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RESEARCH ARTICLE

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STRESS AMONG BRAZILIAN PHYSICIANS DURING THE CORONAVIRUS DISEASE PANDEMIC

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ABSTRACT

Objective: This study aimed to develop epidemiological profiles of Brazilian physicians who were experiencing different levels of stress during the corona virus disease pandemic. **Methods:** This cross-sectional, exploratory, quantitative study was conducted between April and May 2020. A sociodemographic questionnaire was used, and the Lipp's Stress Symptoms Inventory for Adults was used to assess stress symptoms. **Results:** Women were more stressed (76.7%) than men. A majority of those who were stressed (43.3%) were aged 31 to 40 years. General practitioners (57.1%) were more stressed than specialists. The participants had been using antidepressants (23.5%) and anxiolytics (15.3%), but they were disinterested in receiving referrals to mental health services (60.5%). **Conclusions:** It is important to monitor the mental health of physicians so that they are healthy and able to provide optimal healthcare to their patients.

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INTRODUCTION

In December 2019, the world became aware of a new disease that had been detected in the city of Wuhan in China. Initially, this disease was not well defined (Elbay et al., 2020). In January 2020, the World Health Organization declared that there had been an outbreak of a new disease caused by a coronavirus and that it was collapsing the Chinese health system (Blake et al., 2020). Further, in China, health professionals were shouldering a heavy workload, and this resulted in higher levels of stress, anxiety, and depression. These outcomes underscored the need for improved mental health care for frontline professionals (Organization, 2020). Studies conducted during past outbreaks (e.g., the outbreak of severe acute respiratory syndrome in 2003) found that health professionals were experiencing high levels of psychological stress during these periods. Unfortunately, however, their mental health needs were not addressed because of slow emergency responses (Assari & Habibzadeh, 2020). The first few studies on stress were conducted in 1936. The endocrinologist Hans Selye defined stress as the nonspecific response of an organism to a threatening situation (Mendes et al., 2011; Oswald, 2009).

The symptoms of stress were conceptualized in terms of a "generalized adaptation syndrome," which is activated when an individual is confronted with a stressor. Further, he noted that an internal homeostasis breakdown occurs during the resistance phase, and this requires the organism to adapt (Mendes et al., 2011; Santos & Cardoso, 2010). If the stressor is not suppressed or if the situation is not appropriately managed, the individual may reach a stage of physical and psychological exhaustion and become vulnerable to diseases (Santos & Cardoso, 2010).

During a pandemic, health professionals are exposed to emotional stressors to a greater extent because of their commitment to treat infected individuals, concerns about their own health and the health of their loved ones, and increased risk of infecting their families. In addition, high rates of inpatient deaths, inadequate personal protective equipment (PPE), and a strenuous workload increase stress levels among these professionals (Ayanian, 2020; Elbay et al., 2020; Mason & Friese, 2020; Ornell et al., 2020; Pimentel et al., 2020). The purpose of this study, which was a part of a larger investigation into the mental health of physicians during the COVID-19 pandemic, was to identify the factors that contribute to stress among physicians.

METHODS

This was a cross-sectional, exploratory, quantitative study. Official figures for the number of physicians who have been treating patients infected with severe acute respiratory syndrome coronavirus are not available. In the worst-case scenario, the rate of direct exposure to the virus among physicians would be 50% (i.e., to maximize error in estimation). Therefore, assuming a finite population of 485,000 physicians (5% margin of error, 95% confidence level), the minimum required sample size was found to be 384 physicians (Miot, 2011). A total of 486 physicians were recruited from all regions of Brazil, and they responded to an online survey between April 19 and May 3, 2020. Each participant provided electronic consent by completing an Informed Consent Registration Form before responding to the survey. This study was approved by the National Research Ethics Commission (no. 3,979,226). Two data collection instruments were used. The first assessment, which was created by the present researchers, assessed the following sociodemographic characteristics: sex, age, religion, marital status, whether they had children, the person with whom they were living, whether they were isolating from their family members, time since graduation, specialty, type of workplace, use of PPE, psychotherapeutic and psychiatric monitoring, use of psychotropic drugs, COVID-19 exposure, infected or deceased family members or friends, and emotional and family conflicts.

