



# The Brazilian Journal of INFECTIOUS DISEASES

[www.elsevier.com/locate/bjid](http://www.elsevier.com/locate/bjid)



## Original Article

# Anxiety, health-related quality of life, and symptoms of burnout in frontline physicians during the COVID-19 pandemic



Ricardo Ávila Chalhub <sup>a,1</sup>, Marta Silva Menezes <sup>a,1</sup>,  
Carolina Villa Nova Aguiar <sup>a</sup>, Larissa Souza Santos-Lins <sup>b</sup>,  
Eduardo Martins Netto <sup>b</sup>, Carlos Brites <sup>b</sup>, Liliane Lins-Kusterer <sup>a,b,\*</sup>

<sup>a</sup> Bahiana School of Medicine and Public Health, Salvador, BA, Brazil

<sup>b</sup> Federal University of Bahia, Faculty of Medicine, Salvador, BA, Brazil

### ARTICLE INFO

#### Article history:

Received 7 May 2021

Accepted 12 August 2021

Available online 30 August 2021

#### Keywords:

COVID-19

Physicians

Health-related quality of life

Anxiety

Professional burnout

### ABSTRACT

**Background:** COVID-19 pandemic caused increased workload and stress for health professionals involved in the care of such patients. We aimed to describe the health-related quality of life, and burnout in frontline physicians diagnosed with anxiety during the COVID-19 pandemic.

**Methods:** This was a cross-sectional study conducted during the first-wave phase of COVID-19, from September to October 2020. Questionnaires were sent electronically to 450 physicians from State of Bahia, assessing symptoms of anxiety, health-related quality of life (HRQOL) and burnout syndrome. For the categorical variables, the Pearson's chi-square test was used and difference between means was compared using the Mann-Whitney test. Groups with and without anxiety symptoms were compared using prevalence ratios (PR). Pearson's correlation measured the correlation between WHOQOL-BREF and MBI (Maslach Burnout Inventory) domains. The Fisher r-to-z transformation was used to assess the significance of the difference between two correlation coefficients. The significance level was <0.05.

**Results:** Out of the 450 physicians, 223 (49,6%) completely answered the questionnaire and 38 (17%) showed symptoms of anxiety. Physicians with anxiety had higher scores in emotional exhaustion (EE) ( $38.31 \pm 8.59$  vs  $25.31 \pm 0.87$ ;  $p = 0.0001$ ) and depersonalization (DP) ( $9.0 \pm 5.6$  vs  $5.9 \pm 5.3$ ;  $p = 0.001$ ) domains, and lower scores in personal accomplishment (PA) ( $32.1 \pm 8.2$  vs  $36.3 \pm 7.6$ ;  $p = 0.004$ ), than those without anxiety. All correlations between WHOQOL-BREF domains and MBI in physicians without anxiety were significant ( $p = 0.01$ ).

**Conclusion:** Physicians with anxiety showed more emotional exhaustion, less personal accomplishment, and lower quality of life. All domains of WHOQOL BREF were correlated with all MBI domains among physicians without anxiety. Differences in correlation according to anxiety were remarkable in psychological HOQOL BREF domain and emotional

\* Corresponding author at: Faculty of Medicine, Federal University of Bahia, Avenida Reitor Miguel Calmon s/n, CEP 40110-100, Salvador, Bahia, Brazil.

E-mail address: [lkusterer@gmail.com](mailto:lkusterer@gmail.com) (L. Lins-Kusterer).

<sup>1</sup> These authors have equally contributed for this work.

<https://doi.org/10.1016/j.bjid.2021.101618>

1413-8670/© 2021 Sociedade Brasileira de Infectologia. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

exhaustion and depersonalization MBI domains. The effect of anxiety leading to poorer levels of perceived health needs to be further investigated.

