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Burn-out syndrome in Spanish internists during the COVID-19 outbreak and associated factors: a cross-sectional survey

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ABSTRACT

Objectives The objective of this study is to evaluate the impact of the COVID-19 outbreak on mental health and burn-out syndrome in Spanish internists and the factors that could be related to its appearance.

Design We performed an observational, cross-sectional, descriptive study for which we designed a survey that was distributed in May 2020.

Setting We included internists who worked in Spain during the COVID-19 outbreak.

Participants A total of 1015 internists responded to the survey. Of those 62.9% were women.

Results Of 1015 people, 58.3% presented with high emotional exhaustion, 61.5% had a high level of depersonalisation and 67.6% reported low personal fulfilment. 40.1% presented with the 3 criteria described, and therefore burn-out syndrome.

Burn-out syndrome was independently related to the management of patients with SARS-CoV-2 (HR: 2.26; 95% CI 1.15 to 4.45), the lack of availability of personal protective equipment (HR: 1.41; 95% CI 1.05 to 1.91), increased responsibility (HR: 2.13; 95% CI 1.51 to 3.01), not having received financial compensation for overtime work (HR: 0.43; 95% CI 0.31 to 0.62), not having rested after 24-hour shifts (HR: 1.61; 95% CI 1.09 to 2.38), not having had holidays in the previous 6 months (HR: 1.36; 95% CI 1.01 to 1.84), consumption of sleeping pills (HR: 1.83; 95% CI 1.28 to 2.63) and higher alcohol intake (HR: 1.95; 95% CI 1.39 to 2.73).

Conclusions During the COVID-19 outbreak, 40.1% of Internal Medicine physicians in Spain presented with burn-out syndrome, which was independently related to the assistance of patients with SARS-CoV-2, overworking without any compensation and the fear of being contagious to their relatives. Therefore, it is imperative to initiate programmes to prevent and treat burn-out in front-line physicians during the COVID-19 outbreak.

Strengths and limitations of this study

- We present the results of the largest study dealing with burn-out syndrome in Spanish internists due to the COVID-19 outbreak.
- The survey was specifically designed for this study, so it has not been previously used or validated.
- This study has been carried out through a voluntary online survey so it is possible that the most affected doctors were most interested in answering the survey questionnaire, which may constitute a bias.
- The survey was anonymous so we do not have data about the people who accessed the form but did not fill it in.

INTRODUCTION

The current pandemic caused by SARS-CoV-2, a new *Betacoronavirus* that appeared in December 2019 in Wuhan (China),[1] has been a stressful period that has put healthcare systems and their professionals under considerable pressure.[2] This illness can present with a range of symptoms, although fever and cough are the most common ones (mimicking SARS-CoV). The commonness of these symptoms, together with the different imaging patterns exhibited by the illness, complicates the diagnosis.[3] The first case in Spain was diagnosed on 21 February 2020,[4] with a subsequent exponential growth in the number of diagnoses that has affected more than 250 000 people in Spain by May 2020.[5]

Burn-out is a psychosocial syndrome that has a high prevalence[6 7] in health professionals all over the world. It occurs in response to stressful situations during the development of a work activity. The first description of burn-out syndrome was made in 1974 by Freudenberger[8] and, later, it has been extensively studied by Maslach.[9] Currently, it has become a very common problem in daily clinical practice. Depersonalisation, emotional exhaustion and a sense of reduced personal accomplishment are its main characteristics.[9] This syndrome is closely related to work overload, age, poor work environment, lack of leadership, inequity, negative feedback and

whether someone has received threats.[7 10 11] The most validated scale to quantify it is called the *Maslach Burnout Inventory*.[12] A recent publication in Spain has revealed that more than a third of Internal Medicine specialists suffer from burn-out syndrome.[10] Moreover, it has been shown that in several other countries more than an a half of the residents suffer from burn-out syndrome.[13]

A few studies have evaluated stress and burn-out syndrome in health workers during the COVID-19 outbreak, finding an increase in stress levels,[14–17] with the exception of a single Chinese analysis that found less burn-out syndrome prevalence in people who worked on the front line compared with people performing usual ward work during the pandemic in Wuhan.[18]

The objective of this study is to evaluate the impact of the COVID-19 outbreak on mental health and burn-out syndrome in Spanish internists and the factors that could be related to its appearance.