The Lipp's Stress Symptoms Inventory for Adults (LSSI) was used to assess the symptoms of stress (Men, 2005). This scale has been standardized (including validity) in Brazil (Sadir et al., 2010), with good psychometric properties validated with 1853 people between 15 to 75 years old (Cunha et al., 2017). It assesses the different types of stress symptoms (somatic and psychological) and determines the phase of the stress response to which a respondent belongs (de Carvalho & Malagris, 2007; Santos & Cardoso, 2010). With regard to data analysis, categorical variables were examined by computing absolute and relative frequencies. Fisher's exact test and Pearson's chi-squared analysis (with and without Monte Carlo simulations) were used to examine the associations between categorical variables. The significance level was set as 5%, and all analyses were conducted using R Core Team 2020.

RESULTS

Physicians working in outpatient clinics and hospitals in the public and private sectors were recruited from all regions of Brazil. Information about their families and current employment status was also acquired. Only one participant was in the alert phase (symptoms experienced during the past 24 hours). Therefore, he was excluded from the sample. The other participants belonged to the following categories: no stress or the resistance or exhaustion phases of the stress response. Most of the participants (N = 486) were women (68.1%). Moreover, 39.9% of the participants were aged 31–40 years, 59.9% of them were married, in a stable relationship, or cohabiting, 46.7% of them had children, and 36% of them were living with their spouse and children. With regard to the presence of stress symptoms, women were more stressed (76.7%), and 43.3% of those who were stressed belonged to the 31–40-year-old age group. However, age-wise comparisons revealed that most physicians younger than 30 years were stressed (i.e., when compared to those who were not stressed). Among those who had children, only 36.3% were stressed. Further, a minority of those (28.8%) who were living with their spouse and children were stressed (Table 1). The following factors were associated with stress: not having children (63.8%), working in the public sector (46.7%), time since graduation < 5 years (39.2%), working as a general practitioner (36.7%), and concurrently working as a general physician and a specialist (20%). Most participants were working only as specialists (254). However, only 104 specialist physicians (43.4%) reported feeling stressed. Those who were not stressed were more likely to have children, to be working as a specialist, and to have graduated more than 10 years ago (Table 2).

Table 1. Sociodemographic characteristics of physicians as a function of stress level, Brazil, 2020

	Stress n (%)	No stress n (%)	p
Sex			
Female	184 (76.7)	147 (59.8)	< 0.001 ^Q
Male	56 (23.3)	99 (40.2)	
Age			
< 30 years	77 (32.1)	40 (16.3)	< .001 ^{QM}
31–40 years	104 (43.3)	90 (36.6)	
41–50 years	42 (17.5)	59 (24)	
51–60 years	16 (6.7)	34 (13.8)	
61–70 years	1 (0.4)	20 (8.1)	
> 70 years	0 (0)	3 (1.2)	
Marital status			
Single but dating	47 (19.6)	28 (11.4)	0.024 ^{QM}
Single and alone	44 (18.3)	38 (15.4)	
Married, stable union, or cohabiting	130 (54.2)	161 (65.4)	
Separated or divorced	19 (7.9)	17 (6.9)	
Widower	0 (0)	2 (0.8)	
Do you have children?			
Yes	87 (36.3)	140 (56.9)	< 0.001 ^Q
No	153 (63.8)	106 (43.1)	
With whom do you live?			
Parents and/or siblings	41 (17.1)	22 (8.9)	0.005 ^{QM}
Boyfriend/girlfriend/fiancé (e)/spouse	60 (25)	51 (20.7)	
Spouse and children	69 (28.8)	106 (43.1)	
Parents or in-laws, spouse, and children	7 (2.9)	10 (4.1)	
Only children	9 (3.8)	15 (6.1)	
Friends	4 (1.7)	5 (2)	
Alone	50 (20.8)	37 (15)	

Legend: LSSI = Lipp's Stress Symptoms Inventory for Adults. n = absolute frequency. % = (relative frequency) percentage. Q = Pearson's chi-squared test. QM = Pearson's chi-squared test with Monte Carlo simulations. Significant results are presented in boldface (p < 0.05).

Table 2. Sociodemographic characteristics of physicians as a function of stress levels according to work activity, Brazil, 2020

	Stress n (%)	No stress n (%)	p
During this ongoing pandemic, in which sectors have you been directly working with patients?			
Public	112 (46.7)	86 (35)	0.005 ^Q
Private	34 (14.2)	60 (24.4)	
Both	94 (39.2)	100 (40.7)	
During this ongoing pandemic, have you been working in outpatient clinics or hospitals?			
Hospitals	94 (39.2)	84 (34.1)	0.021 ^{QM}
Outpatient clinics	53 (22.1)	82 (33.3)	
Both	93 (38.8)	80 (32.5)	
How long has it been since you graduated?			
< 5 years	94 (39.2)	56 (22.8)	< 0.001 ^{QM}
5–10 years	67 (27.9)	57 (23.2)	
11–20 years	47 (19.6)	52 (21.1)	
21–30 years	24 (10)	47 (19.1)	
> 31 years	8 (3.3)	34 (13.8)	
Do you work as a specialist or a general practitioner?			
Specialist	104 (43.3)	150 (61)	0.001 ^{QM}
General practitioner	88 (36.7)	66 (26.8)	
Both	48 (20)	30 (12.2)	
Have you been on call during the pandemic?			
Yes, for a public hospital	91 (37.9)	57 (23.2)	0.001 ^{QM}
Yes, for a private hospital	26 (10.8)	35 (14.2)	
Yes, for both	50 (20.8)	41 (16.7)	
No	73 (30.4)	113 (45.9)	

