Impact of Anxiety on Health-Related Quality of Life and Symptoms of Burnout in Multi-Professional Residents in Brazil During the COVID-19 Pandemic

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Abstract

We aimed to determine the prevalence of anxiety and to identify associated factors among multi-professional residents in Brazil during the early days of the COVID-19 pandemic. A cross-sectional study included a sample of 752 multi-professional residents selected by snowball technique. Symptoms of anxiety were measured by the Beck anxiety inventory scale (≥ 16 cut-off). We used WHOQOL-BREF to access the health-related quality of life and the Maslach Burnout Inventory to measure the burnout syndrome. PR and respective 95% confidence intervals (CI) were calculated using the Poisson regression model. The prevalence of anxiety was 41.2% (310/752). Some variables were strongly associated with anxiety: afraid of getting COVID-19; extra work demand during COVID-19 pandemic; sweating/wheezing/increased heart rate during work; feeling safe when using personal protective equipment at work, and psychological support from residence preceptors. Residents with symptoms of anxiety showed high emotional exhaustion at work (36.6 ± 9.6 vs. 24.7 ± 10.7, P=0.001) and depersonalization (8.9 ± 6.0 vs. 5.6 ± 4.9, P=0.001). Correlations coefficients between emotional exhaustion versus Physical WHOQOL-BREF and between emotional exhaustion versus Psychological WHOQOL-BREF were significantly lower among residents without anxiety (P=0.027 and P=0,03, respectively). The prevalence of anxiety was high and strongly associated with several variables, particularly with being afraid of getting COVID-19, the perception of workload, somatization (sweating, wheezing and increased heart rate during work), feeling unsafe when using personal protective equipment, and lack of psychological support from residence preceptors. Anxiety was associated with increased emotional exhaustion and depersonalization and low health-related quality of life during the COVID-19 pandemic in Brazil. Low WHOQOL-BREF environment domain, and high emotional exhaustion MBI domain increased the chances of presenting symptoms of anxiety.

Keywords Health-related quality of life · Burnout · Multi-professional residences · Healthcare

Introduction

SARS-Cov-2 infection (COVID-19) was first detected by the end of 2019 and quickly became a worldwide threat, being declared as pandemic by the World Health Organization early in 2020 (Cheng & Khan, 2020; Sohrabi et al., 2020). Compared to previous epidemics, the COVID-19 pandemic represents a challenge due to the high contagiousness of the virus, the low level of knowledge on the course of disease, lack of treatment or vaccines, and devastating economic consequences (Shek, 2021; Sohrabi et al., 2020). The first COVID-19 case in Brazil was confirmed on February 26th, 2020 and on March 17th the first death was reported (de Souza et al., 2020). In Brazil, from 5 to 11 July 2020 there was a mean of 1018 daily deaths per day and total number of deaths was 71.469, ranking second worldwide (John Hopkins University, 2020).

Brazilian healthcare networks during the COVID-19 pandemic deal with insufficient Primary Health Care, the lack of coordination between levels of care, and the negative impact of the underfinancing of the Unified Health System (SUS) (Daumas et al., 2020). During the pandemic, not only intensive care unit beds and ventilators are urgent for implantation in the SUS. The maintenance of care pathways for chronic diseases and other emergency conditions are also of great importance. Thus, the organization of the care network is essential to guarantee timely access to healthcare assistance (Daumas et al., 2020).

During COVID-19 pandemic front-line healthcare professionals have to deal with excessive workload, mental health distress and negative psychological effects. This burden may compromise the healthcare professionals' decision-making capacities (Dewey et al., 2020; Preti et al., 2020). Zerbini et al. (2020), compared nurses with physicians and found different distress perception at work by different professionals in the same environment. Nurses working in the COVID-19 wards experienced higher levels of depressive mood, exhaustion, lower levels of fulfillment, and stress at work, compared to their colleagues working in the regular wards. Physicians working in the COVID-19 wards and regular ones did not differ significantly from each other.

Fear of infection and stress at work are associated with burnout among healthcare professionals dealing with COVID-19 patients. Brazilian frontline healthcare professionals are mentally exhausted because of poor working conditions, the lack of personal protective equipment, the feeling of fighting an uphill battle against a highly contagious disease, the fear of getting COVID-19, and work burden (Silva-Gomes & Silva-Gomes, 2021). A cross-sectional study by Brito-Marques et al. (2021) reported that 64.1% of the 332 Brazilians surveyed physicians were afraid of having or transmitting COVID-19, 61% felt unsafe in the work environment, 36.2% showed an increase in alcohol consumption, and 4.2% increased the consumption of stimulants. The study also showed a significant relationship among symptoms of anxiety, depression, and insomnia ($p < 0.001$) (Brito-Marques et al., 2021). A recent study evaluated the health-related quality of life and burnout in frontline physicians diagnosed with anxiety during the COVID-19 pandemic in Salvador Bahia. Anxiety was associated with emotional exhaustion, less personal accomplishment, and lower quality of life (Chalhub et al., 2021).