METHODS

For this study we designed a survey using the Google Forms application. The survey was specifically designed for this study by a group of Spanish internists with representation of all ages and work positions. The first part of the survey has not been previously used or validated. The second part of the survey corresponds to the Maslach Burnout Inventory, a questionnaire that has been validated to identify burn-out in health professionals.[12] The survey consisted of the following sections:

- Demographic variables: age, sex, marital status, and whether the person had children in their care or lived with older people.
- Work conditions: type of contract, type of hospital, type of work performed, compliance with established work hours, commute time to the workplace and means of transportation, vacations in the previous 6 months, rest after night shifts and 24-hour shifts, and 48 hours of rest per week. Additionally, it has been studied whether people had practised sports or other leisure activities during their free time.
- Change in work and lifestyle conditions due to the COVID-19 outbreak: assistance to patients with SARS-CoV-2 infection, confirmed personal SARS-CoV-2 infection, access to personal protective equipment (PPE), increased responsibility, increased working hours, financial compensation for overtime work, fear of infecting their families and change of place of residence to avoid it. Moreover, we studied the change in the pattern of tobacco or alcohol consumption, and the need for sleeping pills.
- Maslach Burnout Inventory: Human Services Survey for Medical Personnel in Spanish. It consists of 22 questions, 9 of which refer to emotional fatigue, 5 to depersonalisation and 8 to personal fulfilment. Burn-out syndrome was defined as high emotional exhaustion, a high level of depersonalisation and low level of personal accomplishment.[12]

Participants and public involvement

A group of participants, who represented all ages and work positions, were involved in the design of the first part of the survey.

Participants

The survey was distributed in May 2020 through the mailing list of the members of the Spanish Society of Internal Medicine (SEMI) and through SEMI's social networks (Facebook, Twitter and Instagram). We only included internists who worked in Spain during the COVID-19 outbreak. We excluded retired people, medical students and internists who worked in a country other than Spain.

The SEMI had 6331 members at the time of the survey. The sample size needed considering a prevalence of burn-out in Spanish internists of 30%,[10] a precision of the study of 3%, a confidence level of 95% and a missing rate of 15% is 924 responders. One thousand four hundred and ninety-seven internists accessed the form and 1015 of them filled it in. The distributions of sex and age of the people who replied are comparable to the distributions containing the data of all the members of SEMI. All the autonomous communities in Spain are represented in the data.

Statistical methods

A descriptive analysis was performed by calculating the rates of qualitative variables and the median and IQR for the continuous variables. In order to find the variables associated with burn-out, we performed a χ^2 test (or Fischer's exact test when n<5) for the qualitative variables and a Student's t-test for the quantitative variables. Following the principle of parsimony, we omitted redundant items in the questionnaire to perform multivariate analysis. We conducted two stepwise binary logistic regressions backwards. The first one included the changes in work and lifestyle conditions that could trigger burn-out. The second one included behaviours and thoughts that may be regarded as consequences of burn-out. We considered $p<0.05$ to be statistically significant. The analysis was performed using the SPSS V. 22.0 software package (SPSS, Chicago, Illinois, USA).

Ethics statement

The survey was anonymous, and all participants accepted the use of their responses for publication and scientific studies. We requested the explicit approval of the Gregorio Marañón Hospital's Ethics Committee. However, they answered that due to the characteristics of the study (anonymous voluntary survey, without confidentiality issues), it was ethical and no explicit approval was needed. They have sent a favourable report that is available as online supplemental file 1. The study followed the criteria of the Helsinki Declaration.