Legend: LSSI = Lipp's Stress Symptoms Inventory for Adults. n = absolute frequency. % = (relative frequency) percentage. Q = Pearson's chi-squared test. QM = Pearson's chi-squared test with Monte Carlo simulations. Significant results are presented in boldface (p < 0.05).

With regard to the exhaustion phase, when (a) a stressor persists for at least one month and (b) a person has lost the capacity to adapt, he or she becomes vulnerable to several diseases.

Accordingly, the following factors were most strongly associated with exhaustion: working in the public sector (43%), working in hospitals (44.7%) or concurrently working in outpatient clinics and hospitals (34.2%) rather than only in outpatient clinics (21.1%), time since graduation ≤ 10 years (74.6%), and working only in public hospitals (34.2%) rather than in private facilities (10.8%) (Table 3).

professionals, most of them did not wish to seek referrals or assistance. Only 30.4% and 39.5% of those who were in the resistance and exhaustion phases intended to seek treatment, respectively. In addition, few participants (8.5%) who were not stressed expressed a desire to receive this kind of care, possibly as a prophylactic measure (Table 4).

Table 3. Routine work habits of physicians without stress and physicians in the resistance and exhaustion phases (LSSI), Brazil, 2020

	No stress n (%)	Resistance n (%)	Exhaustion n (%)	Total	p
During this ongoing pandemic, in which sectors have you been directly working with patients?					
Public	86 (35)	63 (50.4)	49 (43)	198 (40.8)	0.010
Private	60 (24.4)	18 (14.4)	15 (13.2)	93 (19.2)	
Both	100 (40.7)	44 (35.2)	50 (43.9)	194 (40)	
During this pandemic, have you been working in outpatient clinics or hospitals?					
Hospitals	84 (34.1)	42 (33.6)	51 (44.7)	177 (36.5)	0.026
Outpatient clinics	82 (33.3)	29 (23.2)	24 (21.1)	135 (27.8)	
Both	80 (32.5)	54 (43.2)	39 (34.2)	173 (35.7)	
How long has it been since you graduated?					
< 5 years	56 (22.8)	46 (36.8)	48 (42.1)	150 (30.9)	< 0.001
5–10 years	57 (23.2)	29 (23.2)	37 (32.5)	123 (25.4)	
11–20 years	52 (21.1)	28 (22.4)	19 (16.7)	99 (20.4)	
21–30 years	47 (19.1)	16 (12.8)	8 (7)	71 (14.6)	
> 31 years	34 (13.8)	6 (4.8)	2 (1.8)	42 (8.7)	
Have you been working as a specialist or a general practitioner?					
Specialist	150 (61)	59 (47.2)	44 (38.6)	253 (52.2)	0.001
General practitioner	66 (26.8)	41 (32.8)	47 (41.2)	154 (31.8)	
Both	30 (12.2)	25 (20)	23 (20.2)	78 (16.1)	
Have you been on call during the pandemic?					
Yes, for a public hospital	57 (23.2)	52 (41.6)	39 (34.2)	148 (30.5)	0.001
Yes, for a private hospital	35 (14.2)	14 (11.2)	11 (9.6)	60 (12.4)	
Yes, for both	41 (16.7)	20 (16)	30 (26.3)	91 (18.8)	
No	113 (45.9)	39 (31.2)	34 (29.8)	186 (38.4)	

Legend: LSSI = Lipp’s Stress Symptoms Inventory for Adults. n = absolute frequency. % = (relative frequency) percentage. Pearson’s chi-squared test with Monte Carlo simulations.