In this study, we focus on the effects of COVID-19 on anxiety and associated factors in multi-professional residences in Brazil. In Brazil, "multi-professional residences" are the name for in-service fellowships for several health areas, except medical (social workers, nurses, physiotherapists, physical educators, occupational therapists, nutritionists, biomedicine professionals, psychologists, and dentists). Multi-professional residency programs in healthcare are financed by Ministry of Health and provide professional postgraduate students to compose the health teams of public hospitals and primary care, strengthening the unified health system assistance. This training modality can be an exposure to their area for up to 60 (sixty) hours per week in full-time education (Silva, 2018). These characteristics of the *multi-professional residences* can make them highly stressful, especially in times of COVID-19, and can decrease the health-related quality of life (HRQOL). In July 2020, a cross-sectional study by Dantas et al. (2021) examined anxiety among 67 multi-professional health residents from a university hospital. About one-third of the residents reported to be anxious and symptoms of anxiety were associated with assisting patients with suspected or confirmed diagnosis of COVID-19 (Dantas et al., 2021). However, the study comprised only a small sample of residents (N=67) from a university hospital and did not investigate quality of life and symptoms of burnout.

There is a lack of knowledge in current literature, about consequences of anxiety and related factors, such as burnout and quality of life in Brazilian multi-professional residents. These residents are in hospital and primary care assistance during the COVID-19 pandemic. Acknowledgment of their mental health symptoms status and quality of life perceptions may help the implementation of health policies and immediate responses in psychosocial management, reducing anxiety and improving quality of life in these population. In this work, we examined the prevalence of anxiety and associated factors among multi-professional residents in Brazil during the early days of the COVID-19 pandemic.

Methods

This cross-sectional study was conducted by the School of Medicine Federal University of Bahia from April to June 2020, during the increasing incidence phase of COVID-19. Google form® questionnaires were sent to 450 multi-professional programs in Brazil, corresponding to 15% of the total number (2,967) of this modality of residences in Brazil. Ethical clearance to conduct the study was obtained from the National Ethics Review Committee of the National Council of Health, Brazilian Ministry of Health, number 4.008.150. Data were collected through a questionnaire sent electronically to the residents, using snowball sampling. Before assessing the questionnaire, participants signed the informed consent agreeing to participate in the survey. Information was collected about sex, age, race, income, region of the country, specific multi-professional residence lifestyle, health-related quality of life, anxiety, burnout, and COVID-19-related aspects. Twenty-eight questionnaires containing more than 20% of missing data were discarded. In total, 752 residents participated in the study.

Beck Anxiety Inventory (BAI)

The Beck anxiety inventory (BAI) scale is a 21-item self-report questionnaire, which investigates common symptoms of anxiety: feeling nervous, scared, and fear of dying. The inventory was developed to distinguish symptoms of anxiety from symptoms of depression. The items were rated on a 4-point Likert-type scale, ranging from 0 to 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 suggested cutoff for BAI clinically significant symptom of anxiety was 16 (Kabacoff et al., 1997).

WHOQOL-BREF

We used WHOQOL-BREF to access health-related quality of life (HRQOL), which consists of four domains: Physical Health, Psychological, Social Relationships, and Environment (World Health Organization, 1996). The domain scores were scaled in a positive direction, i.e. higher scores reflect a higher quality of life. According to the WHOQOL manual, we converted raw scores to transformed scores (range between 4 and 20), which are comparable with the WHOQOL-100. The WHOQOL-BREF mean scores of residents were compared with the mean scores of healthy people in a previous study conducted in Brazil(Fleck et al., 2000) (mean $\pm$ SD, Physical Health: 16.6 ± 2.1; Psychological, 15.6 ± 2.1; Social relationships, 15.5 ± 2.6, and Environment, 14.0 ± 2.1).

Maslach Burnout Inventory (MBI)

The Maslach Burnout Inventory (MBI) was developed to assess the three aspects of the burnout syndrome: emotional exhaustion (EE, feelings of being overextended and exhausted by work-related aspects), depersonalization (unfeeling and impersonal response the recipient service), and personal accomplishment (PA, feelings of competence, and successful work achievement). The scale is composed by 22 items rated on 7-point Likert-type scale, ranging from never (0) to every day (6). High score of EE and DP and a lower score of PA indicates higher degree of experienced burnout (Maslach et al., 1996). We considered the interpretation of scores for MBI domains as High (≥ 30) Moderate (18–29) Low (≤ 17) for EE; High (≥ 12) Moderate (6–11) Low (≤ 5) for DP, and High (≤ 33) Moderate (34–39) Low (≥ 40) for PA (Chiron et al., 2010).

