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Risk of burnout and stress in physicians working in a COVID team: A longitudinal survey

Tommaso Dionisi[1] | Luisa Sestito[1] | Claudia Tarli[1,2] | Mariangela Antonelli[1,2] | Alberto Tosoni[1,2] | Stefano D'Addio[1] | Antonio Mirijello[3] | Gabriele Angelo Vassallo[4] | Lorenzo Leggio[5,6,7,8] | Antonio Gasbarrini[1,9] | Giovanni Addolorato[1,2] | On behalf of Gemelli Against COVID-19 Group

[1]Department of Internal Medicine and Gastroenterology, Catholic University of Rome, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy

[2]Internal Medicine Unit, Department of Internal Medicine and Gastroenterology, Columbus-Gemelli Hospital, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy

[3]Department of Medical Sciences, IRCCS Casa Sollievo della Sofferenza Hospital, San Giovanni Rotondo, Italy

[4]Internal Medicine Department, Barone Lombardo Hospital, Canicattì, Italy

[5]Clinical Psychoneuroendocrinology and Neuropsychopharmacology Section, Translational Addiction Medicine Branch, National Institute on Drug Abuse Intramural Research Program and National Institute on Alcohol Abuse and Alcoholism Division of Intramural Clinical and Biological Research, National Institutes of Health, Baltimore and Bethesda, Maryland, USA

[6]Medication Development Program, National Institute on Drug Abuse Intramural Research Program, National Institutes of Health, Baltimore, Maryland, USA

[7]Center for Alcohol and Addiction Studies, Department of Behavioral and Social Sciences, Brown University, Providence, Rhode Island, USA

[8]Division of Addiction Medicine, Department of Medicine, School of Medicine, Johns Hopkins University, Baltimore, Maryland, USA

[9]Internal Medicine Unit, Department of Internal Medicine and Gastroenterology, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy

Correspondence
Giovanni Addolorato, Department of Internal Medicine and Gastroenterology, Internal Medicine Unit, Columbus-Gemelli Hospital, Fondazione Policlinico Universitario A. Gemelli IRCCS, Via Giuseppe Moscati, Rome 31 - 00168, Italy.
Email: giovanni.addolorato@unicatt.it

Abstract

Background and aims: The COVID-19 pandemic represents a source of stress and potential burnout for many physicians. This single-site survey aimed at assessing perceived stress and risk to develop burnout syndrome among physicians operating in COVID wards.

Methods: This longitudinal survey evaluated stress and burnout in 51 physicians operating in the COVID team of Gemelli Hospital, Italy.

Participants were asked to complete the Maslach Burnout Inventory (MBI) and the Perceived Stress Questionnaire on a short run (PSQs) (referring to the past 7 days) at baseline (T0) and then for four weeks (T1-T4). Perceived Stress Questionnaire on a long run (PSQl) (referring to the past 2 years) was completed only at T0.

Results: Compared with physicians board-certified in internal medicine, those board-certified in other disciplines showed higher scores for the Emotional Exhaustion (EE) score of the MBI scale ($P < .001$). Depersonalisation (DP) score showed a reduction over time ($P = .002$). Attending physicians scored lower than the resident physicians on the DP scale ($P = .048$) and higher than resident physicians on the Personal Accomplishment (PA) scale ($P = .04$). PSQl predicted higher scores on the EE scale ($P = .003$), DP scale ($P = .003$) and lower scores on the PA scale ($P < .001$). PSQs showed a reduction over time ($P = .03$). Attending physicians had a lower PSQs score compared with the resident physicians ($P = .04$).

Conclusions: Medical specialty and clinical position could represent risk factors for the development of burnout in a COVID team. In these preliminary results, physicians board-certified in internal medicine showed lower risk of developing EE during the entire course of the study.

1 | INTRODUCTION

The novel coronavirus (SARS-CoV-2), originating from Wuhan, China in December 2019, is in the same family as the causative agents for previous Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS) outbreaks. The high rates of transmissibility, in particular from asymptomatic carriers, as well as the high severity of illness in individuals with very common preexisting chronic conditions (eg, diabetes, obesity, heart disease, lung disease)[1] led the World Health Organization (WHO) to declare the outbreak of this new coronavirus disease (COVID-19) as a Public Health Emergency of International Concern, in January 2020. Two months later, WHO *declared* the novel coronavirus *outbreak* a *global pandemic*.[2] The exponential growth of cases all over the world and the unprecedented severity of this outbreak, at least as it related to the past century, left many physicians unprepared for an event of this magnitude. The COVID-19 pandemic has had an important impact on health care systems all over the world, and the response to the pandemic has added stress to all health care providers, including physicians.