© 2021 Sociedade Brasileira de Infectologia. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

## Introduction

COVID-19 pandemic affected health professionals in many ways. The stress of the pandemic has physical and psychological health consequences, in addition to economic crisis and high unemployment rate.<sup>1,2</sup> Different countries have faced the pandemic in different ways, and emotional consequences are under intense evaluation to assess its impact on quality of life.<sup>3</sup>

Although the main focus of frontline healthcare workers (HCW) is on minimizing transmission and treating COVID-19 patients, the pandemic impact on mental health and its consequences cannot be underestimated.<sup>4</sup> Healthcare workers are facing increased mental health problems, such as insomnia, anxiety, depression,<sup>5,6</sup> burnout syndrome (BS),<sup>7</sup> and poor health-related quality of life (HRQOL).<sup>3</sup> In Italy, frontline HCW presented with many symptoms of work-related psychological stress and burnout during the peak of the COVID-19 pandemic. Many of these professionals may be at risk of post-traumatic stress disorders.<sup>7</sup>

Some aspects, including fear of infecting relatives, long and direct care for COVID-19 patients, and sleep disorders may contribute to the risk of developing psychological symptoms.<sup>6,8</sup> Yet, there are few studies linking anxiety to HRQOL and BS exclusively among physicians.<sup>4</sup> Therefore, this study aimed to describe HRQOL and burnout syndrome in frontline physicians with anxiety during the COVID-19 pandemic.

## Material and methods

This cross-sectional study was conducted from September through October 2020, during the first-wave phase of COVID-19. Questionnaires were sent electronically to 450 physicians from all COVID-19 referral institutions in the State of Bahia, Brazil using an Internet-based survey site (<https://pt.surveymonkey.com/>). Of these, 251 physicians answered the questionnaire. Before assessing the questionnaire, participants signed an informed consent form and agreed to participate in the survey. Twenty-eight questionnaires with more than 20% of missing data were discarded. The final sample included 223 physicians, representing 49.6% of physicians in the frontline in the study period. Sociodemographic data (sex, income, marital status, religion, and years of experience), COVID-19 related aspects, quality of life<sup>9</sup> (WHOQOL BREF), burnout<sup>10</sup> (Maslach Burnout Inventory, MBI) and anxiety<sup>11</sup> (Beck Anxiety Inventory, BAI) were assessed. The research was approved by the National Ethics Review Committee of the National Council of Health, Brazilian Ministry of Health, protocol number (4.008.150).

## Beck Anxiety Inventory (BAI)

Anxiety was measured using the BAI. In short, this is a 21-item self-reported questionnaire, which aims to distinguish symptoms of anxiety from symptoms of depression. The items were rated on a Likert-type scale, ranging from 0-3. The recommended clinical classification is described as follows: 0–7 (minimal anxiety), 8–15 (mild anxiety), 16–25 (moderate anxiety), and 26–63 (severe anxiety). The BAI cutoff for clinical symptoms of anxiety is 16, suggested by the instrument developers.<sup>11</sup> In this paper physicians with  $\geq 16$  points were classified as With Anxiety Group.

## World Health Organization Quality of Life - BREF

The Health-related quality of life (HRQOL) was assessed using the WHOQOL BREF,<sup>12</sup> a 26-item questionnaire covering four domains: Physical Health, Psychological Health, Social Relationships, and Environment. The responses were classified with a Likert-type scale, ranging from 1-5. The domain scores were calculated using the mean score in each domain. Higher scores represented a better HRQOL. To be comparable with WHOQOL-100, mean scores domains were multiplied by 4.<sup>9</sup> The WHOQOL BREF mean scores of physicians were compared with the mean scores of healthy individuals in a previous study conducted in Brazil<sup>13</sup> (Physical Health,  $16.6 \pm 2.1$  (mean  $\pm$  DP); Psychological,  $15.6 \pm 2.1$ ; Social relationships,  $15.5 \pm 2.6$ , and Environment,  $14.0 \pm 2.1$ ).

## Maslach Burnout Inventory (MBI)

The Maslach Burnout Inventory (MBI) was used to assess the three aspects of Burnout Syndrome (BS): emotional exhaustion (EE), depersonalization (DP) and personal accomplishment (PA). The scale has 22 items rated on Likert-type scale, ranging from 0-6. Experienced burnout is defined by higher scores of EE and DP; and a lower score of PA.<sup>10</sup> Scores were categorized as follow: for EE: High ( $\geq 30$ ) Moderate (18-29) Low ( $\leq 17$ ); for DP: High ( $\geq 12$ ) Moderate (6-11) Low ( $\leq 5$ ); and for PA High ( $\leq 33$ ) Moderate (34-39) Low ( $\geq 40$ ).<sup>14</sup>

## Statistical analysis

Data analysis was performed using a statistical package for social sciences (SPSS) version 18. Internal reliability of each subscale was calculated using the Cronbach's alpha coefficient.<sup>15</sup> Values from 0.60 to 0.70 were considered as satisfactory and those  $> 0.70$  were considered ideal.<sup>16</sup> The dependent variable (outcome) was anxiety, and the independent variables were HRQOL and BS. For the categorical variables, the Pearson's chi-square test was used, and the Mann-Whitney test to compare difference between means. Prevalence ratio