Statistical Analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 22. Cronbach's alpha coefficient measured the internal reliability of each subscale (Taber, 2018), considering values from 0.60 to 0.70 as satisfactory and

> 0.70 as ideal (Streiner, 2003). We performed the confirmatory factor analysis to evaluate the model fit of the BAI, WOQOL-BREF, and MBI scales, verifying the factor structure, empirically derived from the scales items scores, using JASP software. We used the Robust Diagonally Weighted Least Squares (RDWLS) estimation method, suitable for categorical data. We based the assessments of the model fit on the following indices: chi-square/df; Comparative Fit Index (CFI); Tucker-Lewis Index (TLI); Standardized Root Mean Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA). Values of chi-square should not be significant; CFI and TLI values must be ≥ 0.90; RMSEA values should be ≤ 0.08, with a confidence interval (upper limit) ≤ 0.10 (Brown, 2015; Furr, 2011). We described categorical variables by using frequencies and percentages. For continuous variables we used mean and standard deviation (SD). We compared WOHQOL-BREF and Maslach Burnout scores of multi-professional residents with and without symptoms of anxiety measured by the BAI scale (symptoms of anxiety ≥ 16), which Cronbach's alpha was 0.92. Differences in proportion between groups were evaluated by chi-squared test. We used t-tests for mean comparisons. A p-value < 0.05 was used as the level of significance. We evaluated the correlations among WHOQOL-BREF and MBI domains by using Pearson correlation coefficient (Hosmer & Lemeshow, 2000). We used the Fisher r-to-z transformation to assess the difference between two correlation coefficients (Lowry, 2008). Variables associated with COVID-19 were dichotomized (Never/Very rarely/Rarely and Frequently/ Very frequently) and described by using prevalence ratio (PR). Bivariate analysis used chi-square test or Fisher test for categorical variables, and the t-test for comparing continuous variables. Variables reaching $p < 0.20$ in the bivariate analysis were selected for multivariate analysis, for which we used a Poisson regression with robust variance estimators (Barros & Hirakata, 2003; Coutinho et al., 2008), since the model data did not present overdispersion (Burger et al., 2009). Variables reaching $p < 0.05$ were selected for composing the final, adjusted model. The adequacy of the adjustment was evaluated by a decrease in the Akaike Information Criteria more than 5.00.

Results

The present study included 752 multi-professional residents, mean age of 26.4 ± 4.6. The prevalence of anxiety was 41.2% among the residents. Female residents showed a 1.6 times higher prevalence of anxiety than males. The prevalence of anxiety did not differ markedly according to the region in Brazil, race, income, economic sector, area of residence and professional area (Table 1). Anxiety was not associated with age (with anxiety, 26.1 ± 4.5 years vs. without anxiety, 26.5 ± 4.7 years).

Of the residents that were surveyed, 3 of the 4 residents that had COVID-19 during the study´s period experienced anxiety. Of the 33 residents that suspected to have contracted COVID-19 and were under investigation, 60.6% had symptoms of anxiety. Residents caring suspected case of COVID-19 were 1.5 more likely to report anxiety, while residents that had contact with patients with COVID-19 were 1.33 more likely to feel anxious. Several variables were associated with anxiety:

Table 1 Anxiety according to sociodemographic characteristics of 752 students in multi-professional residences in Brazil, 2020

Sociodemographic and occupational characteristics	With Anxiety N=310 N (%)	Without Anxiety N=442 N (%)	PR	P
Sex				
Female	285(43.2)	374 (56.8)	1.61	0.003
Male	25(26.9)	68 (73.1)	1	
Region				
Northeast	85 (40.7)	124 (59.3)	1.10	0.492
North	7 (41.2)	10 (58.8)	1.12	
Midwest	18 (45.0)	22 (55.0)	1.22	
Southeast	117 (44.8)	144 (55.2)	1.21	
South	83 (36.9)	142 (63.1)	1	
Race				
White	203 (43.5)	264 (56.5)	1.16	0.109
Mulatto/ Black/ Other	107 (37.5)	178 (62.5)	1	
Income (in Brazilian Reais)				
< 2.000	52 (39.1)	81 (60.9)	0.93	0.583
≥ 2000	258 (41.7)	361 (58.3)	1	
Residence Economy Sector				
Private	35 (41.2)	50 (58.8)	1.00	0.993
Public	275 (41.2)	392 (58.8)	1	
Residence area				
Hospital	193 (41.0)	278 (59.0)	0.98	0.858
Family Health/Other	117 (41.6)	164(58.4)	1	
Health área				
Nursing	86 (45.7)	102 (54.3)	1.21	0.556
Pharmacy	25 (39.1)	39 (60.9)	1.05	
Physiotherapy	31 (38.7)	49 (61.3)	1.03	
Nutrition	40 (43.0)	53 (57.0)	1.15	
Dentistry	38 (42.2)	52 (57.8)	1.13	
Psychology	35 (38.9)	55 (61.1)	1.04	
Other	55 (37.4)	92 (62.6)	1	