RESULTS

Demographic characteristics

A total of 1497 internists accessed the form and 1015 of them (250 residents, 702 Internal Medicine specialists, 60 heads of department and 2 Chief Medical Officer) filled in the survey, representing all the autonomous communities in Spain. Of those, 62.9% were women. The mean age was 39.9±11.1 years, 77.2% were married or had a stable partner, 47.1% had children and 9.6% lived with older dependent people. Table 1 shows the demographic characteristics and working conditions of the studied population. We do not have the data of the people who accessed the form but did not fill it in, due to the anonymity of the survey.

Change in work and lifestyle conditions due to the COVID-19 outbreak

Of the internists who answered, 92.2% treated patients infected with SARS-CoV-2, 73.2% experienced an increase in their usual responsibilities (only officially recognised in 11.5% of cases) and 81.3% underwent an increase in weekly working hours. Only 27.9% of the internists received financial compensation for overtime. Free time after 24-hour shifts was not respected in 13.9% of cases, and only 36.1% had gone on holidays in the previous 6 months.

Of those who filled the survey, 29.6% did not have access to PPE when they needed it, 86.8% were afraid of infecting their families because of their job, and 29.8% decided to change their usual place of residence to be separated from their families. Finally, 176 Internal Medicine physicians (17.4%) presented with SARS-CoV-2 infection confirmed by PCR test. Of these, 15 physicians required hospitalisation and only 1 required admission to an intensive care unit.

Of the participants 21.4% consumed more alcohol or started consuming alcohol during the pandemic, 7.9% smoked more tobacco or started smoking, 18.6% used sleeping pills on a regular basis.

Although 79.0% of the respondents would still choose Internal Medicine as a specialty, 39.1% have considered a change of specialty, 44.7% have considered working abroad and 60.0% have thought of leaving the medical profession.

Burn-out syndrome and related factors

Of those who responded (1015), 58.3% presented with high emotional exhaustion, 61.5% had a high level of depersonalisation and 67.6% reported low personal fulfilment. A total of 407 internists (40.1%) presented with the three previous criteria, and therefore burn-out syndrome. All Maslach Burnout Inventory results are shown in table 2.

Table 3 shows the distribution of the main items of the questionnaire and its distribution among physicians that had a burn-out syndrome according to the Maslach Burnout Inventory.

Table 1 Demographic characteristics and work conditions

	Number of responders (1015)	Number (%) or median (IQR)
Age	975	37 (31–47)
Sex	1015	
Female		638 (62.9)
Male		377 (37.1)
Civil status	1011	
Single		231 (22.9)
Married		446 (44.1)
Stable partner (not married)		334 (33.0)
Partner is healthcare worker	934	
No		525 (56.2)
Yes		409 (43.8)
Children	1009	
No		534 (52.9)
Yes		475 (47.1)
Living with elderly person	1012	
No		915 (90.4)
Yes		97 (9.6)
Being forced to separate from your family	1014	
No		712 (70.2)
Yes		302 (29.8)
Afraid of infecting their family	1005	
No		133 (13.2)
Yes		872 (86.8)
Current position	1014	
Resident doctor		250 (24.7)
Medical specialist		702 (69.2)
Service head		60 (5.9)
Medical director		2 (0.2)
Assisted patients with COVID-19	1010	
No		79 (7.8)
Yes		931 (92.2)
Infected with SARS-CoV-2	1009	
No		833 (52.6)
Yes		176 (17.4)
Need of admission in hospitalisation ward	342	
No		327 (95.6)
Yes		15 (4.4)
Need of admission in intensive care unit	237	
No		236 (99.6)
Yes		1 (0.4)
Access to PPE when needed	1003	