Several factors, including perceived stress and burnout, have an impact on clinicians' well-being and could result in increased medical errors and malpractice risk, therefore adversely affecting patient care.[3]

Physician burnout has always been a universal dilemma that is seen in healthcare professionals, resulting from chronic work-related stress, with symptoms characterised by feelings of energy depletion or exhaustion, increased mental distance from one's job, or feelings of negativism or cynicism related to one's job, and reduced professional efficacy.[4] Factors such as working hours, workload expectations, insufficient rewards, interpersonal communication, negative leadership, and quality of night sleep have always been considered influential.[4] Many physicians had to change departments quickly, often on a short notice and found themselves working in an unfamiliar environment. They found themselves caring for patients who were not their usual ones and having to manage new and unexpected clinical challenges. It was considered appropriate to investigate which specialists were best suited to manage this unprecedented situation. As shown in the literature, work experience and age are protective factors against Burnout.[4] In addition, the type of work performed may also have an impact on stress and the risk of developing Burnout. Age, career years, and the type of activity performed are related to a job position. More experienced physicians have older age and have more managerial roles, and have less contact with the patient. Moreover, the development of burnout syndrome affects patients' quality of care, and it has a direct, negative impact on the physicians' quality of life, in particular on mood disorders, anxiety, alcohol and substance use disorders, and suicides.[4]

During the COVID-19 pandemic, it is more important than ever to address the physical and psychological health of physicians, who are already at risk of experiencing stress and developing burnout syndrome.

This pilot study aimed to conduct a survey in a group of physicians, working in a COVID team, during the March-April 2020 outbreak in Italy. The goal of the survey was to evaluate their perceived stress and burnout before, during and after the experience in a COVID team, and identify subgroups of physicians at higher risk of developing burnout and stress.

What's known?

Physician burnout has always been a universal dilemma that is seen in healthcare professionals. COVID-19 pandemic has had an important impact on the health care system all over the world, and the response to the pandemic has represented additional stress for all health care providers, including physicians. Some peculiarities could represent potential risk factors for the development of burnout in a COVID team of physicians.

What's new?

Medical specialty and clinical position could represent potential risk factors for the development of burnout in a COVID team of physicians. In our sample, physicians board-certified in internal medicine showed lower risk of developing emotional exhaustion, during the entire course of the study, compared with physicians board-certified in other disciplines. The latter had an increase in the perceived stress over time, compared with physicians board-certified in internal medicine.

2 | MATERIALS AND METHODS

This longitudinal survey was conducted among physicians involved in the COVID team of the Gemelli Hospital, Rome, Italy during the

March-April 2020 outbreak, specifically from March 19, 2020 to April 21, 2020. All of the physicians to whom the survey was submitted worked in departments with a similar intensity of care. No other exclusion criteria were used.

A sample size was not calculated a priori for this study, which in fact represents a pilot investigation that may guide power calculation and other aspects of future larger studies.

A total of 136 physicians were invited by email, face-to-face or direct phone call to participate, at their entry into the COVID team. The invitation to participate explained the voluntary and confidential nature of the study. Among them, 53 consented to participate in the study. None of the physicians who filled out the questionnaires had a psychiatric history.

Participants were asked to indicate their gender and age. Also, information was collected on their clinical position (ie, whether they were attending physicians or resident physicians), and on their medical specialty (board-certified in internal medicine or in other disciplines). Once they left the COVID team, they were asked to specify whether they had been in contact with patients who had died because of COVID-19. Given the small sample and the high percentage of physicians board-certified in internal medicine in our study, the specialty variable divided the sample into physicians board-certified in internal medicine vs physicians board-certified in other disciplines. The latter subgroup included physicians board-certified in endocrinology, rheumatology, gastroenterology, emergency medicine, geriatrics and allergology. Sociodemographic and professional characteristics of the sample are reported in Table 1.

Physicians were asked to complete the PSQ on a long term (PSQl) at enrolment and Maslach Burnout Inventory (MBI) and PSQ on a short term (PSQs) at enrolment and weekly. Reminders to complete the questionnaires were periodically sent to the participants by email. Two participants, who only answered one questionnaire, were excluded from the data analysis, therefore the final analysed sample included 51 participants.

TABLE 1 Sociodemographic and professional characteristics. All values are reported as frequency and percentage or mean and standard deviation

	Frequency or mean	Percentage or SD
Gender		
Women	25	49.02%
Men	26	50.98%
Age	34.76	8.89 (SD)
Clinical position		
Resident physician	27	52.94%
Attending physician	24	47.06%
Medical specialty		
Internal medicine	26	50.98%
Other disciplines	25	49.02%
Report dead COVID-19 patients		
No	17	33.33%
Yes	34	66.67%

The questionnaires were administered at baseline and at each follow-up timepoint. The exact timeline was slightly flexible, based on the shifts during which the participants were working in the COVID team. T0 refers to questionnaires completed during a time window ranging from 3 days before to 3 days after joining the COVID team. T1 refers to the questionnaires completed during the time window ranging from day 4 and day 10 of work on the COVID team. T2 refers to those completed during the time window ranging from day 11 and day 17. T3 refers to those completed during the time window ranging from day 18 and day 24, and T4 refers to those completed during the time window ranging from day 25 and day 31.

The study was approved by the Catholic University of Rome Ethics Committee and was consistent with the European good clinical practice standards (art.34 RD 223/2004; European Community Directive 2001/20/EC).

