate (Table 2) and in the multivariate (Table 3) analysis.

Other risk factors associated with reported burnout in the bivariate analysis (Table 2) were: social distancing from family/friends who are their social support; loss or change of routine; unavailability of domestic help, perception of a decrease in public safety; anxiety associated with COVID-19; tenseness associated with COVID-19; depression associated with COVID-19 and previous negative SARS-CoV-2 serology.

The multivariate analysis is shown in Table 3 and the variance inflation factor for the variables in this model ranged from 1.013 to 1.898. Being a physician; being a physiotherapist; perceiving a decrease in

public safety; anxiety associated with COVID-19; depression associated with COVID-19; besides negative feelings towards previous negative SARS-CoV-2 serology were independently associated with burnout.

Depression associated with COVID-19 adjOR: 3,772 (95%CI: 1.464-9.717; p=0.006) was the only predictor associated with severe burnout (Table 4).

Discussion

The results of our study of burnout in HW working in potentially high exposure areas and who were routinely screened for SARS-CoV-2 infection support the perceptions of our team, that negative emotional responses to previous negative SARS-CoV-2 serology was a risk factor for burnout in the population we studied. Together with reports of anxiety (17.7%), tenseness (15.1%), and depression (9.3%) associated with COVID-19 in our sample, we hypothesize the perceptions of not being immune to the infection is a major stressor and increase chances of burnout. An alternative interpretation would be that infection would have given some time out to those HW, most of whom would have been given a sick leave, but this alternative seems less plausible given that, in our sample, earlier infection alone was not associated with burnout, only when negative emotional reactions were associated with negative serologies.

The other risk factors for burnout were: being a physician or physiotherapist; perceiving a decrease in public safety; anxiety or depression associated with COVID-19.

Unexpectedly, we observed a lower prevalence of burnout (15.8%) among HW than previously described during the COVID-19 pandemic in other countries.¹⁴⁻¹⁵ A study conducted in Japan during COVID-19 pandemic, for instance, found that more than 40% of the nurses and more than 30% of the radiology technologists and pharmacists met criteria for burnout. The authors hypothesized that these findings may be cultural, as the higher prevalence of burnout among non-physicians could be because these job categories have lower dimensions of control (skill discretion and decision authority) compared with physicians.¹⁴

In contrast, our study showed that physicians, nursing assistants, and physiotherapists reported burnout more frequently. Another Brazilian study conducted among 163 head and neck surgeons (74.2% males) during the COVID-19 pandemic reported that 24 (14.7%) of those HW had burnout, similar to our study. Anxiety, distress, and depression symptoms were reported in 74 (45.5%), 43 (26.3%) and 26 (16.0%) physicians.⁹ In a multivariable analysis, female physicians were more likely to report burnout compared to males (OR 2.88, CI [1.07-7.74]). Physicians aged 45 years or older were less likely to experience anxiety symptoms than those younger (OR 0.40, CI [0.20-0.81]). However, in our study we found different factors associated with burnout.

The explanation for the lower prevalence of burnout among HW at our hospital could be related to preparedness for the pandemic. PPE was made available to all hospital HW, who were trained to don and doff PPE in face-to-face sessions and with videos and posters. In addition, our hospital offers SARS-CoV-2 RT-PCR to all HW with respiratory symptoms; if positive, the HW receives paid leave during 14 days from

the onset of symptoms. Routine serology screening also provided to HW that worked at the COVID-19 building. Other hypothesis was suggested in a cross-sectional survey of 60 countries including Brazil; burnout was higher in high-income countries (HICs) compared to low- and middle-income countries (LMICs) (RR=1.18; 95% CI=1.02-1.36, P=0.018) during the COVID-19 pandemic. Country-level analysis revealed lower reported burnout in Italy (RR=0.72, 95% CI=0.61-0.84, P<0.001) and Sweden (RR=0.43, 95% CI=0.30-0.59, P<0.001) compared to the United States.¹⁶ Finally, it is worth mentioning that our hospital promoted a massive mental health support and promotion program, which may also have cushioned the emotional impacts of the pandemic over our HW. Anyhow, a potential bias should be considered, that those who answered the questionnaire were less likely to be experiencing burnout than those who did not answer it.