Continued

Table 1 Continued

	Number of responders (1015)	Number (%) or median (IQR)
No		295 (29.4)
Yes		708 (70.6)
Type of hospital	1014	
Public		892 (88.0)
Private		68 (6.7)
Both		54 (5.3)
Hospital size	1006	
Regional hospital		257 (25.5)
Secondary hospital		234 (23.3)
Tertiary hospital		510 (5.7)
Research centre/university		5 (0.5)
Commute time (from home to workplace)	1012	
Less than 1 hour from home		958 (94.3)
More than 1 hour from home		58 (5.7)
Means of transportation to work	1011	
On foot		232 (22.9)
By car		611 (60.4)
Bicycle		22 (2.2)
Motorcycle		13 (1.3)
Public transport		132 (13.1)
Working from home		1 (0.1)
More responsibility at work during pandemic	1011	
No		271 (26.8)
Yes		740 (73.2)
Recognition of increased responsibility	737	
No		652 (88.5)
Yes		85 (11.5)
Increase in weekly working hours during pandemic	1010	
No		189 (18.7)
Yes		821 (81.3)
Economic compensation for overtime	913	
No		658 (72.1)
Yes		255 (27.9)
Rest after 24-hour shifts	997	
No		139 (13.9)
Yes		858 (86.1)
Holidays in the last 6 months	1011	
No		646 (63.9)
Yes		365 (36.1)
Type of work contract	814	
Until the end of COVID-19 pandemic		25 (3.1)
Less than a month		13 (1.6)
1 month		22 (2.7)
3 months		27 (3.3)
6 months		42 (5.2)
More than 6 months		170 (20.9)
Permanent		515 (63.3)
Physical activity per week	1013	
Never or almost never		508 (50.1)
Once		128 (12.6)
Twice or thrice		267 (26.4)
Everyday		110 (10.9)
Leisure activity per week	1013	
Never or almost never		426 (42.1)
Once		193 (19.0)
Twice or thrice		240 (23.7)
Everyday		154 (15.2)
Need for sleeping pills	1011	
No		823 (81.4)
Yes		188 (18.6)
Use of antidepressant drugs	1010	
No		952 (94.3)
Yes		58 (5.7)
Change in smoking habits during pandemic	816	
Same		741 (90.8)
Less		11 (1.4)
More		46 (5.7)
Start smoking		18 (2.2)
Change in alcohol consumption during pandemic	979	
Same		662 (67.6)
Less		108 (11.0)
More		180 (18.4)
Start taking alcohol		29 (3.0)
Use of recreational drugs	1008	
No		993 (98.5)
Yes		15 (1.5)
Choosing internal medicine again	1008	
No		212 (21.0)
Yes		796 (79.0)

Table 1 Continued

	Number of responders (1015)	Number (%) or median (IQR)
Having thought of changing specialty	1011	
No		616 (60.9)
Yes		395 (39.1)
Having thought of working abroad	1008	
No		451 (44.7)
Yes		557 (55.3)
Having thought of abandoning medicine	1009	
No		404 (40.0)
Yes		605 (60.0)

PPE, personal protective equipment.

The demographic and work conditions regarded as trigger factors related to burn-out syndrome and its multivariate analysis are shown in table 4. Burn-out syndrome was independently related to the management of patients with SARS-CoV-2 (HR: 2.26; 95% CI 1.15 to 4.45), the lack of availability of PPE (HR: 1.41; 95% CI 1.05 to 1.91), increased responsibility (HR: 2.13; 95% CI 1.51 to 3.01), not having received financial compensation for overtime work (HR: 0.43; 95% CI 0.31 to 0.62), not having rested after shifts (HR: 1.61; 95% CI 1.09 to 2.38), not having had holidays in the previous 6 months (HR: 1.36; 95% CI 1.01 to 1.84) and having used public transport to commute (HR: 1.96; 95% CI 1.30 to 2.95).

Moreover, we present in table 5 the multivariate analysis of habits and thoughts that can be considered consequences of burn-out syndrome. Physicians with burn-out syndrome were independently associated with consumption of sleeping pills (HR: 1.83; 95% CI 1.28 to 2.63), higher alcohol intake (HR: 1.95; 95% CI 1.39 to 2.73), increased desire to change medical specialty (HR: 1.87; 95% CI 1.38 to 2.54) and a greater desire to quit the medical profession (HR: 1.87; 95% CI 1.38 to 2.56).