marijuana use (PR from 1 to 1.59), stimulant use (PR from 1 to 1.59), increased alcohol consumption due to COVID-19 (PR from 1 to 1.35), sweating, wheezing and increased heart rate during work (PR 1 to 3.00) (Table 2).

Feeling COVID-19 pandemic demands more work from you (PR from 1 to 1.81), not feeling safe when using Personal Protective Equipment in your job (PR 1 to 1.52), and not having psychological support from residence preceptors (PR 1 to 1.70) have also been associated with anxiety. Both groups were used to check the news about COVID-19 and worked in a high risk of contamination environment. Data are shown in Table 2.

Table 2 Anxiety (Prevalence Ratio = PR) according to COVID-19-related variables in 752 students in multi-professional residences in Brazil, 2020

COVID-19-related aspects	With Anxiety N = 310 N (%)	Without Anxiety N = 442 N (%)	PR	p
Suspected case of COVID-19				
Yes	20 (60.6)	13 (39.4)	1.50	
No	290 (40.3)	429 (59.7)	1	0.021
Contact with patients with COVID-19				
Yes	124 (49.4)	127 (50.6)	1.33	
No	186 (37.1)	315 (62.9)	1	0.001
Marijuana use				
Yes	40 (62.5)	24 (37.5)	1.59	
No	270 (39.2)	418 (60.8)	1	0.001
Stimulant use				
Yes	28 (68.3)	13 (31.7)	1.72	
No	282 (39.7)	429 (60.3)	1	0.001
Started to use stimulants due to COVID-19[a]				
Never/Very rarely/Rarely	291 (39.9)	439 (60.1)	1	0.001
Frequently/ Very frequently	19 (86.4)	3 (13.6)	2.17	
Increased alcohol consumption due to[c] COVID-19				
Never/Very rarely/Rarely	213 (37.8)	350 (62.2)	1	0.001
Frequently/ Very frequently	96 (51.1)	92 (48.9)	1.35	
Use to check the news about COVID-19				
Never/Very rarely/Rarely	13 (38.2)	21 (61.8)	1	0.717
Frequently/ Very frequently	297 (41.4)	421 (58.6)	1.08	
Afraid to getting COVID-19				
Never/Very rarely/Rarely	23 (20.0)	92 (80.0)	1	<0.001
Frequently/ Very frequently	287 (45.1)	350 (54.9)	2.25	
COVID-19 pandemic demands much more work from you				
Never/Very rarely/Rarely	62 (30.1)	144 (69.9)	1	<0.001
Frequently/ Very frequently	298 (54.6)	248 (45.4)	1.81	
Have accomplished all job tasks[a]?				
Never/Very rarely/Rarely	37 (38.9)	58 (61.1)	1	0.644
Frequently/ Very frequently	272 (41.5)	383 (58.5)	1.06	
Sweating, wheezing, and increased heart rate during work[b]?				
Never/Very rarely/Rarely	110 (23.5)	358 (76.5)	1	<0.001
Frequently/ Very frequently	200 (70.7)	83 (29.3)	3.00	
Feels safe when using Personal Protective Equipment in your job[a]				
Never/Very rarely/Rarely	215 (47.8)	235 (52.2)	1.52	<0.001
Frequently/ Very frequently	94 (31.3)	206 (68.7)	1	
Avoid attending patients suspected of COVID-19				
Never/Very rarely/Rarely	176 (36.1)	312 (63.9)	1	<0.001
Frequently/ Very frequently	134 (50.8)	130 (49.2)	1.41	

Table 2 (continued)

COVID-19-related aspects	With Anxiety N=310 N (%)	Without Anxiety N=442 N (%)	PR	p
Psychological Support from resident fellows				
Never/Very rarely/Rarely	37 (50.7)	36 (49.3)	1.26	0.041
Frequently/ Very frequently	273 (40.2)	406 (59.8)	1	
Psychological Support from residence preceptors				
Never/Very rarely/Rarely	116 (59.2)	80 (40.8)	1.70	<0.001
Frequently/ Very frequently	194 (34.9)	362 (65.1)	1	
Feels able to manage COVID-19 cases				
Never/Very rarely/Rarely	211 (47.9)	230 (52.1)	1.99	<0.001
Frequently/ Very frequently	99 (31.8)	212 (68.2)	1	
Working in a high risk of contamination environment				
Never/Very rarely/Rarely	137 (39.9)	206 (60.1)	1	0.513
Frequently/ Very frequently	173 (42.3)	236 (57.7)	1.06	
Decreased of social relationships quality				
Never/Very rarely/Rarely	43 (35.8)	77 (64.2)	1	0.191
Frequently/ Very frequently	267 (42.2)	365 (57.8)	1.18	