(PR) was used to compare groups with and without symptoms of anxiety. Pearson's correlation measured the correlation between WHOQOL-BREF and MBI domains. These results were interpreted based on Cohen's classification.<sup>17</sup> Coefficients higher than 0.50 indicate strong, between 0.30 and 0.49 moderate, and below 0.29, weak correlation. We used the Fisher r-to-z transformation to assess significance of the difference between two correlation coefficients.<sup>18</sup> The significance level was <0.05.

## Results

In this sample, the clinical prevalence of anxiety ( $BAI \geq 16$ ) in frontline physicians was 17.0% (Table 1). Anxiety was over two-fold more prevalent in female physicians than in males ( $PR=2.2$ ;  $p = 0.007$ ). Marital status, religion, and/or having less than two years work experience were not associated with anxiety (Table 2).

Among physicians in the anxiety group, alcohol ingestion was 87% higher ( $PR=1.87$ ;  $p = 0.030$ ) and use stimulants was over three-fold more prevalent than in physicians without

anxiety ( $PR=3.33$ ;  $p = 0.002$ ). Those with anxiety were more likely to avoid close contact with patients suspected of COVID-19 ( $PR=1.93$ ;  $p = 0.029$ ) (Table 3).

All physicians on the frontline against COVID-19 experienced at least moderate symptoms of Burnout Syndrome (Table 4). Physicians in the anxiety group showed higher scores in emotional exhaustion (EE) ( $p = 0.0001$ ) and depersonalization (DP) ( $p = 0.001$ ) domains, in addition to lower scores in personal accomplishment (PA) ( $p = 0.004$ ), than the group without anxiety.

All HRQOL scores in the anxiety group were lower than those without anxiety ( $p < 0.01$ ). (Table 5). Scores of WHOQOL-BREF were significantly correlated with all domains of MBI in physicians without anxiety ( $p = 0.001$ ). A significantly positive correlation was detected between all domains of WHOQOL-BREF and PA MBI domain in physicians with anxiety, ranging from 0.38 to 0.42 (Table 6). The Fisher r-to-z test showed differences according to anxiety in correlations between EE and Psychological Domain ( $z = 1.92$ ,  $p = 0.03$ ) and between DP and Psychological Domain ( $z = 1.76$ ,  $p = 0.04$ ).

## Discussion

To the best of our knowledge this is the first study that investigated the impact of anxiety on health-related quality of life and symptoms of burnout in frontline physicians in Bahia during the COVID-19 pandemic. The response rate of the present study was similar to the 54% mean of other published studies in the literature that conducted email survey with medical professionals.<sup>19</sup> Even though the prevalence of anxiety in our sample was 17.0%, both groups experienced moderate levels of BS symptoms. Prior to the COVID-19 pandemic, a study involving intensive care physicians in Brazil showed a high prevalence of BS symptoms in EE domain, and a low prevalence in other domains of MBI.<sup>20</sup> However, that

**Table 1 – Beck Anxiety Inventory frequency according to clinical classification in 223 physicians in the frontline against COVID-19, Bahia, Brazil, 2020.**

Beck anxiety inventory (BAI)	N	%
Minimal anxiety (0-7)	123	55.2
Mild anxiety (8-15)	62	27.8
Moderate anxiety (16-25) <sup>a</sup>	30	13.5
Severe anxiety (26-63)	8	3.6
Total	223	100.0

<sup>a</sup> The cutoff for clinical symptoms of anxiety is  $\geq 16$  12.

**Table 2 – Sociodemographic characteristics of 223 physicians in the frontline against COVID-19, according to diagnosis of anxiety, Bahia, Brazil, 2020.**