DISCUSSION

More than 90% of the Spanish internists treated patients with SARS-CoV-2, and most of them experienced changes in their work and personal life caused by the outbreak. Excessive work and fear of being contagious to their relatives increased stress and resulted in burn-out.

More than 90 000 people in Spain were hospitalised from February to May 2020 due to SARS-CoV-2 infection and more than 7000 had to be admitted to intensive care units.[4] Spanish hospitals were overcrowded, without enough beds or ventilators for all the patients who needed

Table 2 Results of the Maslach Questionnaire

	Number of responders (1015)	N (%)
Emotional exhaustion, score	1015	
Low (0–18)		232 (22.9)
Medium (19–26)		191 (18.8)
High (27–54)		592 (58.3)
Depersonalisation, score	1015	
Low (0–33)		185 (18.2)
Medium(6–9)		206 (23.2)
High (10–30)		624 (61.5)
Personal accomplishment, score	1015	
Low (0–33)		686 (67.6)
Medium (34–39)		235 (23.1)
High (40–56)		94 (9.3)
Burn-out syndrome	1015	
No		608 (59.9)
Yes		407 (40.1)
Burn-out syndrome in residents	250	
No		135 (54.0)
Yes		115 (46.0)
Burn-out syndrome in specialists	764	
No		472 (61.8)
Yes		292 (38.2)

Table 3 Distribution of different included characteristics in the survey according to burn-out