This study has a few additional limitations. It was conducted in a single reference institution for COVID-19 and there was an overrepresentation of women. Therefore, the findings of this study may not be generalizable to other countries or regions. Furthermore, because we have not assessed the baseline level of burnout, before the pandemic, we were unable to compare changes in prevalence.

To our knowledge, this is the first report on burnout comparing professional categories and associated risk factors among HW routinely screened for SARS-CoV-2. Having a safe environment for HW is essential to minimize burnout in their routine, especially during a pandemic. Routine serological testing was one of the strategies used in our hospital to promote the well-being of HW. We also observed an interesting and original finding regarding the perception of the HW about their serology, as they were being routinely tested during the pandemic. Although 29.6% felt happy to have had a previous negative SARS-CoV-2 serology; having negative feeling towards a previously negative SARS-CoV-2 serology was independently associated with burnout. Although feeling bad about earlier negative serologies and strict adherence to safety protocols may appear contradictory, a closer look will reveal that both may mean protection against severe forms of COVID-19. At least to some HW, having tested positive without symptoms may mean that they accidentally got infected and luckily did not have a severe form of the disease, but now are immune anyway. If that is not the case, an infection may be a threat of severe forms of the disease, so it is better to act preventively. Moreover, the adhesion to the serology screening was high, pointing out that HW wanted to perform the test.

Conclusions

The prevalence of burnout among HW in our setting was lower than in other countries, probably due to the fact that we prepared for a pandemic and cultural behaviour. As expected, we observed that those who had negative feeling regarding testing negative to COVID-19 in previous serologies were at higher risk of burnout, suggesting that the risk of contracting the disease is a major stressor in HW.

Declarations

Contributorship

SFC, ICB, PG, LB, and FC contributed equally to this paper.

Conceptualization; APMP, EPES, JK, ECM, MA, PB, GP, ES Formal analysis: LB, PB, RP Funding acquisition: ESDOB, AJP. Patients samples: LGNS, AAB, RESS, AC, MCPBF, FMS, MAJM, LQ, GFP, MCPBF, FMS, MAJM, LQ; REBS Laboratory: LGNS; MMR, CL, AC, VAS, AJSD. questionnaire data: CMP, DMRC, ABO, MFLF, ASAP, DMRC, MCPBF, FMS, MAJM, LQ; Methodology: PB, MA, RP, JK, MCCM, IOMS, ES Resources: MBMP, ESDOB, AJP Writing- original draft:, ACS, ASL,MC, PSB, AB, E ; Writing - review & editing ACS, ASL, ARB, MA, PSB, ECM, GP.

The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted

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Ethical approval: This study was approved by the Hospital das Clinicas da faculdade de Medicina da Universidade de Sao Paulo (protocol number 30701920200000068).

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

Data sharing: No additional data available.

Dissemination to participants and related patient and public communities: The findings of this study was disseminated to all clinical departments caring for patients with covid-19 at author affiliated institution.

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Tables

Table 1 Characteristics of 1,948 healthcare workers of COVID-19-dedicated areas who were evaluated for burnout and who were tested by serology (Hospital das Clínicas, São Paulo, Brazil)

Characteristics	n/N* (%) or median [IQR ^a]
Female	1,510/1,948 (77.5)
Age (years)	35 (27 – 44)
Professional category	
Physician	363/1,942 (18.7)
Nurse	290/1,942 (14.9)
Nursing assistant	402/1,942 (20.7)
Physiotherapist	158/1,942 (8.1)
Administrative job	156/1,942 (8.0)
Others	210/1,942 (10.8)
Hospital unit of work ^b	
Intensive care unit	729/1,926 (37.9)
Inpatient ward	319/1,926 (16.6)
Emergency room	178/1,926 (9.2)
Surgical center	23/1,926