Socio-demographic and occupational characteristics	N = 223	With anxiety N = 38	Without anxiety N = 185	PR	p-value <sup>a</sup>
<b>Sex – N (%)</b>					0.007
Male	120 (53.8)	13 (10.8)	107 (89.2)	1	
Female	103 (46.2)	25 (24.3)	78 (75.7)	2.24	
<b>Marital Status – N (%)</b>					0.068
In a relationship with someone	118 (52.9)	15 (12.7)	103 (87.3)	1	
Single (presently without partner)	105 (47.1)	23 (21.9)	82 (78.1)	1.72	
<b>Religion – N (%)</b>					0.211
Non-religious	46 (20.6)	5 (10.9)	41 (89.1)	1	
Religious	177 (79.4)	33 (18.6)	144 (81.4)	1.71	
<b>Income (in Brazilian Real)<sup>b</sup> – N (%)</b>					0.061
<10,000	36 (16.1)	26 (72.2)	10 (27.8)	1	
$\geq 10,000$	187 (83.9)	159 (85)	28 (15)	1.18	
<b>Work experience – N (%)</b>					0.078
>10 years	117 (52.5)	15 (12.9)	102 (87.1)	1	
<10 years	106 (47.5)	23 (21.7)	83 (78.3)	1.70	

PR, prevalence ratio.

<sup>a</sup> Chi-square test (2-tail).

<sup>b</sup> 1USD=5.46BR.

**Table 3 – COVID-19 pandemic related aspects of 223 physicians in the frontline against COVID-19, according to diagnosis of anxiety, Bahia, Brazil, 2020.**

Pandemic COVID-19- related aspects	N = 223	With anxiety N = 38	Without anxiety N = 185	PR	p-value
COVID-19 pandemic demands much more work from you? - N (%)					
Never/Very rarely/Rarely	28 (12.6)	3 (10.7)	25 (89.3)	1	
Frequently/Very frequently	195 (87.4)	35 (17.9)	160 (82.1)	1.67	0.511 <sup>a</sup>
Have accomplished all job tasks? - N (%)					
Never/Very rarely/Rarely	6 (2.7)	1 (16.7)	5 (83.3)	1	
Frequently/Very frequently	217 (97.3)	37 (17.1)	180 (82.9)	1.02	0.999 <sup>a</sup>
Feel safe when using Personal Protective Equipment in your job? - N (%)					
Never/Very rarely/Rarely	48 (21.5)	11 (22.9)	37 (77.1)	1.48	
Frequently/Very frequently	175 (78.5)	27 (15.4)	148 (84.6)	1	0.222 <sup>b</sup>
Have you increased your alcohol ingestion? - N (%)					
Never/Very rarely/Rarely	140 (62.8)	18 (12.9)	122 (87.1)	1	
Frequently/Very frequently	83 (37.2)	20 (24.1)	63 (75.9)	1.87	0.030 <sup>b</sup>
Are you using stimulants because of COVID-19 pandemic? - N (%)					
Never/Very rarely/Rarely	204 (91.5)	29 (14.2)	175 (85.8)	1	
Frequently/Very frequently	19 (8.5)	9 (47.4)	10 (52.6)	3.33	0.002 <sup>a</sup>
Avoid attending patients suspected of COVID-19 - N (%)					
Never/Very rarely/Rarely	118 (52.9)	14 (11.9)	104 (88.1)	1	
Frequently/Very frequently	105 (47.1)	24 (22.9)	81 (77.1)	1.93	0.029 <sup>b</sup>
Psychological support from co-workers - N (%)					
Never/Very rarely/Rarely	21 (9.4)	5 (23.8)	16 (76.2)	1.45	
Frequently/Very frequently	202(90.6)	33 (16.3)	169 (83.7)	1	0.549 <sup>a</sup>
Feel able to manage COVID-19 cases - N (%)					
Never/Very rarely/Rarely	17 (7.6)	3 (17.6)	14 (82.4)	1.03	
Frequently/Very frequently	206 (92.4)	35 (17.0)	171 (83.0)	1	0.999 <sup>a</sup>
Decrease in quality of social relationships - N (%)					
Never/Very rarely/Rarely	47 (21.1)	4 (8.5)	43 (91.5)	1	
Frequently/Very frequently	176 (78.9)	34 (19.3)	142 (80.7)	2.27	0.080 <sup>b</sup>

PR, prevalence ratio.  
<sup>a</sup> Fisher's test (2-tail).  
<sup>b</sup> Chi-square test (2-tail).