Variable	All (n=1015) Median IQR or number/total (%)	No burn-out (n=609) Median IQR or number/total (%)	Burn-out (n=406) Median IQR or number/total (%)	P value
Demographics				
Age (years)	*37 (31–47)*	*38 (31–48)*	*36 (30–44)*	*0.002*
Female	638/1015 (62.9%)	371/609 (60.9%)	266/406 (65.5%)	0.138
Stable partner (married or unmarried)	780/1011 (77.2%)	478/608 (78.6%)	302/403 (74.9%)	0.172
Partner is healthcare worker	525/934 (56.2%)	315/558 (56.5%)	209/376 (55.6%)	0.794
Children	*474/1009 (47%)*	*308/605 (50.9%)*	*166/404 (41.1%)*	*0.002*
Living with elderly person	97/1012 (9.6%)	51/607 (8.4%)	46/407 (11.4%)	0.118
Being forced to separate from your family	302/1014 (29.8%)	168/609 (27.6%)	134/406 (33.1%)	0.061
Afraid of infecting their family	*872/1005 (86.8%)*	*506/601 (84.2%)*	*366/404 (90.6%)*	*0.003*
Infected with SARS-CoV-2	176/1009 (17.4%)	103/605 (17%)	73/404 (18.1%)	0.668
Work conditions				
Resident doctor	*250/1014 (24.7%)*	*135/609 (22.2%)*	*115/406 (28.3%)*	*0.026*
Medical specialist	*702/1014 (69.2%)*	*426/609 (70%)*	*276/406 (68%)*	*0.026*
Service head	*60/1014 (5.9%)*	*46/609 (7.6%)*	*14/406 (3.5%)*	*0.026*
Medical director	*2/1014 (0.2%)*	*1/609 (0.2%)*	*1/406 (0.2%)*	*0.026*
Regional hospital	257/1006 (25.5%)	149/609 (24.5%)	108/406 (26.6%)	0.228
Secondary hospital	234/1006 (23.3%)	145/609 (23.8%)	88/406 (21.7%)	0.228
Tertiary hospital	510/1006 (50.3%)	303/609 (49.8%)	208/406 (51.2%)	0.228
Research centre/medical school	5/1006 (0.5%)	4/609 (0.7%)	1/406 (0.2%)	0.228
Time to work >1 hour	*58/1012 (5.7%)*	*25/607 (4.1%)*	*33/405 (8.1%)*	*0.007*
On foot to work	*232/1011 (22.9%)*	*146/609 (24%)*	*85/406 (20.9%)*	*0.009*
By car to work	*611/1011 (60.4%)*	*367/609 (60.3%)*	*244/406 (60.1%)*	*0.009*
Public transport to work	*132/1011 (13.1%)*	*66/609 (10.8%)*	*67/406 (16.5%)*	*0.009*
Bicycle to work	*22/1011 (2.2%)*	*13/609 (2.1%)*	*9/406 (2.2%)*	*0.009*
Motorcycle to work	*13/1011 (1.3%)*	*13/609 (2.1%)*	*0/406 (0%)*	*0.009*
Assisted patients with COVID-19	*931/1010 (92.2%)*	*544/606 (89.8%)*	*387/404 (95.8%)*	*<0.001*
More responsibility at work during pandemic	*740/1011 (73.2%)*	*406/607 (66.9%)*	*334/404 (82.7%)*	*<0.001*
Recognition of increased responsibility	*85/737 (11.5%)*	*63/408 (15.4%)*	*22/329 (6.7%)*	*<0.001*
Number of patients per day	10 (8–12)	10 (8–12)	10 (8–12)	0.345
No access to PPE when needed	*295/1003 (29.4%)*	*151/601 (25.1%)*	*144/258 (35.8%)*	*<0.001*
Increase in weekly working hours work	*821/1010 (81.3%)*	*475/604 (78.6%)*	*346/406 (85.2%)*	*0.009*
Guard hours per week	*32 (15–52)*	*30 (14–50)*	*40 (16.5–56)*	*0.009*
Economical compensation for overtime	*257/913 (28.1%)*	*188/538 (34.9%)*	*69/375 (18.4%)*	*<0.001*
No rest after 24-hour shift	*139/997 (13.9%)*	*65/594 (10.9%)*	*74/403 (18.4%)*	*0.001*
Not having 48 hours per week to rest	*582/1003 (58%)*	*318/599 (53.1%)*	*264/404 (65.3%)*	*<0.001*
Free days in the last month	*6 (4–7)*	*6 (4–7)*	*5 (3–6)*	*<0.001*
No holiday in the last 6 months	*646/1011 (63.9%)*	*369/606 (60.9%)*	*276/405 (68.1%)*	*0.019*
Stable contract	*514/1015 (50.6%)*	*328/609 (53.9%)*	*186/406 (45.8%)*	*0.012*
Habits and thoughts				
Physical or any leisure activity twice a week	*559/1015 (55.1%)*	*356/609 (58.5%)*	*203/406 (50%)*	*0.008*
More tobacco (increased consumption or started to consume)	64/1015 (6.3%)	31/609 (5.1%)	33/406 (8.1%)	0.051
More alcohol (increased consumption or started to consume)	*209/1015 (20.6%)*	*96/609 (15.8%)*	*113/406 (27.8%)*	*<0.001*

Continued

Table 3 Continued

Variable	All (n=1015) Median IQR or number/total (%)	No burn-out (n=609) Median IQR or number/total (%)	Burn-out (n=406) Median IQR or number/total (%)	P value
Use of recreational drugs	15/1015 (1.5%)	9/606 (1.5%)	6/402 (1.5%)	0.649
Need for sleeping pills	*188/1011 (18.6%)*	*83/605 (13.7%)*	*105/405 (25.9%)*	*<0.001*
Use of antidepressant drugs	58/1010 (5.7%)	32/606 (5.3%)	26/404 (6.4%)	0.440
Would not choose internal medicine again	*212/1008 (21%)*	*80/603 (13.3%)*	*132/404 (32.7%)*	*<0.001*
Having thought of changing specialty	*395/1011 (39.1%)*	*172/607 (28.3%)*	*223/404 (55.2%)*	*<0.001*
Having thought of working abroad	*555/1008 (55.1%)*	*299/606 (49.3%)*	*256/402 (63.7%)*	*<0.001*
Having thought of abandoning medicine	*604/1009 (59.9%)*	*302/606 (49.8%)*	*302/403 (74.9%)*	*<0.001*

All variables in italics are significantly (p<0.05) related to burn-out syndrome.
PPE, personal protective equipment.

them. Health workers had to work longer shifts and their responsibility increased. This was especially important in Internal Medicine, the specialty that generally treats infectious diseases in Spain.