2.1 | Maslach Burnout Inventory—Human Services Survey (MBI-HSS)

Burnout was measured using MBI-HSS (Italian validated version).[5] The questionnaire consists of 22 items, divided into 3 scales: 9 items for Emotional Exhaustion (EE), 5 items for Depersonalisation (DP) and 8 for Personal Accomplishment (PA). Each item was scored according to a Likert scale ranging from "never" (0) to "every day" (6). Each subscale was scored individually and assessed on a continuous scale. The dimensions were categorised into low, moderate and high levels, considering the cut-off points previously validated. In particular, EE scores were categorised as low: 0-18, medium: 19-26, high: ≥27. DP scores were categorised as: low: 0-5, moderate: 6-9, high: ≥10. PA scores were categorised as: low: 0-33, moderate: 34-39, high: ≥40. Low scores for EE and DP and high ones for PA indicate the absence of burnout. Exceeding the cut-off in all scales corresponds to a higher risk of burnout syndrome. A reduced PA is inversely associated with burnout.[6,7]

2.2 | Perceived Stress Questionnaire (PSQ)

The perceived stress was measured using the Italian version of the PSQ.[8] PSQ consists of 20 items (PSQ-20) divided into four scales: *Worries*, *Tension* and *Joy* measure the individual's internal stress reactions and *Demands* represents the individual's general perception of external stressors. Each item was rated on a 4-point Likert scale from 1: "almost never" to 4: "usually." A linear transformation changes the subscale scores to values from 0 to 1.[9] Participants were asked to fill out the questionnaire on a long run form (Perceived Stress Questionnaire on Long term, PSQl), marking the answers that best described their emotional state over the last 2 years. In addition, they were asked to mark the answers that best described their

emotional state in the last month (Perceived Stress Questionnaire-on Short term, PSQs).

2.3 | Statistical analysis

All analyses were conducted using Stata 14, according to the modified intention to treat in the worst-case scenario model. The descriptive statistics were performed using averages (SD) and median (IQR) for quantitative variables and frequency and percentage for categorical ones. Linear mixed models were designed for each continuous variable of interest. All models were estimated through restricted maximum likelihood (REML). A null model was initially analysed to evaluate the variability of the dependent variable among the participants and evaluate data structure. The time variable was inserted in the analysis to investigate the variability, over time, of the variables of interest. The variance over time of the intercept and slope between participants for dependent variables has been studied. The time was treated as a continuous variable. The possibility that some variables could explain the characteristics of interest was then studied. All of the variables described above have been studied as fixed covariates, and any interactions have been studied. More covariance structures have been tested to account for heteroskedasticity. Visual inspection of residual plots did not reveal any obvious deviations from homoscedasticity or normality. *P*-values were obtained by likelihood ratio tests of the full model, with the effect in question against the model without the effect the same.

Student's *t* tests, Mann-Whitney, variance analysis and Kruskal-Wallis and Dunn post hoc tests were performed to analyse the relationship between sociodemographic and professional data and PSQI scales.

3 | RESULTS

3.1 | Maslach Burnout Inventory

On MBI, median (IQR) values were analysed for each scale. EE showed a value of 19 (11-25) at T0, and of 13 (7-23) at T4.

DP showed a value of 5 (2-9) and 3 (1-8) at T4. Finally, PA score at T0 was 42 (38-47) and 41 (36-46) at T4. The remaining median values (IQRs) are shown in Table 2. In addition, the complete results of linear mixed model analysis are shown in Table 3.

The data analysis did not show significant variations of the EE score over time (β, 0.42; 95% CI: −0.41 to 1.24; $P = .32$). A model was built by inserting *Overall* PSQ scale on the long term and specialty, considering the interaction between specialty and time. Higher scores at *Overall* PSQ scale on long term predicted higher scores on EE scale (β, 49.99; 95% CI: 37.89 to 62.08; $P < .001$). Compared with the physicians board-certified in internal medicine, physicians board-certified in other disciplines showed higher scores on the EE scale (β, 8.28; 95% CI: 4.50 to 12; $P < .001$), however, the former showed a significant reduction of EE score over time (β, −1.21; 95% CI: −2.36 to −0.06; $P = .04$) (Figure 1).

The data analysis showed a significant reduction in the DP scores over time (β, −0.58; 95% CI: −0.95 to −0.22; $P = .002$). A model was built by inserting *Overall* PSQ scale on a long period and clinical position, considering the interaction between clinical position and time. Higher scores on *Overall* PSQ scale on long term predicted higher scores on the DP scale (β, 14.91; 95% CI: 5.11 to 24.72; $P = .003$). Attending physicians scored significantly lower than resident physicians on the DP scale (β, −3.05; 95% CI: −6.07 to −0.02; $P = .048$), however, the latter showed decreasing score on this scale over time than attending physicians (β, 0.50; 95% CI: 0.01 to 1.00; $P = .047$) (Figure 2).

The data analysis did not show a significant increase in PA scores over time (β, −0.18; 95% CI: −0.56 to 0.2; $P = .36$). A model was built by inserting *Overall* PSQ scale on long term and clinical position. Higher scores on *Overall* PSQ scale on long term predicted lower scores on the PA scale (β, −23.34; 95% CI: −35.37 to −11.31; $P < .001$). Attending physicians score significantly higher than resident physicians on the PA scale (β, 3.8; 95% CI: 0.14 to 7.45; $P = .04$) (Figure 3).