**Table 4 – Burnout Syndrome symptoms (MBI) scores of 223 physicians in the frontline against COVID-19, according to diagnosis of anxiety, Bahia, Brazil, 2020.**

MBI domains	N = 223 M ± SD	Cronbach's alpha	With anxiety N = 38 M ± SD		Without anxiety N = 185 M ± SD		p-value <sup>a</sup>
Emotional exhaustion (EE) -	27.53 ± 11.59	0.88	38.31 ± 8.59	High	25.31 ± 0.87	Moderate	0.0001
Depersonalization (DP)	6.44 ± 5.45	0.69	9.02 ± 5.62	Moderate	5.91 ± 5.27	Moderate	0.001
Personal accomplishment (PA) -	35.62 ± 7.87	0.82	32.13 ± 8.16	High	36.34 ± 7.64	Moderate	0.004

M, Mean; SD, Standard deviation.  
MBI cut-off according to Chiron et al, 2010. EE: High ( $\geq 30$ ), Moderate (18-29), and Low ( $\leq 17$ ); DP: High ( $\geq 12$ ), Moderate (6-11), and Low ( $\leq 5$ ); PA: High ( $\leq 33$ ), Moderate (34-39), and Low ( $\geq 40$ ).  
<sup>a</sup> Student's t-test (with anxiety versus without anxiety).

**Table 5 – Health-related quality of life (WHOQOL-BREF) scores of 223 physicians in the frontline against COVID-19, according to diagnosis of anxiety, Bahia, Brazil, 2020.**

WHOQOL-BREF domains	N = 223 M ± SD	Cronbach's alpha	With anxiety N = 38 M ± SD	Without anxiety N = 185 M ± SD	p-value <sup>a</sup>
Physical	12.87 ± 1.87	0.79	11.54 ± 1.74	13.15 ± 1.78	0.0001
Psychological	14.03 ± 3.13	0.89	10.87 ± 3.45	14.68 ± 2.63	0.0001
Social Relationships	13.53 ± 3.20	0.65	11.40 ± 3.37	13.96 ± 2.99	0.0001
Environment	14.82 ± 2.23	0.77	13.50 ± 2.12	15.10 ± 2.16	0.0001

M, Mean; SD, Standard deviation.

<sup>a</sup> Mann-Whitney's Test (with anxiety versus without anxiety).

**Table 6 – Pearson's correlation coefficients between health-related quality of life (WHOQOL-BREF) and Burnout Syndrome symptoms (MBI) of 223 physicians in the frontline against COVID-19, according to diagnosis of anxiety, Bahia, Brazil, 2020.**

WHOQOL-BREF domains	With anxiety N = 38 MBI domains			Without anxiety N = 185 MBI domains		
	Emotional exhaustion (EE)	Depersonalization (DP)	Personal accomplishment (PA)	Emotional exhaustion (EE)	Depersonalization (DP)	Personal accomplishment (PA)
Physical	-0.30	-0.15	0.42**	-0.51**	-0.28**	0.36**
Psychological	-0.27 <sup>a</sup>	-0.11 <sup>b</sup>	0.53**	-0.56 <sup>aa</sup>	-0.41 <sup>ab</sup>	0.51**
Social Relationships	-0.13	-0.05	0.38*	-0.38**	-0.23**	0.30**
Environment	-0.12	-0.32*	0.36*	-0.37**	-0.34**	0.49**

\* The correlation was significant at 0.05 level (2-tailed).

\*\* The correlation was significant at 0.01 level (2-tailed). a,a; b,b - Significance of the difference between two correlation coefficients by Fisher r-to-z transformation.

study included a smaller sample of Brazilian physicians (24 from Belem, 18 from Goiania, 28 from Porto Alegre, 65 from Salvador and 45 from Sao Paulo). Another Brazilian study evaluated the effect of supportive leadership on symptoms of burnout in physicians during COVID-19 pandemic, showing a weaker effect for frontline physicians compared to previous data.<sup>21</sup> A cohort study in the Netherlands, with physicians and nurses working in a critical care scenario during COVID-19 pandemic, reported a two-fold higher prevalence of burnout symptoms in comparison to anxiety.<sup>22</sup>

During the COVID-19 pandemic, nurses and physicians with increased scores for exhaustion, depression, anxiety, and stress were associated with a greater fear of being infected with coronavirus.<sup>23</sup> Higher score of emotional exhaustion and levels of stress were seen in nurses with contact with COVID-19 patients, compared to nurses with no contact with such patients.<sup>23</sup> In Italy, the burnout syndrome was associated with more depression or higher anxiety scores in HCW during the acute phase of COVID-19.<sup>24</sup>