This situation caused increased stress and ethical dilemmas when deciding which patients were candidates for intensive care units. Additionally, physicians faced an unknown new infectious disease without enough personal protective material. In fact, 29.6% of the respondents did not have access to PPE when they needed it. In our survey, 17.4% of the respondents presented with SARS-CoV-2 infection confirmed by PCR analysis, and 15 cases reported severe disease.

All these factors increased the number of Internal Medicine physicians who presented with burn-out syndrome. One year ago, the prevalence in Spain was 33.4%,[10] and in the actual survey the prevalence is 40.1%.

Other previous studies[14–17] also showed increased stress during the COVID-19 outbreak. Only a single Chinese study[18] showed that burn-out syndrome prevalence was lower in professionals who worked on the first line. They discussed that this was possibly related to the fact that these professionals had more knowledge about the disease, more sense of control of the situation and more social recognition. In our study we have found the opposite results. This is probably due to shortage of PPE and low level of social recognition in Spain. In fact, the factors related to burn-out syndrome were those related to fear of contagion (managing patients with SARS-CoV-2, not having access to PPE and using public transport to commute) and those related to overworking without sufficient recognition (increased responsibility, not resting after shifts and not having financial compensation for overtime work).

Moreover, the pandemic hit Europe right after the influenza season, when health workers were already tired and stressed from the overwork of the winter season. In fact, not having had any holidays in the previous 6 months was related to higher burn-out scores.

As previous studies have found,[7 19 20] burn-out had important consequences on the health of professionals, such as anxiety, depression, substance abuse or development of psychosomatic symptoms. In fact, we also found that burn-out was related to increased consumption of alcohol and sleeping drugs.

Moreover, doctors who had high levels of burn-out were less satisfied with their job and, similarly to previous studies,[10 11] we found that they would be more willing to change their medical specialty or abandon the medical profession. Furthermore, there are studies that have found a reduction in the productivity and efficiency of medical care and an increase in medical errors.[21 22]

Therefore, it is important to initiate programmes to prevent and treat burn-out in front-line physicians during the COVID-19 outbreak.[23–25] In general, two different types of stress reduction measures have been previously studied: those that focus on work organisation and those that focus on the individual. The first group includes measures such as reducing the number of shift hours, increasing professional recognition, rotation between different kinds of work and the implementation of equity policies.[22 26 27] The second includes measures such as promotion techniques to handle stressful situations, meditation techniques, communication skills and cognitive–behavioral therapy.[11 28–30]

The main limitation of our study is that it was carried out through a voluntary online survey. It is possible that the most affected doctors were the most interested in answering the survey and, therefore, the prevalence of burn-out could have been overestimated. However, since our results were similar to those of previous studies,[7 29] the high number of responders may have mitigated this effect. In addition, according to the design of the study, cause-effect relation of the variables can only be suggested and not categorically established. Moreover, the survey was distributed through SEMI's social networks and the mailing list of the members of SEMI. The fact that this survey has been carried online and on a voluntary basis could have led to a higher number of answers by young people; nevertheless the distribution of ages of the sample was similar to the distribution of all the internists of the society.