[a] - One case missing in each With anxiety and Without anxiety groups;

[b] - One case missing in Without anxiety group;

[c] - One case missing in anxiety group;

The CFA measurement model obtained the following fit indices: 1- BAI: $\chi2$ (df): 476.333 (189); CFI: 0.984; GFI: 0.988; TLI: 0.982; RMSEA: 0.045 (90% CI: 0.045–0.050); 2- WHOQOL-BREF: $\chi2$ (df): 627.450 (246); CFI: 0.915; GFI: 0.989; TLI: 0.905; RMSEA: 0.045 (90% CI: 0.041–0.050); and 3- MBI: $\chi2$ (df): 1145.600 (206); CFI: 0.968; GFI: 0.998; TLI: 0.964; RMSEA: 0.078 (90% CI: 0.074–0.082); All residents' WHOQOL-BREF scores were lower than those observed in the healthy population in Brazil. Compared with residents without anxiety, residents with anxiety presented reduced HRQOL for all domains (Physical, 11.8 ± 1.7 vs. 12.6 ± 1.6, P=0.001; Psychological, 12.5 ± 2.0 vs. $1\ 3.4\pm1.8$, P=0.001; Social, 12.3 ± 3.2 vs. 13.7 ± 3.0, P=0.001, and environment, 11.9 ± 2.2 vs. 13.3 ± 2.2). The internal consistency of WHOQOL-BREF domains showed satisfactory and high values (0.6–0.7 or >0.7) (Table 3). Regarding the burnout indices, all MBI scores were higher in participants classified as anxious. Professionals presenting with symptoms of anxiety showed higher emotional exhaustion at work than those without symptoms of anxiety (36.6 ± 9.6 vs. 24.7 ± 10.7, P=0.001; High MBI index ≥30), both groups showed moderate MBI scores for Depersonalization (8.9 ± 6.0 vs. 5.6 ± 4.9, P=0.001; Moderate MBI index 6–11), and high MBI for Personal Accomplishment meaning burnout related to their job (30.3 ± 7.0 vs. 31.4 ± 7.4, P=0.050; High MBI index ≤33). The reliability of MBI domains showed good values (>0.7) (Table 4).

Table 3 Anxiety according to WHOQOL-BREF scores in 752 Brazilian multi-professional residents, 2020

WHOQOL-BREF	$Mean \pm SD$ $N = 752$	Cronbach's Alpha	With Anxiety[a] $Mean \pm SD$ $N = 310$	Without Anxiety[a] $Mean \pm SD$ $N = 442$
Physical	12.3 ± 1.7	0.70	11.8 ± 1.7	12.6 ± 1.6
Psychological	13.0 ± 1.9	0.80	12.5 ± 2.0	13.4 ± 1.8
Social Relationships	13.1 ± 3.1	0.60	12.3 ± 3.2	13.7 ± 3.0
Environment	12.7 ± 2.3	0.70	11.9 ± 2.2	13.3 ± 2.2

[a,a] All scores were lower for residents with anxiety (< 0.001)

Reference for health population in Brazil: Physical Health 16.6 ± 2.1; Psychological 15.6 ± 2.1;

Social relationships 15.5 ± 2.6, and Environment 14.0 ± 2.1

The correlation coefficients between WHOQOL-BREF and MBI domains were predominantly weak ($r < 0.30$), except for the correlations between EE MBI versus Physical WHOQOL-BREF ($r = -0.373$) and EE MBI versus Psychological WHOQOL-BREF ($r = -0.332$) in residents without anxiety. Correlations coefficients between EE MBI versus Physical WHOQOL-BREF and between EE MBI versus Psychological WHOQOL-BREF were significantly lower among residents without anxiety than among those with anxiety ($P = 0.027$ and $P = 0,030$, respectively) (Table 5).

The saturated model identified four variables which were analyzed in the adjusted model. The prevalence of anxiety was significantly higher among feminine than among masculine sex ($PR = 1.38$) and among those who referred sweating, wheezing, and increased heart rate during work ($PR = 2.80$). The model estimated a 0.943 lower value of environment quality of life domain, and a 1.039 higher Emotional Exhaustion value for those feeling anxious compared to those not feeling anxious (Table 6). A decrease in AIC (1,037.808 to 1,019.184) confirmed the adequacy of the adjustment of the model. The Omnibus test was < 0.001 in both saturated and adjusted models.