3.2 | Perceived Stress Questionnaire

On PSQI, the effect of the medical specialty on the *Worries* score was statistically significant, and physicians board-certified in internal medicine scored lower than physicians board-certified in other disciplines [0.2 (0.13-0.27)-0.33 (0.27-0.43), $P = .006$]. Resident physicians reported higher scores than attending physicians on the *Tension* [.33 (0.2-0.47)-(0.33-0.53), $P = .08$], but lower scores on the *Joy* scale [0.33 (0.13-0.53)-0.47 (0.33-0.667), $P = .019$]. There was a significant effect of clinical position on the *Overall* score, with attending physicians reporting higher score than resident physicians [0.43 (0.38-0.57)-0.37 (0.27-0.48), $P = .03$]. The results of the linear mixed models are reported in Table 4.

The data analysis showed a significant reduction of the *Overall* scores over time (β, −0.01; 95% CI: −0.03 to −0.002; $P = .03$). A model was built by inserting clinical position and the contact with patients who died for COVID-19, also considering the interaction

TABLE 2 Median score of MBI scales

Median (IQR)	T0	T1	T2	T3	T4
EE	19 (11-25)	14 (7-25)	15 (7-24)	15 (7-24.5)	13 (7-23)
DP	5 (2-9)	4 (1-9)	4 (1-9)	3 (0/9)	3 (1-8)
PA	42 (38-47)	42.5 (38-45.25)	42 (36-46)	42 (36-46)	41 (36-46)

TABLE 3 Each Maslach Burnout Inventory scale was individually tested with each independent variable with Linear Mixed Model

	Coefficients	*P*	[95%	CI]
Emotional exhaustion				
Time	−0.1855461	.509	−0.7360901	0.3649979
Age	−0.2831311	.100	−0.6204909	0.0542287
Gender (referent women)	3.465964	.271	−2.7056	9.637528
C. position (referent residents)	−4.265795	.172	−10.38862	1.857034
Specialty (referent Int. Med.)	8.391379	.004	2.640286	14.14247
Rep dead Cov-19 p (referent No)	−5.62258	.083	−11.98492	0.7397577
PSQ/Short	52.49965	.000	38.35497	66.64434
Depersonalisation				
Time	−0.3430927	.004	−0.5784324	−0.107753
Age	−0.1693321	.045	−0.3352664	−0.0033978
Gender (referent women)	2.497344	.105	−0.5249497	5.519638
C. position (referent residents)	−2.524302	.102	−5.550627	0.5020234
Specialty (referent Int. Med)	2.572788	.095	−0.4467031	5.592279
Rep. dead Cov-19 p (referent No)	0.572288	.732	−2.696747	3.841323
PSQ/Short	17.1919	.000	7.563742	26.82007
Personal accomplishment				
Time	−0.1737624	.318	−0.5146185	0.1670936
Age	0.2261985	.041	0.0090496	0.4433474
Gender (referent women)	2.021447	.328	−2.025661	6.068554
C. position (referent residents)	4.617989	.019	0.7630367	8.47294
Specialty (referent Int. Med.)	−1.651755	.424	−5.704125	2.400614
Rep. dead Cov-19 p (referent No)	2.023576	.351	−2.228826	6.275978
PSQ/Short	−26.50371	.000	−38.59023	−14.41719

Abbreviations: C. position, clinical position; CI, confidence interval; Int. Med., internal medicine physicians; PSQ/Short, perceived stress questionnaire on short run.; Rep. dead Cov-19 p, reporting dead COVID-19 patients; SE, standard error.

between specialty and time. Attending physicians tended to have a lower *Overall* scale score compared with the resident physicians (β, −0.08; 95% CI: −0.16 to 0.008; $P = .07$). Compared with physicians board-certified in internal medicine, those board-certified in other disciplines had an increase in the *Overall* scale score over time (β, 0.02; 95% CI: 0.00 to 0.04; $P = .04$). Those who were in contact with patients who died from COVID-19 had a lower *Overall* score (β, −0.09; 95% CI: −0.18 to 0.00; $P = .05$).

The data analysis did not show a significant modification in the *Worries* score over time (β, −0.02; 95% CI: −0.01 to 0.01; $P = .5$). None of the parameters analysed in the study were able to predict the *Worries* scale score.

The data analysis did not show a significant reduction in the *Tension* scores over time (β, 0.00; 95% CI: −0.01 to 00; $P = .5$). A model was built by considering the interaction of medical specialty and clinical position. Compared with resident physicians training in internal medicine, resident physicians training in other disciplines scored higher on the *Tension* scale (β, 0.25; 95% CI: 0.12 to 0.39; $P < .001$).