Table 4. Monitoring, drug use, and treatment preferences among physicians without stress and physicians in the resistance and exhaustion phases (LSSI), Brazil, 2020

	LSSI			Total	p
	No stress n (%)	Resistance n (%)	Exhaustion n (%)		
Have you received psychotherapy?					
Yes	79 (32.2)	55 (44)	46 (40.4)	180 (37.2)	0.060
No	166 (67.8)	70 (56)	68 (59.6)	304 (62.8)	
Have you undergone a psychiatric evaluation?					
Yes	38 (15.4)	32 (25.6)	42 (36.8)	112 (23.1)	< 0.001
No	208 (84.6)	93 (74.4)	72 (63.2)	373 (76.9)	
Hypnotics	9 (3.7)	14 (11.2)	13 (11.4)	36 (7.4)	0.007
Mood stabilizers	7 (2.8)	1 (0.8)	10 (8.8)	18 (3.7)	0.004
Antidepressants	36 (14.6)	35 (28)	43 (37.7)	114 (23.5)	< 0.001
Antipsychotics	1 (0.4)	0 (0)	1 (0.9)	2 (0.4)	0.744
Anxiolytics	19 (7.7)	21 (16.8)	34 (29.8)	74 (15.3)	< 0.001
A combination	5 (2)	5 (4)	16 (14)	26 (5.4)	< 0.001
Do you wish to receive assistance from or referrals to mental health professionals?					
Yes	21 (8.5)	38 (30.4)	45 (39.5)	104 (21.4)	< 0.001
No	225 (91.5)	87 (69.6)	69 (60.5)	381 (78.6)	

Legend: LSSI = Lipp’s Stress Symptoms Inventory for Adults. n = absolute frequency. % = (relative frequency) percentage. Pearson’s chi-squared test with Monte Carlo simulations.

The following factors played a protective role by enhancing the physical and mental well-being of the participants and helping them adapt to dominant stressors: a maximum workload of 44 hours per week, age >41 years, time since graduation ≥11 years, having children, and living with one’s family. Irrespective of the experience of stress, the most commonly used medications were antidepressants (23.5%), followed by anxiolytics (15.3%). However, the percentage of participants who had undergone psychiatric evaluation (23.1%) was lower than the percentage of those who had undergone psychotherapeutic evaluation (37.2%). Among those who underwent psychiatric monitoring, 15.4% were not stressed, 25.6% were in the resistance phase, and 36.8% were in the exhaustion phase. Despite the evident impact of the pandemic on the mental health of health

DISCUSSION

In this study, there was an association between stress and the female sex. This finding is consistent with the results of past studies that have used a wide range of measures to assess stress and examine the effect of the COVID-19 pandemic on the mental health of health professionals, especially physicians (Chew *et al.*, 2020; Luo *et al.*, 2020; Podder *et al.*, 2020; Talevi *et al.*, 2020). Women play several (caregiving) roles within their homes and families. Thus, they engage in a high number of activities and experience more stress (Podder *et al.*, 2020; Urooj *et al.*, 2020). In this study, greater stress was associated with age (younger) and time since graduation

(<five years). The first inference pertains to the fact that these two findings are related because less-experienced physicians were young adults (i.e., < 30 years). Therefore, they had less time to acquire and apply knowledge in clinical practice. Thus, they may not have possessed the knowledge required to provide care to individuals with COVID-19 symptoms. The second inference pertains to the level of confidence that physicians gain over time. They may begin to gain a broader and more secure view of what they are required to do as professionals, even in very challenging situations (Podder *et al.*, 2020). With regard to the work environment (public vs. private), higher levels of stress were observed among physicians who were working in the public sector. This association may be attributable to the uncertainties encountered by these professionals. Specifically, there may have been a shortage of human resources, materials, supplies, and PPE (e.g., masks, faceshields, gloves, and other protective equipment) (Adams & Walls, 2020; Hall, 2020; Pimentel *et al.*, 2020). Higher levels of stress were observed among general practitioners. These professionals may not have had adequate time to apply what they had learned during training. Further, emergent situations may have necessitated the acquisition of new information and in-depth knowledge. Such experience can be gained during medical residency. During this period, physicians acquire specialized knowledge. As a result, they are likely to be more confident in their professional skills and experience lower levels of stress (Podder *et al.*, 2020). At the beginning of their careers, physicians follow a more exhausting and demanding routine. This adversely affects their mental and physical health. Consequently, they may enter into the exhaustion phase, which is characterized by a lack of assertive adaptation (Gracino *et al.*, 2016).