Discussion

Anxiety among healthcare professionals involved in COVID-19 care is becoming an increasingly important public health. A recent systematic review with meta-analysis of 13 cross-sectional studies and a total of 33,062 participants showed a prevalence rate of anxiety in healthcare workers of 23.2% during COVID-19 pandemic (Pappa et al., 2020). A Portuguese study reported higher depression, anxiety, and stress levels in nurses when compared to the Portuguese general population (Sampaio et al., 2020). In 2020, a study conducted by our research group reported 17% of anxiety in 223 frontline physicians in the city of Salvador, Bahia, Brazil. The present study showed a high proportion of Brazilian multi-professional residents (41.2%) with symptoms of anxiety. The fact that the residents are young (mean age of 26.4 ± 4.6) and with little experience in clinical practice may have contributed to this higher prevalence of anxiety in multi-professional residents than that found in previous studies.

Table 4 Anxiety according to MBI scores in 752 Brazilian multi-professional residents, 2020

MBI Domains	Mean ± SD N = 752	Cronbach's Alpha	With Anxiety Mean ± SD N = 310		Without Anxiety Mean ± SD N = 442	
Emotional exhaustion (EE)***	29.6 ± 11.8	0.90	36.6 ± 9.6	High	24.7 ± 10.7	Moderate
Depersonalization (DP)***	7.0 ± 5.6	0.70	8.9 ± 6.0	Moderate	5.6 ± 4.9	Moderate
Personal accomplishment (PA)**	30.9 ± 7.3	0.80	30.3 ± 7.0	High	31.4 ± 7.4	Moderate

Score of *emotional exhaustion* and *depersonalization* were higher for residents with anxiety ($p < 0.001$), no difference for *personal accomplishment*. For the Maslach Burnout Index (MBI) is a is 22 items on 7-point Likert-type scale, ranging from never (0) to every day (6). High score of EE and DP and a lower score of PA indicates higher degree of experienced burnout. For *emotional exhaustion* (EE) the high score for burnout was considered above 30; moderate from 18 to 29; and low less than 17; *depersonalization* (DP) for high score for burnout was considered above 12; moderate from 6 to 11; and low less than 5; *personal accomplishment* (PA) the high score for burnout less than 33; moderate (34–39); and low less than 40. * Student t test

Table 5 Pearson correlation coefficients between WHOQOL-BREF and MBI scores according to symptoms of anxiety in 752 Brazilian multi-professional residents, 2020

WHOQOL-BREF	With Anxiety N=310			Without Anxiety N=442		
	MBI			MBI		
	Emotional exhaustion	Depersonalization	Personal accomplishment	Emotional exhaustion	Depersonalization	Personal accomplishment
Physical	−0.22**a	−0.08	0.25**	−0.37**a	−0.11*	0.21**
Psychological	−0.18**b	−0.20**	0.26**	−0.33**b	−0.20**	0.29**
Social Relationships	−0.22**	−0.25**	0.16**	−0.27**	−0.22**	0.19**
Environment	−0.20**	−0.11	0.11*	−0.25**	−0.14**	0.17**

**Correlation is significant at the 0.01 level (2-tailed); *Pearson correlation coefficient significant at the 0.05 level (2-tailed). a,a; b,b - Significance of the difference between two correlation coefficients by Fisher r-to-z transformation

Female health care workers and nurses present with high levels of symptoms of depression, anxiety, insomnia, and distress according to a previous report (Shaukat et al., 2020). Anxiety is also more prevalent in female than in males physicians and is associated with avoidance of treating suspected cases of COVID-19 (Chalhub et al., 2021). In the present study, symptoms of anxiety were also associated with being woman, being a suspected case of COVID-19, and having contact with patients with COVID-19.

The association of anxiety disorders with problems caused by alcohol and marijuana use is reported in literature. Social anxiety is related to greater negative expectancies that may contribute to the use of marijuana (Buckner & Schmidt, 2008). In France, association of stress and reduced well-being scores ($P < 0.001$) with increase in alcohol (24.8%), and marijuana (31.2%) consumption during COVID-19 outbreaks has been reported (Rolland et al., 2020). In 2020, a Brazilian study with a sample of 67 multi-professional residents also detected high levels of anxiety during the COVID-19 pandemic coupled with the use of psychotropic drugs (Dantas et al., 2021). The association of anxiety and increased alcohol ingestion, use of stimulants, and avoidance of treating patients with suspected COVID-19 were reported in 223 front-line physicians in Brazil (Chalhub et al., 2021). In the present study, the use of marijuana (59%), stimulants (59%), and increased alcohol consumption due to COVID-19 (35%) were more frequent among those with anxiety.