The data analysis did not show a significant reduction in the *Joy* scores over time (β, 0.00; 95% CI: −0.01 to 0.02; $P = .49$). A model was built by inserting contact with patients who died from COVID-19, considering the interaction of specialty and clinical positions. Those who had contact with patients who died from COVID-19 had a higher *Joy* score (β, 0.17; 95% CI: 0.06 to 0.28; $P = .002$). Analysis of the interaction between clinical position and specialty indicated that resident physicians training in other disciplines scored lower than resident physicians training in internal medicine on the *Joy* scale (β, −0.21; 95% CI: −0.36 to −0.06; $P = .008$). However, attending physicians board-certified in other disciplines scored higher than resident physicians board-certified in internal medicine on it (β, 0.30; 95% CI: 0.09 to 0.52; $P = .005$).

Finally, for the *Demands* scale, data analysis showed a significant reduction in score over time (β, −0.02; 95% CI: −0.04 to −0.01; $P < .001$). None of the parameters analysed in the study were able to predict the *Demands* scale score.

4 | DISCUSSION

The present study investigated the perceived stress and burnout, assessed by the PSQ and MBI questionnaires, respectively, in

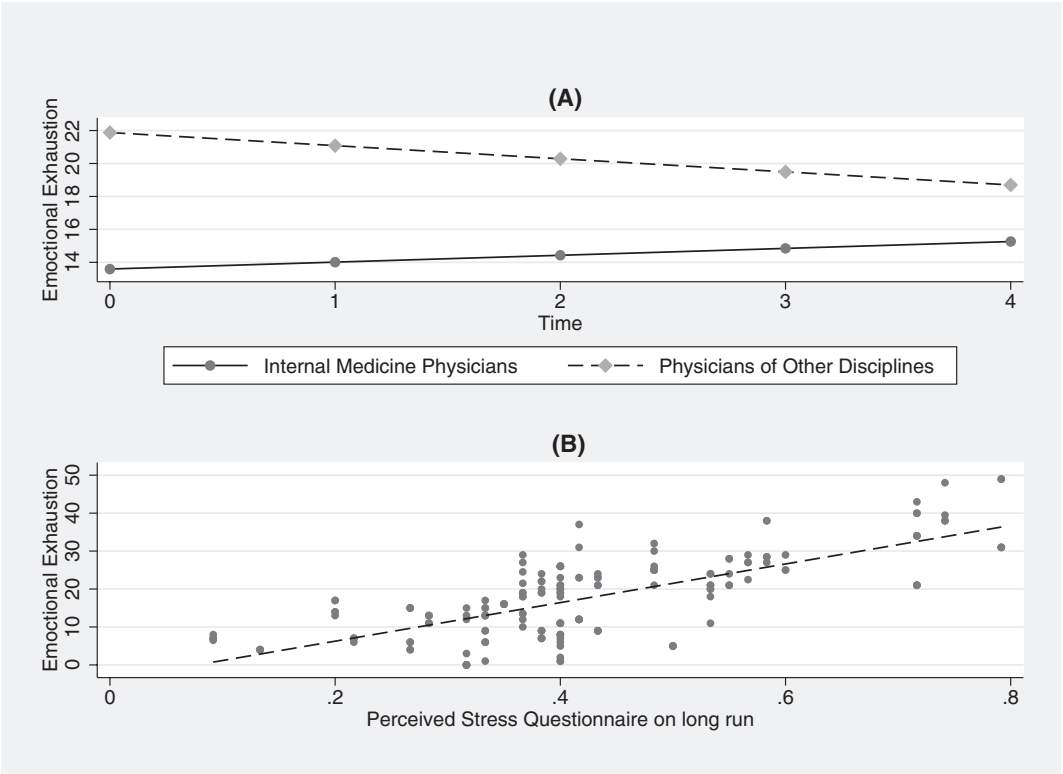

FIGURE 1 Linear Mixed Model of Maslach Burnout Inventory—Emotional Exhaustion (EE) scale. A, EE score over time by medical specialty (β, 8.28; 95% CI, 4.50 to 12; $P < .001$). Compared with physicians board-certified in internal medicine, physicians board-certified in other disciplines showed a significant reduction of EE score (β, −1.21; 95% CI, −2.36 to −0.06; $P = .04$). B, scatter plot and regression line indicating the correlation between EE score and PSQ on a long run score (β, 49.99; 95% CI, 37.89 to 62.08; $P < .001$)

physicians working in a single-site COVID team, identifying potential risk factors predisposing to this state of physical and mental exhaustion.

Many risk factors have been identified in the literature, whether personal (age, gender), familial (being married, having children, living alone) or occupational (position, specialty, constant changes in working conditions).[10]

The concern of being infected, the increase in working hours, the critical conditions of patients are some of the main causes leading to stress and burnout, which in turn may increase medical error.[11]

Occupational risk factors were considered in this study.

