ORIGINAL ARTICLE

Impact of the COVID-19 pandemic on the development of burnout syndrome in frontline physicians: prevalence and associated factors

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SUMMARY

OBJECTIVE: To evaluate the prevalence of burnout syndrome (BS) in physicians working during the COVID-19 pandemic in Paraíba and to investigate the association between BS and the sociodemographic and labor variables of these professionals.

METHODS: This was a cross-sectional study including physicians who were active during the pandemic in Paraíba, whether they were on the front line (group 1) or not (group 2). Sociodemographic and labor variables were collected, and the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) questionnaire was applied.

RESULTS: A total of 126 physicians were included, including 82 who were on the front line. Among the professionals with results compatible with BS, 85.5% were in group 1, compared with 14.5% in group 2, and this difference was statistically significant. At the 5% level, the variables associated with BS were age (24–33 years), not having children, working on the front line, working in the COVID-19 ICU, being on duty, and having contracted COVID-19.

CONCLUSIONS: This case series found a positive association between the development of BS and medical action on the front line of the COVID-19 pandemic in Paraíba.

KEYWORDS: Coronavirus. Burnout. Health professional. Factor analysis statistical. Chi-square test.

INTRODUCTION

According to World Health Organization (WHO) data, as of May 2021, COVID-19 has affected more than 200 countries, resulting in approximately 159 million cases and approximately 3 million deaths[1]. In Brazil, this number has been increasing considerably, with more than 15 million cases and approximately 428,000 deaths from the disease reported as of May 2021[2].

Infection with the new coronavirus, SARS-CoV-2, which causes a severe acute respiratory syndrome known as COVID-19, may be asymptomatic or can cause problems ranging from mild respiratory tract symptoms to sepsis and multiple organ

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failure, which is life-threatening; thus, it has led to a significant increase in hospitalizations[3].

The increase in the number of cases and their evolution has caused an overload of health systems, especially in Brazil. As a result of this workload, many health professionals may experience burnout, fatigue, and stress, among other risk factors for physical and mental illness[3].

Burnout syndrome (BS) or burnout is a possible effect of chronic exposure to occupational stress and affects health professionals, particularly those working in hospitals[4]. It is believed that with the overload of health services, many professionals may have developed the disorder, with impacts on both the life of professionals and the care they provide.

The present study aimed to evaluate the prevalence of BS in physicians working during the COVID-19 pandemic in Paraíba and to verify its association with the sociodemographic and labor variables of these professionals.

METHODS

This was a cross-sectional study that included physicians of both sexes who worked during the COVID-19 pandemic in Paraíba, either on the front line (group 1) or off it (group 2). The physicians were recruited by e-mail and/or telephone in November 2020. The sample was obtained from the medical departments of reference hospitals for COVID-19 (group 1) and nonreference hospitals (group 2). Those who did not meet the inclusion criteria or did not adequately complete the data collection instrument were excluded.

The study was approved by the research ethics committee under no. 4,354,660 and followed the standards for research in humans.

A questionnaire was administered via Google Forms to obtain free and informed consent, collect sociodemographic and labor information, and administer the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) questionnaire version validated for Portuguese[5]. The MBI-HSS consists of 22 items that reflect 3 dimensions: emotional exhaustion (EE; 9 items), depersonalization (DP; 5 items), and reduced personal achievement (rPA; 8 items)[6].

The data were analyzed using R® software. To test the fit of the three-factor structure of the MBI-HSS, confirmatory factor analysis (CFA) was performed using the maximum likelihood method. The prevalence of BS was calculated, and the chi-square test was performed to investigate the association between the explanatory variables and the presence or absence of BS at a significance level of 5%.

There is no consensus on adequate cutoff points for MBI-HSS results. The manual published by Maslach et al.[6] advises that each dimension be analyzed separately to obtain the diagnosis from high EE and DP indices and low rPA[6]. The five-point Likert scale was used according to the adaptation validated by Tamayo[7], applied in some studies in Brazil[8,9]. Individuals with mean response options equal to or higher than "sometimes" (a score of 3 on the Likert scale) for the EE and ED dimensions or scores of 3 or less for the rPA dimension were considered to have a high risk of BS.