In the present study, COVID-19 work-related variables were associated with signs and symptoms of anxiety: having the perception that COVID-19 pandemic demands much more work, reporting sweating, wheezing and increased heart rate during work, not feeling safe when using Personal Protective Equipment during work, and lack of psychological support from colleagues and residence preceptors. The COVID-19 pandemic has negative implications for the emotional and social functioning of health care professionals due to their risk of exposure to the virus, workload, precarious infrastructure in their jobs or shortage of personal protective equipment, and concerns about spreading the virus to their families (Koven, 2020). A study conducted in the Netherlands reported that healthcare workers who were in direct contact with COVID-19 patients presented more sleep problems and were more physically exhausted than those who were not in the front-line against COVID-19. However, mental exhaustion and general health did not differ significantly between healthcare workers who were in the front-line and those who were not (Van Roekel et al., 2021). High levels of anxiety during the COVID-19 pandemic has been associated with the need of psychological assistance (Dantas et al., 2021).

Our data showed that symptoms of anxiety were also associated with fear of getting COVID-19. Previous studies reported burdens in health care professionals' mental health, during the COVID-19 pandemic, associated with high mortality, rationing of Personal Protective Equipment and healthcare resources, infection risk to self and others compromise (Gavin et al., 2020). In China, 1,257 physicians, and nurses in the front-line against COVID-19 reported high rates of symptoms of depression (50.4%), anxiety (44.6%), insomnia (34.0%), and distress (71.5%) (Lai et al., 2020). In Mexico, a cross-sectional online study investigated the mental health and COVID-19-related aspects in 5,938 healthcare workers. Frontline healthcare workers reported insomnia (52.1%), depression (37.7%), and posttraumatic

Table 6 Results of Poisson regressions having anxiety as the dependent variable among 748 Brazilian multi-professional residents, 2020

Predictors (referent)	Saturated model			Adjusted model		
	PR	95% CI	P	PRPR	95% CI	P
Sex (masculine)	1.381	1.014–1.879	0.040	1.381	1.018–1.874	0.038
Suspected case of COVID-19 (Yes)	0.811	0.598–1.100	0.178			
Contact with patients with COVID-19 (No)	1.026	0.879–1.198	0.746			
Marijuana use (No)	1.093	0.914–1.306	0.329			
Started to use stimulants due to COVID-19[a] (No)	1.067	0.865–1.316	0.545			
Increased alcohol consumption due to[c] COVID-19 (No)	1.163	0.994–1.360	0.059			
Afraid to getting COVID-19 (No)	1.351	0.966–1.890	0.079			
COVID-19 pandemic demands much more work from you (No)	0.995	0.820–1.208	0.961			
Sweating, wheezing, and increased heart rate during work[b]? (No)	1.995	1.661–2.397	0.000	2.080	1.738–2.490	0.000
Feels safe when using Personal Protective Equipment in your job[a] (Yes)	1.122	0.950–1.324	0.174			
Avoid attending patients suspected of COVID-19 (No)	1.118	0.964–1.298	0.141			
Psychological Support from resident fellows (Yes)	1.115	0.859–1.446	0.413			
Psychological Support from residence preceptors (Yes)	1.003	0.861–1.169	0.967			
Feels able to manage COVID-19 cases (Yes)	1.049	0.885–1.244	0.582			
Emotional exhaustion (EE)	1.034	1.025–1.043	0.000	1.039	1.031–1.047	0.000
Depersonalization (DP)	1.008	0.994–1.022	0.263			
Physical	0.987	0.937–1.040	0.622			
Psychological	0.993	0.948–1.040	0.765			
Social Relationships	1.006	0.977–1.035	0.695			
Environment	0.948	0.913–0.985	0.006	−0.943	0.913–0.973	0.000

[a] - One case missing in each With anxiety and Without anxiety groups;

[b] - One case missing in Without anxiety group;

[c] - One case missing in anxiety group;

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stress disorder (37.5%). The main risk factor for depression was mourning the death of family or friends due to COVID-19 (OR = 2.2, 95%CI 1.8–2.7), and for post-traumatic stress disorder was personal COVID-19 status (OR = 2.2, 95%CI 1.7–2.9) (Robles et al., 2020). A study conducted with 726 first-year training physicians in China also evidenced the increase in mental health symptoms, and decline in mood of young physicians after the COVID-19 pandemic (Li et al., 2020). In the present study, residents were also very young (mean age of 26.4 ± 4.6) and they might feel unprepared to carry out the clinical intervention in COVID-19 cases, as well as to deal with the workload, precarity of work environment, and stress during pandemic. Preventive policies against mental health distress in health care workers should be widely implemented. Literature suggests that societal support, quality of governance, and credible media coverage are relevant factors in the pandemic context (Gavin et al., 2020).The training of health care workers to deal with pandemic context, addressing technical and ethical issues should be included in undergraduate and postgraduate courses. Like in other countries (Kinman et al., 2020), Brazilian guidance, containing practical recommendations on how to respond to the pandemic, is of great importance. This guidance should help at the individual and organizational levels. At the individual level, the healthcare team should be stimulated to develop flexibility, ethical values, and healthy relationships. At the organization level, the guidance should strengthen the increase of work connection, the development of communication, give any mental health support for being exposed to high-stress events, and provide the opportunity for sharing their experiences with the team.