On MBI, in contrast to what was expected and reported in other studies,[12,13] a significant reduction in depersonalisation (DP score) was found over time. This effect could be related to the reduced perception of environmental stress displayed in our sample. Moreover, resident physicians scored higher on *Depersonalisation* scale than attending physicians. However, the latter showed a significant increasing score over time. Di Monte et al[14] have shown a correlation between age, years of work experience and depersonalisation; all factors related to clinical position. Occupational factors greatly affect the mental well-being of physicians and healthcare workers employed during the emergency of COVID-19.[15]For the PSQ scale, a significant reduction in perceived stress over time was also found, both on the overall PSQ scale and specifically in the level of perceived demands as measured by the Demands subscale. Stress and depersonalisation were also found to be correlated. Similar results are reported in the literature in particular in the study of Kelker et al,[16] which reported a significant reduction in personal safety concerns and symptoms of stress, anxiety and fear over 4 weeks. Hines et al[17] demonstrated a reduction in distress over time measured at baseline, 1- and 3-month time points, showing that the level of moral injuries was unchanged, a finding confirmed by another study in Canadian emergency physicians that found no significant differences in terms of emotional exhaustion and depersonalisation in the first weeks after the start of the pandemic.[18] The reduction in stress and depersonalisation over time could be because of the ability of staff to adapt to the new work environment and the improvement and improvement of guidelines for COVID departments over time.

In our study, MBI and PSQ-20 scores were better in attending physicians than resident physicians. Higher professional qualification could be a protective factor for burnout and stress. This result confirms what has been reported in the literature.[19,20] A systematic review by Pulcrano et al, conducted in the pre-COVID era, already showed a higher prevalence of burnout among residents than in attending physicians.[21]

It should also be noted that some studies do not report a significant difference between the prevalence of burnout in residents working in COVID wards and those working in normal wards,[22] and others despite reporting such a difference do not report a significant increase in the prevalence of burnout compared with data

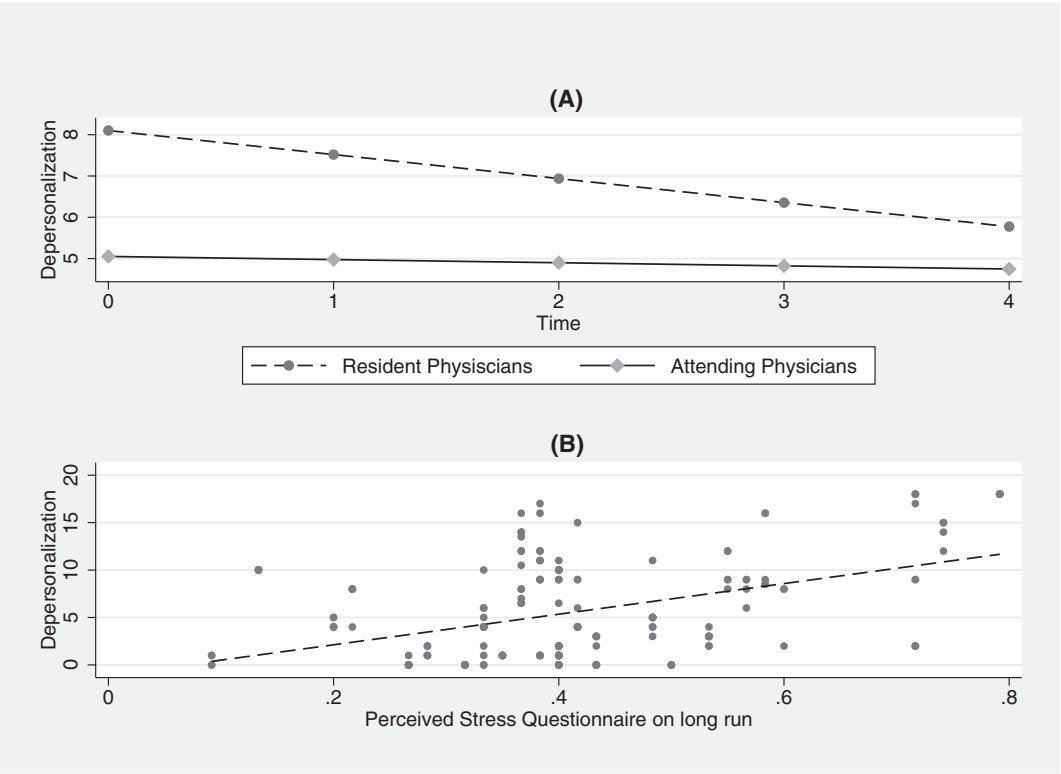

FIGURE 2 Linear Mixed Model of Maslach Burnout Inventory—Depersonalisation (DP) scale. A, DP score over time by clinical position (attending vs. resident). Attending physicians showed lower score on the DP scale over time than resident physicians (β, −3.05; 95% CI, −6.07 to −0.02; $P = .048$). The latter showed decreasing score on the DP scale over time than attending physicians (β, 0.505; 95% CI, 0.01 to 1.00; $P = .047$). B, scatter plot and regression line indicating the correlation between DP score and PSQ on a long run score (β, 14.91; 95% CI, 5.11 to 24.72; $P = .003$)

reported in the pre-COVID era.[23] This could be because of a rearrangement of work as working hours are reduced and remote work is employed.[23,24]