RESULTS

A total of 126 physicians who were working during the pandemic were included, comprising 82 physicians who were on the front line (group 1) and 44 who were not (group 2). Females were prevalent in both the groups.

The mean age was 33.77 years in group 1 and 38.02 in group 2. The majority (54.9%) of the professionals in group 1 had COVID-19, compared with 4.5% in group 2. Descriptive statistics are presented in Table 1.

Through exploratory factor analysis (EFA), the fit of the data was observed, and 64.01% of the variance was explained. The adequacy of the original three-factor structure of the MBI-HSS was tested using CFA. The EE domain was composed of items 1, 2, 3, 6, 8, 13, 14, 16, and 20; the DP domain was composed of items 5, 10, 11, 15, and 22; and the rPA domain included items 4, 7, 9, 12, 17,18 19, and 21.

The CFA obtained the following results for the three-dimensional model: $\chi(206)=295.25$; $p<0.001$; comparative fit index (CFI)=0.965; Tucker-Lewis index (TLI)=0.961; and root mean square error of approximation (RMSEA)=0.059 with 95%CI 0.043–0.073, confirming the adequacy. The internal consistency estimated by Cronbach's alpha was substantial: 0.89 (EE), 0.66 (DP), and 0.82 (rPA).

The categorization of BS dimensions was performed using the cutoff points from the Maslach et al., manual[6]: for EE: ≥27 (high), 17–26 (moderate), and ≤16 (low); for DP: ≥13 (high), 7–12 (moderate), and ≤6 (low); for rPA: ≤31 (high), 38–32 (moderate), and ≥39 (low). Table 2 shows the distribution according to these levels.

The results of the chi-square test are shown in Table 3. The statistically significant variables at the 5% level were age between 24 and 33 years (p=0.008), not having children (p=0.004), working on the front line (p<0.001), working in the COVID ICU, being on-duty (p=0.001), and having contracted COVID-19 (p=0.016). Among the professionals whose results were compatible with BS, 85.5% worked on the front line and 14.5% worked off the front the line, and this difference was statistically significant (p<0.001).

Table 1. Distribution of individuals according to sociodemographic and labor characteristics and COVID-19 infection history.

Variable	Front line		Not front line	
	n	%	n	%
Gender				
Female	45	54.9	36	81.8
Male	37	45.1	8	18.2
Marital status				
Married	52	63.4	36	81.8
Other	2	2.4	0	0
Separated	5	6.1	4	9.1
Single75	23	28.0	4	9.1
Color				
Yellow	1	1.2	2	4.5
White	55	67.1	30	68.2
Brown	26	31.7	12	27.3
Comorbidities				
Yes	14	17.1	7	15.9
No	68	82.9	37	84.1
Use of psychotropic drugs				
Yes	11	13.4	8	18.2
No	71	86.6	36	81.8
Physical activity				
Yes	53	64.6	35	79.5
No	29	35.4	9	20.5
Religious				
Yes	71	86.6	43	97.7
No	11	13.4	1	2.3
Smoking				
Yes	3	3.7	1	2.3
No	79	96.3	43	97.7
Alcoholic beverage consumption				
Yes	59	72.0	27	61.4
No	23	28.0	17	38.6
Lives with				
Friends	1	1.2	0	0
Family	64	78.0	42	95.5
Alone	17	20.7	2	4.5
Has children				
Yes	40	48.8	33	75.0
No	42	51.2	11	25.0

Table 1. Continuation.

Variable	Front line		Not front line	
	n	%	n	%
Type of service				
COVID ward	49	59.8	0	0
COVID ICU	33	40.2	0	0
Other service (non-COVID)	0	0	44	100
Position				
Day worker	9	11.0	26	59.1
On call	73	89.0	18	40.9
Weekly workload				
Less than 40 h	29	35.4	17	38.6
Between 40 and 60 h	25	30.5	25	56.8
Over 60 h	28	34.1	2	4.5
Has more than one professional relationship				
Yes	74	90.2	35	79.5
No	8	9.8	9	20.5
Considers their remuneration fair				
Yes	28	34.1	26	59.1
No	54	65.9	18	40.9
Had COVID-19				
Yes	45	54.9	2	4.5
No	37	45.1	42	95.5
Total	82	100.0	44	100.0

Source: Research data. The values highlighted in bold are intended to draw the reader's attention to statistically significant variables.