Poor quality of life has been associated with higher burnout index among healthcare workers (Asante et al., 2019). However, in our study, the correlation coefficients between WHOQOL-BREF and MBI domains were weak, except for the correlations between EE MBI versus Physical WHOQOL-BREF and EE MBI versus Psychological WHOQOL-BREF in residents without anxiety. Residents without anxiety and with EE MBI showed significant differences in lower perception of Physical and Psychological WHOQOL-BREF domains. In our study, all MBI scores were higher in multi-professional residents with anxiety, and only this group reported high symptoms of Emotional Exhaustion at work. However, both groups (with and without anxiety) reported high Depersonalization, and low Personal Accomplishment scores (Chiron et al., 2010). The multivariate analysis showed that lower quality of life in WHOQOL-BREF environment domain, and higher EE MBI domain increased the chances of being classified with symptoms of anxiety. Likewise, a recent study conducted in Italy, found high levels of Emotional Exhaustion in frontline healthcare workers during COVID-19 pandemic (Barello et al., 2020). Professionals reported significant work-related psychological pressure, frequent somatic symptoms, and high levels of Emotional Exhaustion burnout scores compared to previous study before COVID-19 outbreak (Barello et al., 2020). However, most of them presented high levels of Personal Accomplishment, contrasting with our findings. To the best of our knowledge, this is the first study to evaluate the association of symptoms of anxiety with health-related quality of life, and symptoms of burnout in multi-professional residents.

In this study, confirmatory factor analyses were conducted to confirm or reject the measurement theory of applied scales (BAI, WHOQOL-BREF and MBI) in our sample. Results evidenced validity for all instruments, agreeing with previous theoretical model. BAI, WHOQOL-BREF and MBI scales also had satisfactory and high values of internal consistency (Kabacoff et al., 1997; Maslach et al., 1996; World Health Organization, 1996). The Poisson regression model is mainly used in studies in which the outcome is a count (Burger et al., 2009). But Poisson regression using robust variance also applies to model continuous data, as a strategy to obtain better estimates of PR (Barros & Hirakata, 2003; Coutinho et al., 2008).

Our study has some limitations. First, it was focuses only on the early days of the outbreak, second the cross-sectional design does not allow to determine causality among symptoms of anxiety, COVID-19-related variables, low health-related quality of life and symptoms of burnout. Future research on COVID-19 and mental health of healthcare workers could implement longitudinal designs (Bittmann, 2022; Giovanis & Ozdamar, 2022; Morrison et al., 2022). Our sample had predominance of females and it was obtained by using the snowball technique. However, the sample did not differ in other characteristics, but sex and includes different Brazilian regions. In addition, we estimated the prevalence ratio to better evaluate our results, and all applied instruments presented good fit and reliability. This is the first study that investigated the association of symptoms of anxiety with quality of life and symptoms of burnout in Brazilian multi-professional residents during COVID-19 outbreaks.

Conclusion

Multi-professional residents with anxiety showed increased emotional exhaustion MBI domain and low health-related quality of life WOQOL BREF domains, during the COVID-19 pandemic in Brazil. Anxiety was strongly associated with being afraid of getting COVID-19, the perception of workload, somatization like sweating, wheezing and increased heart rate during work, feeling unsafe when using Personal Protective Equipment, and having psychological support from residence preceptors. Several analyses showed that women were more likely to report anxiety symptoms. In addition, anxiety was associated with increased sweating, wheezing, and increased heart rate during work, lower quality of life in the WHOQOL-BREF environment domain, and higher emotional exhaustion MBI domain. Residents need special attention as the provision of adequate protective supplies, and psychological support when responding to epidemic or pandemic outbreaks. It is important that health authorities be aware of the needs of multi-professional residents responding to the COVID-19 outbreaks. Mental-health problems screening, and psychosocial support may prevent adverse psychosocial outcomes.

Data Availability Data are available upon request to the corresponding author. The authors did not make the data publicly available due to the Brazilian regulation of research ethics and the protection of the confidentiality of participants.

Declarations

Informed Consent All participants in this study provided an informed consent in the research platform.

Conflict of Interest Authors declare no conflict of interests.

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