This observation may be related to a higher professional experience of attending physicians in patients' management, and the greater perception of own responsibility could be related to higher personal accomplishment. In particular, resident physicians seem to be at higher risk of burnout syndrome among doctors, and the risk of burnout is progressively reduced with career progression.[25] Also, the age of the physicians (older than resident physicians) could play a role in this risk reduction: previous investigations already documented an inverse relationship between the prevalence of burnout syndrome and the age of physicians.[26] The different job roles of residents, with more demanding call schedules, could also impact this difference, affecting work and family life, sleep, and possibly being associated with an increased risk of depression and burnout.[20,27,28] Some protective factors in addition to mentorship and support, having control over one's time and taking mental breaks.[29]

As reported in the literature,[21,30] medical specialty also plays an important role in influencing the risk of burnout syndrome. In this sample, physicians board-certified in internal medicine, compared with those board-certified in other disciplines, showed a reduced risk of developing emotional exhaustion during the entire course of the study. However, Macía-Rodríguez et al demonstrated how the prevalence of burnout increased in those working in contact with COVID patients compared with pre-pandemic years.[31] Cubitt et al identified a decline in mental health common to all medical specialties, however, less expressed in those who worked in acute care medicine.[32] Habit in managing complex situations may in fact mitigate the effect of the pandemic on physicians' mental health. Similarly, it is conceivable that the broader scope of work of the internists in our hospital that work in inpatient unit, rather than outpatient settings, and manage patients with more comorbidities (as the ones with coronavirus disease usually show), could make physicians board-certified in internal medicine less vulnerable to burnout and stress when managing this type of patient. In contrast, Torrente et al[33] did not identify significant differences between physicians with different specialties working in COVID departments.

Interestingly, study participants who reported no contact with patients who died of COVID-19, during their work on the COVID team, showed lower levels of positive feelings and were more at risk of developing burnout syndrome. On the other side, physicians who worked in the same departments and during the same time period reported having been in contact with patients who died from COVID-19. Denying the event may be an attempt to avoid traumatic memories that can trigger unpleasant emotions, and this can be interpreted as an acute response to stress.

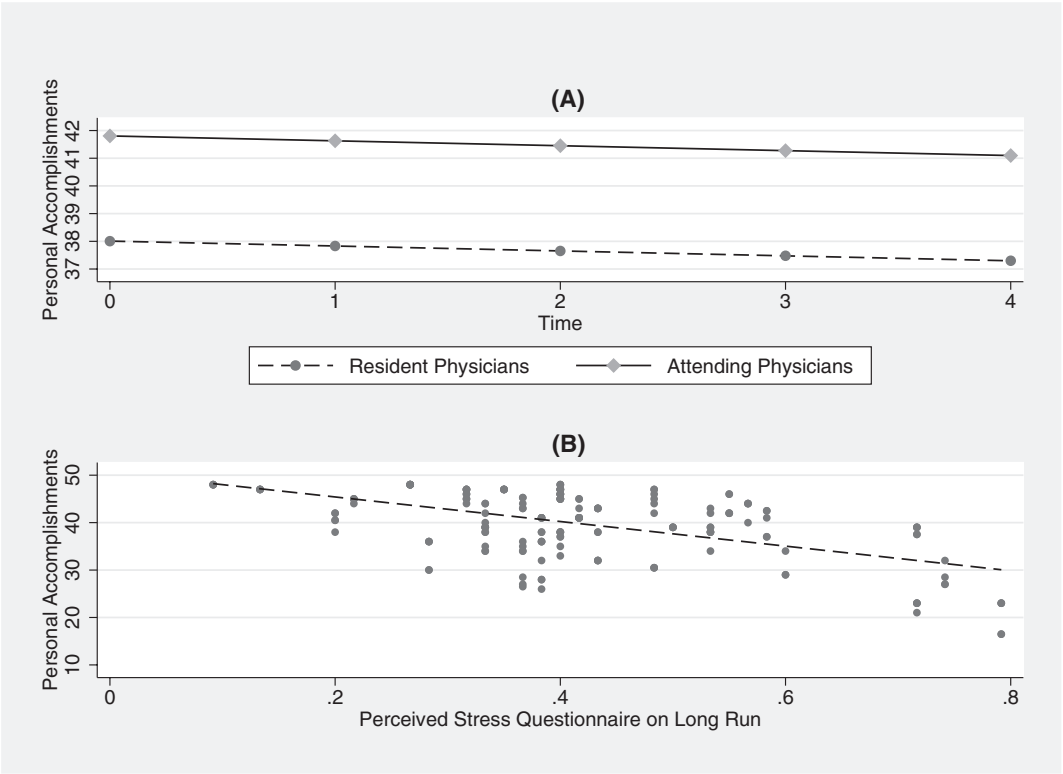

FIGURE 3 Linear Mixed Model of Maslach Burnout Inventory—Personal Accomplishment (PA) scale. A, PA score over time by clinical position (attending vs. resident) (β, 3.8; 95% CI, 0.14 to 7.45; $P = .04$). B, Scatter plot and regression line indicating correlation between PA score and PSQ on a long run score (β, −23.34; 95% CI, −35.37 to −11.31; $P < .001$)

Notably, the overall PSQ scale on long term predicted all the three scales of MBI in our sample. The close correlation of MBI and PSQI scale showed in the present study could justify a screening of physicians involved in emergencies similar to COVID. Moreover, the observed early increased score in MBI scales could help identify those physicians who are most likely to develop burnout syndrome and could benefit from individual support interventions.[34]

Although during a public health emergency like this unprecedented pandemic it is not easy to select the staff to be involved, it would be useful to enlist mainly those with a lower risk of developing burnout syndrome. Moreover, based on our data, it would be appropriate to start involving the most experienced physicians. Besides, monitoring physicians through MBI administration every two weeks could help establish a shift system to reduce the perception of environmental stress through even short periods of rest at home.