	(1.2)
Outpatient clinic	43/1,926
	(2.2)
Laboratory	199/1,926
	(10.3)
Administrative office	149/1,926
	(7.7)
Others	286/1,926
	(14.8)
Pregnant	15/1,948
	(0.8)
Breastfeeding	22/1,948
	(1.1)
Personal effects of the COVID-19 pandemic	
Loss or change of routine	1,066/1,948
	(54.7)
Distancing from family/friends who are their social support	1,039/1,948
	(53.3)
Financial loss	382/1,948
	(19.6)
Unavailability of school/daycare for the children	294/1,948
	(15.1)
Public transportation shortage	255/1,948
	(13.1)
Difficulty in obtaining medical assistance	251/1,948
	(12.9)
Unavailability of house cleaners	185/1,948
	(9.5)
Perceived decrease in public safety	136/1,948
	(7.0)

Unavailability of caregiver for elderly	25/1,948 (1.3)
Unavailability of nanny/babysitter	24/1,948 (1.2)
Food shortage	21/1,948 (1.1)
Feelings and thoughts about COVID-19	
Anxiety	344/1,940 (17.7)
Tenseness	292/1,937 (15.1)
Depression	181/1,938 (9.3)
“Based on your own definition of burnout, how do you rate your burnout level?”	
“I enjoy my work. I have no symptoms of burnout”	794/1,948 (41.2)
“Occasionally I am under stress, and I don’t always have as much energy as I once had, but I don’t feel burned out”	824/1,948 (42.8)
“I am definitely burning out and have one or more symptoms of burnout, such as physical and emotional exhaustion”	248/1,948 (12.9)
“The symptoms of burnout that I’m experiencing won’t go away. I think about frustration at work a lot”	20/1,948 (1.0)
“I feel completely burned out and often wonder if I can go on. I am at the point where I may need some change or may need to seek some sort of help”	40/1,948 (2.1)
Previous diagnosis of COVID-19 (confirmed)	184/1,948 (9.4)
Participated in the first serological testing of the cohort	1,607/1,886 (85.2)
“The fact that my previous SARS-CoV-2 serology resulted negative made me feel:” (more than one option could be selected)	
Indifferent	431/1,607

	(26.8)
Outraged	25/1,607
	(1.6)
Angry	16/1,607
	(1.0)
More anxious	302/1,607
	(18.8)
Less anxious	147/1,607
	(9.1)
Happy	481/1,607
	(29.9)
Sad	150/1,607
	(9.3)
Depressed	11/1,607
	(0.7)
“Which personal protective equipment do you use at the hospital?”	
Surgical mask	1,097/1,948
	(56.3)
N95 respirator or similar	1,366/1,948
	(70.1)
Gloves	1,428/1,948
	(73.3)
Face shield	1,029/1,948
	(52.8)
Goggles	1,173/1,948
	(60.2)
Head cover	1,160/1,948
	(59.5)
Surgical gown	1,149/1,948
	(59.0)

- Not all questions were universally answered.

Table 2 Bivariate analysis of factors associated with burnout in 1,948 healthcare workers in COVID-19-dedicated areas, who underwent serology (Hospital das Clínicas, Universidade de São Paulo, São Paulo, Brazil)

	OR ^a	95% CI ^b	p-value
Female	1.101	0.818 – 1.481	0.527
Age	1.003	0.995 – 1.011	0.465
Professional category			
Physician	1.447	1.081 – 1.937	0.013
Attending	1.080	0.727 – 1.604	0.702
Resident	1.794	1.228 – 2.620	0.002
Nurse	0.974	0.691 – 1.375	0.883
Nursing assistant	0.597	0.425 – 0.838	0.003
Physiotherapist	1.715	1.161 – 2.533	0.007
Administrative job	0.816	0.506 – 1.314	0.403
Hospital unit of work			
Intensive care unit	1.132	0.880 – 1.457	0.333
Inpatient ward	0.885	0.630 – 1.243	0.481
Emergency room	1.246	0.835 – 1.858	0.281
Surgical center	1.129	0.382 – 3.343	0.826
Outpatient clinic	0.866	0.362 – 2.070	0.746
Laboratory	0.749	0.483 – 1.161	0.196
Administrative office	0.922	0.576 – 1.476	0.736
Pregnant or breastfeeding	1.031	0.427 – 2.493	0.946
Personal effects of the COVID-19 pandemic			
Distancing from family/friends who are a social support	1.710	1.329 – 2.201	<0.001
Loss or change of routine	1.360	1.060 – 1.744	0.015
Financial loss	1.224	0.911 – 1.644	0.179
Difficulty in obtaining medical assistance	1.347	0.960 – 1.890	0.085
Unavailability of house cleaners	1.539	1.059 – 2.235	0.024
Unavailability of school/daycare for the children	0.735	0.508 – 1.062	0.101