In Pakistan, a study described a prevalence of 43% of anxiety/depression in frontline physicians one month after the first reported COVID-19 case. The lack of knowledge about COVID-19 was associated with depression in frontline doctors.<sup>25</sup> Almost half (47%) of the Indian healthcare professionals, most of them directly involved in care of COVID-19 patients, had symptoms of depression, which was classified as moderate to severe in 22% of them.<sup>3</sup> Symptoms of depression, anxiety, insomnia, and distress were reported by

physicians and nurses in China two months after the first diagnosed case.<sup>26</sup> Furthermore, burnout, anxiety, and depression symptoms had a negative effect on the quality of life of HCW during the COVID-19 pandemic.<sup>27</sup>

Taking care of COVID-19 patients may lead to a higher prevalence of anxiety, depression, and lower HRQOL<sup>28</sup> in frontline healthcare workers. Additionally, moderate to severe depression and anxiety symptoms had a negative impact on their quality of life.<sup>3</sup> In our study, all physicians had lower HRQOL in comparison with data found in the healthy Brazilian population.<sup>13</sup> Physicians with anxiety had lower HRQOL when compared with the group without anxiety. In addition, smoking and drinking habits may be associated with poor HRQOL and poor mental health.<sup>28</sup> Our findings indicate that alcohol ingestion, as well as use of stimulants, were higher in the anxiety group during COVID-19 pandemic.

We detected a significant correlation between WHOQOL-BREF and MBI in physicians without anxiety. Moreover, there were differences in the correlations between EE and Psychological Domain and between DP and Psychological Domain, according to anxiety. A previous study found that individuals who were predisposed to anxiety and oversensitivity to bodily sensations presented poorer levels of perceived health than those without anxiety. In the same study, not only somatic symptoms, but also symptoms of anxiety are considered a relevant target for improving HRQOL.<sup>29</sup> The correlation between burnout and health-related quality of life in



individuals with anxiety is still not well explored in literature. Anxiety disorders and its effect in HRQoL and burnout should be further investigated.

Our data show that anxiety was more prevalent among females. A systematic review reported a higher risk of female HCW in developing depression, anxiety, and insomnia compared to male workers.<sup>5</sup> Moreover, female frontline workers reported experiencing more severe symptoms and higher levels of depression, anxiety, insomnia, and distress than their male counterparts, during COVID-19 pandemic in China.<sup>26</sup>

This study had some limitations. The cross-sectional design does not allow to confirm causality. The prevalence ratio was calculated to better evaluate our results and all applied instruments presented good reliability and showed satisfactory internal reliability evaluated by Cronbach's alpha test, according to previous psychometric evaluations of MBI and WHOQOL BREF by developers.<sup>10,12</sup> The consistency of final results indicates that the detected associations are robust enough and demonstrates a clear association between frontline working on COVID-19 care and such emotional disturbances.

## Conclusion

Physicians with anxiety showed increased emotional exhaustion, decreased personal accomplishment and a low health-related quality of life in WHOQOL BREF domains during the COVID-19 pandemic in Brazil. Physicians' anxiety was associated with lower health-related symptoms. All domains of WHOQOL BREF were correlated with all MBI domains among physicians without anxiety. Differences in correlation according to anxiety were remarkable in Psychological HOQOL BREF Domain and Emotional Exhaustion and Depersonalization MBI domains. The effect of anxiety leading to poorer levels of perceived health needs to be further investigated.

## Conflicts of interest

The authors declare no conflict of interest.