Table 2. Distribution of professionals on the front line (group 1) and off the front line (group 2) for each dimension.

Level	Emotional exhaustion		Depersonalization		Reduced professional achievement	
	Front line	Off the front line	Front line	Off the front line	Front line	Off the front line
High	41 (50.0%)	8 (18.2%)	31 (37.8%)	1 (2.3%)	53 (64.6%)	21 (47.7%)
Moderate	32 (39.0%)	30 (68.2%)	45 (54.9%)	35 (79.5%)	27 (32.9%)	21 (47.7%)
Low	9 (11.0%)	6 (13.6%)	6 (7.3%)	8 (18.2%)	2 (2.4%)	2 (4.5%)

Source: Research data. The values highlighted in bold are intended to draw the reader's attention to statistically significant variables.

DISCUSSION

The present study explored the factors impacting the development of BS in physicians who worked at hospitals during the COVID-19 pandemic in Paraíba. The findings of this study showed that age between 24 and 33 years, not having children, working on the front line, working in the COVID ICU, being on call, and having contracted COVID-19 were statistically significant variables in relation to the outcome (the presence or absence of BS).

This study also showed that serving on the front line during the COVID-19 pandemic was the main factor associated with professional burnout in the population studied.

Table 3. Results of the tests of association between the explanatory variables and the outcome (presence or absence of burnout syndrome).

	Burnout		No burnout		p-value
	n	%	n	%	
Sociodemographic data					
Age, years					
24–34	32	58.2	22	**31.0**	0.008
34–44	20	36.4	40	**56.3**	
44–55	3	5.5	9	**12.7**	
Gender					
Female	32	58.2	49	69.0	0.208
Male	23	41.8	22	31.0	
Marital status					
Married	36	65.5	52	73.2	0.523
Single	15	27.3	12	16.9	
Divorced	13	23.6	6	8.5	
Other	1	1.8	1	1.4	
Color					
Yellow	1	65.5	2	2.8	0.221
White	33	27.3	52	73.2	
Brown	21	23.6	17	23.9	
Black	0	0.0	0	0.0	
Comorbidities					
Yes	8	14.5	13	18.3	0.574
No	47	85.5	58	81.7	
Use of psychotropic drugs					
Yes	11	20.0	8	11.3	0.174
No	44	80.0	63	88.7	
Physical activity					
Yes	37	67.3	51	71.8	0.580
No	18	32.7	20	28.2	
Religious					
Yes	47	85.5	67	94.4	0.091
No	8	14.5	4	5.6	
Smoking					
Yes	0	0.0	4	5.6	0.074
No	55	100.0	67	94.4	
Alcohol consumption					
Yes	38	69.1	48	67.6	0.859
No	17	30.9	23	32.4	

Table 3. Continuation.

	Burnout		No burnout		p-value
	n	%	n	%	
Lives with					
Friends	1	1.8	0	0.0	
Family	43	78.2	63	88.7	0.195
Alone	11	20.0	8	11.3	
Has children					
Yes	24	43.6	49	69.0	
No	31	56.4	22	**31.0**	**0.004**
Hours of sleep					
Up to 6	37	67.3	37	52.1	
More than 6	18	32.7	34	47.9	0.086
Labor data					
Front line professional					
Yes	47	85.5	35	**49.3**	
No	8	14.5	36	**50.7**	<0.001
Type of service					
COVID ICU	22	40.0	11	**15.5**	
COVID ward	25	45.5	24	**33.8**	<0.001
Other	8	14.5	36	**50.7**	
Position					
On call	48	87.3	43	60.6	
Day worker	7	12.7	28	**39.4**	**0.001**
Workload					
Up to 40 h	15	27.3	31	43.7	
40–60 h	24	43.6	26	36.6	0.149
More than 60 h	16	29.1	14	19.7	
More than one professional relationship					
Yes	48	87.3	61	85.9	
No	7	12.7	10	14.1	0.825
Satisfactory remuneration					
Yes	20	36.4	34	47.9%	
No	35	63.6	37	52.1%	0.195
Had COVID-19					
Yes	27	49.1	20	28.2	
No	28	50.9	51	**71.8**	**0.016**

Source: Research data. The values highlighted in bold are intended to draw the reader's attention to statistically significant variables.