This study has some limitations: because of the different organisation of the teams of other health professionals (eg, nurses and social workers) involved in the COVID emergency in our hospital, it was not feasible to enrol them. The small sample and the fact that the survey was conducted in one hospital prevent generalisability of the findings. Moreover, missing data and failure to adhere to the timing of the follow up could contribute to a bias in the results, although this was a limitation impossible to control for, given the emergency conditions under which the study was conducted. Another limitation of this study is that no patient information was called, therefore we were not able to investigate whether patient's severity of the disease could have an impact on the outcomes assessed in the COVID team. Also, the short follow up may have overestimated the predictive ability of the PSQI on the risk of burnout.

In conclusion, assessing risk factors for stress and burnout syndrome in physicians involved in an emergency response such as COVID-19 could be useful in order to: (a) provide adequate psychological support to those who need it, (b) help physicians find a balance recognising what they can and cannot control[35] and (c) help them address their concerns, improve the individuals' stress response and, consequently, their professional performance. Such a supportive work environment can be critical in maintaining the resilience of clinicians, especially during a crisis such as COVID-19.[25] Institutions should also provide support to healthcare teams to help with their work organisation and internal dynamics, as well as provide individual support to healthcare professionals to improve the working environment and mental health of their employees.[36] It would also be desirable that health care organisations first provide information on reducing burnout and propose a screening of the physicians involved in the emergency teams, to identify those at higher risk of burnout early and set appropriate shift rotations.

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TABLE 4 Each perceived stress questionnaire on short run scale was individually tested with each independent variable with linear mixed model

	Coefficients	*P*	[95%	CI]
Overall				
Time	−0.0058436	.219	−0.0151513	0.0034642
Age	−0.0030716	.234	−0.0081335	0.0019903
Gender (referent women)	0.0315115	.494	−0.058753	0.1217761
C. Position (Referent Residents)	−0.0761806	.091	−0.1646045	0.0122433
Specialty (referent int. med.)	0.0435667	.343	−0.0465063	0.1336397
Rep. Dead Cov-19 P (Referent No)	−0.0897852	.055	−0.1815088	0.0019384
Worries				
Time	0.0017922	.767	−0.0100428	0.0136272
Age	−0.00342	.207	−0.0087364	0.0018965
Gender (referent women)	0.0293974	.544	−0.0655512	0.1243461
C. Position (Referent Residents)	−0.0708057	.138	−0.1644523	0.0228409
Specialty (referent int. med.)	0.0512316	.288	−0.0433463	0.1458095
Rep. Dead Cov-19 P (Referent No)	−0.0809443	.104	−0.1785173	0.0166288
Tension				
Time	−0.0026621	.577	−0.0120134	0.0066892
Age	−0.006273	.041	−0.0122888	−0.0002573
Gender (referent women)	−0.0047833	.933	−0.1159456	0.1063789
C. Position (Referent Residents)	−0.1374169	.010	−0.2415188	−0.033315
Specialty (referent int. med.)	0.0462255	.412	−0.0642736	0.1567246
Rep. Dead Cov-19 P (Referent No)	−0.0523349	.378	−0.1687736	0.0641037
Joy				
Time	0.0046999	.490	−0.0086513	0.0180512
Age	−0.0002399	.946	−0.0071928	0.0067131
Gender (referent women)	0.0120728	.848	−0.1110569	0.1352025
C. Position (Referent Residents)	0.0754639	.224	−0.0461794	0.1971071
Specialty (referent int. med.)	−0.0271482	.665	−0.1501981	0.0959017
Rep. Dead Cov-19 P (Referent No)	0.1767485	.003	0.0588353	0.2946618
Demands				
Time	−0.0239428	.001	−0.0385623	−0.0093232
Age	−0.0025001	.448	−0.0089561	0.0039559
Gender (referent women)	0.0567881	.329	−0.057211	0.1707872
C. Position (Referent Residents)	−0.0513401	.377	−0.165326	0.0626458
Specialty (referent int. med.)	0.0630626	.276	−0.0504838	0.176609
Rep. Dead Cov-19 P (Referent No)	0.0272097	.660	−0.0939563	0.1483756

Abbreviations: C. position, clinical position; CI, confidence interval; Int. Med., internal medicine physicians; PSQ/short, perceived stress questionnaire on short run; Rep. dead Cov-19 p, reporting dead COVID-19 patients; SE, standard error.

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CONFLICTS OF INTEREST

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DATA AVAILABILITY STATEMENT

Data available on request from the authors.

ORCID

Antonio Mirijello https://orcid.org/0000-0003-3932-3803
Giovanni Addolorato https://orcid.org/0000-0002-1522-9946

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