Perceived decrease in public safety	1.871	1.243 – 2.816	0.003
Shortage of public transportation	0.679	0.454 – 1.015	0.059
Unavailability of nanny/babysitter	1.790	0.705 – 4.547	0.221
Unavailability of caregiver for the elderly	1.337	0.498 – 3.589	0.565
Food shortage	1.675	0.609 – 4.606	0.318
Anxiety associated with COVID-19	4.780	3.655 – 6.250	<0.001
Tenseness associated with COVID-19	4.353	3.290 – 5.758	<0.001
Depression associated with COVID-19	5.927	4.286 – 8.194	<0.001
Previous diagnosis of COVID-19	0.823	0.530 – 1.278	0.386
Negative emotional reactions about a previous negative SARS-CoV-2 serology			
No (reference)			
Yes	2.770	2.116 – 3.626	<0.001
Did not participate in the first serological testing of the cohort	0.896	0.593 – 1.355	0.604

^a Odds ratio

^b 95% confidence interval

Table 3 Multivariate analysis of factors associated with burnout in 1,948 healthcare workers who worked in COVID-19 dedicated areas, and who were serologically tested for COVID-19 (Hospital das Clínicas, Universidade de São Paulo, São Paulo, Brazil)

	adjOR ^a	95% CI ^b	p-value
Female	0.983	0.696 – 1.388	0.923
Age	1.001	0.991 – 1.010	0.896
Physician	1.694	1.162 – 2.469	0.006
Physiotherapist	1.902	1.213 – 2.983	0.005
Nursing assistant	0.873	0.589 – 1.292	0.496
Distancing from family/friends who are their social support	1.398	1.054 – 1.853	0.020
Loss or change of routine	1.258	0.951 – 1.664	0.108
Difficulty in obtaining medical assistance	1.316	0.869 – 1.992	0.194
Unavailability of house cleaners	1.105	0.716 – 1.704	0.653
Perceived decrease in public safety	1.834	1.142 – 2.946	0.012
Shortage of public transportation	0.610	0.381 – 0.977	0.040
Anxiety associated with COVID-19	2.502	1.693 – 3.698	<0.001
Tenseness associated with COVID-19	1.465	0.949 – 2.260	0.084
Depression associated with COVID-19	2.114	1.367 – 3.268	0.001
Previous diagnosis of COVID-19	0.887	0.498 – 1.579	0.683
Negative emotional reactions about a previous negative SARS-CoV-2 serology			
No (reference)			
Yes	1.843	1.369 – 2.480	<0.001
Did not participate in the first serological testing of the cohort	0.922	0.595 – 1.428	0.716

^a adjusted odds ratio

^b 95% confidence interval

Table 4 Multivariate analysis of factors associated with severe burnout in 1,948 healthcare workers from Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo, São Paulo, Brazil

	adjOR ^a	adjOR CI ^b	p-value
Female	0.524	0.239 – 1.150	0.107
Age	1.015	0.990 – 1.041	0.231
Physician	0.327	0.093 – 1.147	0.081
Physiotherapist	0.895	0.261 – 3.076	0.861
Distancing from family/friends who are a social support	0.748	0.376 – 1.488	0.408
Perceived decrease in public safety	2.106	0.757 – 5.860	0.154
Shortage of public transportation	0.655	0.219 – 1.957	0.449
Anxiety associated with COVID-19 thoughts	1.831	0.746 – 4.495	0.187
Depression associated with COVID-19 thoughts	3.952	1.566 – 9.974	0.004
Negative emotional reactions about a previous negative SARS-CoV-2 serology			
No (reference)			
Yes	1.503	0.690 – 3.271	0.305
Did not participate in the first serological testing of the cohort	1.365	0.519 – 3.593	0.528

^a Adjusted odds ratio

^b 95% confidence interval