Among the professionals with results compatible with BS, 85.5% worked on the front line. Similar findings were observed in the studies by Kannampallil et al.[10], Giusti et al.[11], and Demartini et al.[12]; however, the findings differed from those reported by Wu et al.[13], Dimitriu et al.[14], and Dinibutum[15], who found a higher prevalence of BS in professionals working off the front line than among those who dealt directly with the disease[13-15].

The highly contagious nature of COVID-19 coupled with the increased workload due to the overload of health services exposes these professionals to the risk of contracting the disease and spreading it to their families, which causes increased levels of stress and anxiety and, consequently, professional exhaustion[10-12].

These findings should be considered because of their potential impact on clinical practice. The development of BS in health professionals, especially those in the medical field, can have serious consequences since it is associated with increased rates of medical error and decreased productivity, which compromises the quality of care for critically ill individuals[16].

Studies conducted prior to the pandemic showed a prevalence of BS that was greater than 40% and was higher in professionals working in emergency departments and ICUs[17]. COVID-19 introduced additional stress factors, such as fear of contracting the infection, fear of spreading the infection to family members, and social isolation[18]; these additional factors caused symptoms of stress and depression that impacted the physical and mental health of health care professionals[19].

The MBI is the most commonly used instrument for measuring occupational burnout and is considered the gold standard[6]. There is a lack of data in the literature applying this tool to professionals working directly with COVID-19. One of the first studies included 220 physicians and found a 25% increase in EE and DP and an approximately 50% increase in rPA[13]. In this case series, among physicians working on the front line, these rates were 50% (EE), 23% (DP), and 64% (rPA), with the latter two being similar to the findings of the cited study.

Comparatively, a study by Giusti et al.[11] that applied the MBI-HSS to 330 health professionals showed that 66.7% had moderate to high levels of EE and rPA and 25% had moderate to high levels of DP[11], similar to the indices found in the present study.

The results of the chi-square test showed that gender was not a significant factor, corroborating the findings of the literature[20,21]; however, the results of the present study differ from those of Kannampallil et al.[10] and a recent study conducted in Brazil that reported a higher prevalence of BS in females[22].

Age was divided into three groups, and age between 24 and 34 years was found to be a significant factor, indicating a higher prevalence of BS in younger professionals (p=0.008). This finding that disagrees with that of Gunasingam et al.[23], in which there was no association between burnout and age. However, it was consistent with other studies in which younger participants had a higher prevalence of BS[22,24].

Working in the ICU was associated with a higher prevalence of burnout (p=0.001), similar to the findings of a case series that included 1001 European intensivists[25] in which BS was present in 52%. Finally, having contracted COVID-19 was associated with a higher prevalence of BS (p=0.016), with statistical significance for all constructs. Similar findings were observed in a study of 330 health professionals in northern Italy[11].

CONCLUSIONS

The occurrence of BS among health professionals (particularly those in the medical field) working on the front line of the COVID-19 pandemic is undeniable and is an important factor to consider not only because of its impact on the mental health of these professionals but also because of its potential to compromise patient care.

In this case series, a positive association was found between the development of BS and action on the front line of the pandemic among physicians in Paraíba. In addition, the following variables were identified as significant factors: age between 24 and 33 years, not having children, working on the front line, working in the COVID ICU, being on call, and having contracted COVID-19.

These results highlight the importance of the early diagnosis and management of BS in doctors working on the front line during the pandemic to establish concrete measures that can increase support for the physical and mental health of these professionals.

AUTHORS' CONTRIBUTIONS

ARQPF: Conceptualization, Data curation, Investigation, Writing – original draft, Writing – review & editing. **HFCC:** Formal analysis, Project administration, Supervision. **ABS:** Conceptualization, Writing – original draft. **LCLD:** Writing – review & editing. **RRC:** Writing – review & editing. **MTL:** Formal analysis, Methodology. **KDTA:** Writing – review & editing. **CMBLL:** Supervision, Project administration, Visualization.

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