## REFERENCES

- Blustein DL, Duffy R, Ferreira JA, Cohen-Scali V, Cinamon RG, Allan BA. Unemployment in the time of COVID-19: a research agenda. *J Vocat Behav.* 2020. <https://doi.org/10.1016/j.jvb.2020.103436>.
- Xiong J, Lipsitz O, Nasri F, et al. Impact of COVID-19 pandemic on mental health in the general population: a systematic review. *J Affect Disord.* 2020;277:55–64.
- Suryavanshi N, Kadam A, Dhupal G, et al. Mental health and quality of life among healthcare professionals during the COVID-19 pandemic in India. *Brain Behav.* 2020;10:1–12.
- Fiest KM, Parsons Leigh J, Krewulak KD, et al. Experiences and management of physician psychological symptoms during infectious disease outbreaks: a rapid review. *BMC Psychiatry.* 2021;21:1–14.
- Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. *Brain Behav Immun.* 2020. <https://doi.org/10.1016/j.bbi.2020.05.026>.
- Brito-Marques JM de AM, Franco CMR, Brito-Marques PR de, Martinez SCG, Prado GF do. Impact of COVID-19 pandemic on the sleep quality of medical professionals in Brazil. *Arq Neuropsiquiatr.* 2021;79:149–55.
- Barello S, Palamenghi L, Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry Res.* 2020;290:113129.
- Ornell F, Schuch JB, Sordi AO, Kessler FHP. Pandemic fear” and COVID-19: mental health burden and strategies. *Br J Psychiatr.* 2020;42:232–5.
- World Health Organization. WHOQOL-BREF: Introduction, administration, scoring and generic version of the assessment. 1996.
- Maslach C, Jackson SE, Leiter MP. The maslach burnout inventory manual. *Maslach Burn Invent.* 1996: 191–217. <https://doi.org/10.1002/job.4030020205>.
- Kabacoff RI, Segal DL, Hersen M, Van Hasselt VB. Psychometric properties and diagnostic utility of the Beck Anxiety Inventory and the State-Trait Anxiety Inventory with older adult psychiatric outpatients. *J Anxiety Disord.* 1997;11:33–47.
- THE WHOQOL GROUP. Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychol Med.* 1998;28:551–8.
- Fleck MPA, Louzada S, Xavier M, et al. Aplicação da versão em português do instrumento abreviado de avaliação da qualidade de vida “WHOQOL-bref. *Rev Saude Publica.* 2000;34:178–83.
- Chiron B, Michinov E, Olivier-Chiron E, Laffon M, Rusch E. Job satisfaction, life satisfaction and burnout in French anaesthetists. *J Health Psychol.* 2010;15:948–58.
- Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res Sci Educ.* 2018;48:1273–96.
- Streiner DL. Starting at the beginning: an introduction to coefficient alpha and internal consistency. *J Pers Assess.* 2003;80:99.
- Cohen J. *Statistical power for the social sciences.* second ed. New York, United States of America: Laurence Erlbaum and Associates; 1988.
- Lowry R. *Concepts and Applications of Inferential Statistics.* Online Sta. Vassar College; 2008.
- Asch DA, Jedrzejewski MK, Christakis NA. Response rates to mail surveys published in medical journals. *J Clin Epidemiol.* 1997;50:1129–36.
- Tironi MOS, Teles JMM, De Souza Barros D, et al. Prevalence of burnout syndrome in intensivists doctors in five Brazilian capitals. *Rev Bras Ter Intensiva.* 2016;28:270–7.
- Moura E C, Furtado L SF. The burnout epidemic during the covid-19 pandemic: the role of lmx in alleviating physicians' burnout. *Rev Adm Empres.* 2020;60:426–36.
- Kok N, van Gorp J, Teerenstra S, et al. Coronavirus disease 2019 immediately increases burnout symptoms in ICU professionals. *Crit Care Med.* 2021: 419–27. <https://doi.org/10.1097/ccm.0000000000004865>.
- Giulia Zerbini, Alanna Ebigbo, Philipp Reicherts, Miriam Kunz, Helmunt Messman. Psychosocial burden of healthcare professionals in times of COVID-19 – a survey conducted at the University Hospital Augsburg. *GMS Ger Med Sci.* 2020;18:1–9.
- Buselli R, Corsi M, Baldanzi S, et al. Professional quality of life and mental health outcomes among health care workers exposed to Sars-Cov-2 (Covid-19). *Int J Environ Res Public Health.* 2020;17:6180.
- Amin F, Sharif S, Saeed R, Durrani N, Jilani D. COVID-19 pandemic- knowledge, perception, anxiety and depression

- 
- among frontline doctors of Pakistan. *BMC Psychiatry*. 2020;20:459.
26. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open*. 2020;3:e203976.
  27. Çelmeçe N, Menekay M. The effect of stress, anxiety and burnout levels of healthcare professionals caring for COVID-19 patients on their quality of life. *Front Psychol*. 2020;11:1–7.
  28. Tran TV, Nguyen HC, Pham LV, et al. Impacts and interactions of COVID-19 response involvement, health-related behaviours, health literacy on anxiety, depression and health-related quality of life among healthcare workers: a cross-sectional study. *BMJ Open*. 2020;10:e041394.
  29. Murphy KM, McGuire AP, Erickson TM, Mezulis AH. Somatic symptoms mediate the relationship between health anxiety and health-related quality of life over eight weeks. *Stress Heal*. 2017;33:244–52.