In particular, during the ongoing pandemic, younger physicians have constantly been experiencing exhaustion. Indeed, in Brazil, there have been more than 120,000 deaths, and even minimal prophylactic and therapeutic measures have not yet been satisfactorily adopted. From the beginning of their training, medical students learn to believe that physicians possess not only the power to fight and overcome death but also adequate knowledge to postpone or even avoid death. However, the occurrence of death, despite their best efforts, causes physicians to face their own finitude, feel frustrated, and experience more stress (Marta *et al.*, 2009). Within the context of the ongoing pandemic, mental illness is a multifactorial construct, because a constant sense of fear, feelings of uncertainty, and the loss of social connectedness induce stress (Li *et al.*, 2020). According to (Li *et al.*, 2020), health professionals (like the general population) experience high levels of psychological pressure. Indeed, they have a duty to care for suspected or infected patients, forge strong relationships with patient relatives, and face the judgment of those who consider them to not be skilled enough to save lives and perceive them as dangerous sources of disease transmission.

Health professionals work in environments that are characterized by high emotional demands. They render them vulnerable to psychological tension, emotional exhaustion, and stress (Santos & Cardoso, 2010). Continued exposure to high levels of stress can trigger physical and emotional exhaustion and lead to the exhaustion phase, which is characterized by the impossibility of adaptation to a stressful event. This can lead to the emergence of both organic pathologies, such as infarction, ulcers, and psoriasis, and mental disorders, such as depression (Mendes *et al.*, 2011). In this study, 49.2% of the physicians had symptoms of stress and were in the resistance and exhaustion phases. A stressed individual may continue to attempt to establish homeostasis in the resistance phase. However, reduced quality of life may directly interfere with clinical practice among professionals (de Carvalho & Malagris, 2007; Oswaldo, 2009). The ongoing pandemic, which has now lasted for more than five months, has resulted in work overload among health professionals. Similar outcomes were witnessed during past outbreaks, which also resulted in high levels of stress that remained unaddressed (Assari & Habibzadeh, 2020). Consistent with past findings, family life (e.g., living with one's spouse and children) emerged as a protective factor. Companionship between partners may act as a buffer in times of adversity (Podder *et al.*, 2020). However, in other studies (Melo *et al.*,

2020), most (90.8%) of the participating physicians had changed how they interacted with their family members because of possible overexposure. They restricted their expressions of affection because of fear of transmitting the disease to their family members and friends (Hall, 2020; Melo *et al.*, 2020; Walton *et al.*, 2020).

The findings of studies conducted during past outbreaks suggest that this psychological burden has adverse long-term effects on the mental health of health professionals (Assari & Habibzadeh, 2020; Hall, 2020; Holmes *et al.*, 2020). Thus, early prophylactic measures and appropriate treatment plans are required. However, unlike physical illnesses, stress does not motivate individuals to seek treatment. Of all the physicians who were stressed, 65.3% did not wish to be referred to mental health services. Even exhausted professionals (49.2%) were unaware of their levels of psychological distress and its impact on their overall health. Although the participants did not wish to be referred to mental health services (65.3% of physicians), they reported using antidepressants (23.5% of all participants, irrespective of stress levels) and anxiolytics (15.3%). It is possible that these professionals were experiencing "psychophobia" (avoidance due to fear of the unconscious self). This sense of fear may be caused by different factors such as a lack of awareness, prejudice, and attitudes rooted in negative beliefs that create fear of the unknown (Prado & Bressan, 2016). The second explanation pertains to the excessive consumption of psychotropic drugs (both prescriptions for patients and self-medication), especially antidepressants and anxiolytics, which was observed in this study (Pelegri, 2003). The post-pandemic world will need to address the increased demand for mental health care. New challenges will arise, and a long-term plan for psychosocial recovery will be needed (Melo *et al.*, 2020). This study has a few limitations because of the unprecedented impact of the pandemic. Few studies have examined the factors that were investigated in this study (e.g., stress levels among physicians) within the context of a pandemic. Only one instrument was used to assess stress. Therefore, there is a need for an approach that permits researchers to assess stress more objectively to extend this line of inquiry.

CONCLUSION

The present findings offer important insights into stress among Brazilian physicians during the COVID-19 pandemic. Women, young adults, and general practitioners were at an increased risk for stress. In addition, despite using psychotropic drugs such as antidepressants and anxiolytics, physicians were disinclined to receive psychological help. This may be attributable to psychophobia among medical professionals. In contrast, the following factors were associated with better well-being and coping during the pandemic: a maximum workload of 44 hours per week, age >41 years, time since graduation ≥11 years, having children, and living with one's family. Mental health issues should be addressed openly and effectively so that all individuals are afforded the opportunity to alleviate their distress. This will allow physicians to receive appropriate treatment and provide better healthcare to their patients. There is a need for further research in this domain. Specifically, there is an urgent need for long-term interventions that can effectively protect and enhance psychological well-being among this important group of health professionals.

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