Table 4 Associated trigger factors for burn-out (demographics, work conditions)

Variable	Univariate HR (CI 95%)	P value	Multivariate initial model HR (CI 95%)	P value	Multivariate final model HR (CI 95%)	P value
Age	0.98 (0.97 to 0.99)	<0.001	0.98 (0.96 to 1.01)	0.173		
Children	0.67 (0.52 to 0.87)	0.002	0.78 (0.452 to 1.17)	0.233		
Being forced to separate from family	1.30 (0.98 to 1.71)	0.061	1.21 (0.88 to 1.67)	0.232		
Resident doctor	1.39 (1.04 to 1.85)	0.026	0.84 (0.53 to 1.32)	0.455		
Assisted patients with COVID-19	2.59 (1.49 to 4.50)	0.001	1.61 (0.78 to 3.32)	0.190	2.26 (1.15 to 4.45)	0.017
No access to PPE when needed	1.66 (1.26 to 2.19)	<0.001	1.33 (0.97 to 1.83)	0.075	1.41 (1.05 to 1.91)	0.024
Time to work >1 hour	2.06 (1.21 to 3.53)	0.008	1.75 (0.94 to 3.27)	0.075		
Public transport to work	1.62 (1.12 to 2.34)	0.009	1.81 (1.18 to 2.79)	0.007	1.96 (1.30 to 2.95)	0.001
More responsibility at work during pandemic	2.36 (1.73 to 3.21)	<0.001	1.91 (1.32 to 2.78)	0.001	2.13 (1.51 to 3.01)	<0.001
Increase in weekly working hours work	1.56 (1.12 to 2.19)	0.009	1.38 (0.90 to 2.12)	0.136		
Economic compensation for overtime	0.42 (0.30 to 0.57)	<0.001	0.42 (0.29 to 0.59)	<0.001	0.43 (0.31 to 0.62)	<0.001
No rest after 24-hour shifts	1.83 (1.27 to 2.63)	0.001	1.33 (0.87 to 2.02)	0.180	1.61 (1.09 to 2.38)	0.016
Not having 48 hours a week to rest	1.66 (1.28 to 2.16)	<0.001	1.21 (0.88 to 1.65)	0.235		
No holidays in the last 6 months	1.37 (1.05 to 1.79)	0.019	1.36 (0.99 to 1.86)	0.055	1.36 (1.01 to 1.84)	0.039
Physical or any leisure activity twice a week	0.71 (0.55 to 0.91)	0.008	0.81 (0.60 to 1.09)	0.176		
Stable contract	0.72 (0.56 to 0.93)	0.012	1.19 (0.78 to 1.81)	0.406		

PPE, personal protective equipment.

Table 5 Habits and career decisions associated with burn-out

Variable	Univariate HR (CI 95%)	P value	Multivariate initial model* HR (CI 95%)	P value	Multivariate final model* HR (CI 95%)	P value
Need for sleeping pills	2.20 (1.60 to 3.03)	<0.001	1.86 (1.30 to 2.67)	0.001	1.83 (1.28 to 2.63)	0.001
Would not choose internal medicine again	3.17 (2.32 to 4.34)	<0.001	2.01 (1.45 to 3.01)	<0.001	2.10 (1.46 to 3.03)	<0.001
Having thought of changing specialty	3.12 (2.39 to 4.05)	<0.001	1.82 (1.34 to 2.47)	0.001	1.87 (1.38 to 2.54)	<0.001
Having thought of working abroad	1.80 (1.39 to 2.33)	<0.001	1.21 (0.90 to 1.63)	0.201		
Having thought of abandoning medicine	3.01 (2.28 to 3.96)	<0.001	1.83 (1.34 to 2.51)	<0.001	1.87 (1.38 to 2.56)	<0.001
More tobacco (increased consumption or started to consume)	1.65 (0.99 to 2.74)	0.053	1.19 (0.67 to 2.09)	0.545		
More alcohol (increased consumption or started to consume)	2.06 (1.51 to 2.80)	<0.001	1.90 (1.35 to 2.68)	<0.001	1.95 (1.39 to 2.73)	<0.001

*Adjusted by age and gender.

In conclusion, during the COVID-19 outbreak more than 40% of Internal Medicine physicians in Spain presented with burn-out syndrome. The development of burn-out syndrome was independently related to the assistance of patients with SARS-CoV-2, the lack of PPE, greater responsibility during the outbreak, the absence of financial compensation despite working overtime, the absence of rest after 24-hour shifts, not having had holidays in the previous 6 months and the use of public transport to commute.

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