

# Covid-19 pandemic for Emergency Medicine residents: an observational study on mental health and medical practice

*Pandemia Covid-19 para residentes Medicina de Emergência: estudo observacional em saúde mental e prática médica*

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## ABSTRACT

**Introduction:** Emergency medicine is a relatively new medical specialty in Brazil, approved just in 2016. Residency training programs have been implemented ever since. The emergency environment is known to represent a death-and-life tension on the professional team, culminating with high rates of mental illness in this population. The Covid-19 pandemic seems to be affecting these rates of depression, anxiety, and burnout in health professionals.

**Objective:** To assess the symptoms of burnout, depression, and anxiety in Brazilian medical residents of Emergency Medicine during the Covid-19 pandemic and compare the residents' beliefs regarding clinical practice related to Covid-19 patients.

**Methods:** A quantitative study was conducted with a convenience sample of volunteer medical residents from an anonymous online survey, available during April 2020. This investigation collected sociodemographic information and used the Oldenburg Burnout Inventory (OLBI) to measure burnout; the Patient Health Questionnaire (PHQ-9) to measure depression; and the General Anxiety Disorders (GAD-7) to measure generalized anxiety disorder. This study also developed a Covid-19 Impact Questionnaire (CIQ-19) to assess the residents' beliefs and clinical practices related to Covid-19 patients.

**Results:** The survey consisted of 63 respondents, about 26,35% of emergency medicine residents in Brazil. Only 39,6% residents felt safe while working with Covid-19 patients. Mild depressive symptoms were found in 68,2% of the residents, followed by anxiety symptoms in 50,7% and burnout in 54,0% overall. About 12% of the residents do nothing about their mental health status, while some prefer to talk with family or friends (36,1%) and discuss with their team support (24,3%) when they need mental health care.

**Conclusion:** Emergency medicine residents have high rates of mental illness and it could get worse when submitted to stressful and unknown situations, such as the Covid-19 pandemic. Initiatives should be made to improve these physicians' mental health status. It is proposed that health institutions pay medical supervisors a closer and more unique look at physicians in training. A mentoring program proposal is an opportunity to reflect on technical and personal improvements for medical residents.

**Keywords:** Emergency Medicine; Residency; Mental Health.

## RESUMO

**Introdução:** Medicina de emergência é uma especialidade relativamente nova no Brasil, aprovada apenas em 2016, e programas de treinamento em residência têm sido instituídos desde então. O ambiente da emergência é conhecido por representar uma tensão entre vida e morte nos profissionais, o que culmina em altos índices de adoecimento mental nessa população. A pandemia da Covid-19 aparenta estar influenciando nas taxas de depressão, ansiedade e burnout de profissionais de saúde.

**Objetivo:** Este estudo teve como objetivos avaliar os sintomas de burnout, depressão e ansiedade em residentes de medicina de emergência brasileiros durante a pandemia da Covid-19 e comparar as crenças deles sobre a prática clínica relacionada aos pacientes com a doença.

**Método:** Um estudo quantitativo foi realizado com uma amostra conveniente de médicos residentes voluntários, por meio de uma pesquisa on-line anônima disponível durante o mês de abril de 2020. Esta investigação coletou informações sociodemográficas e utilizou as seguintes escalas: Oldenburg Burnout Inventory (OLBI) para mensurar burnout, Patient Health Questionnaire (PHQ-9) para mensurar depressão e General Anxiety Disorders (GAD-7) para mensurar transtorno de ansiedade generalizada. Neste estudo, também foi desenvolvido um Questionário sobre o Impacto da Covid-19 (CIQ-19) para acessar as crenças e práticas clínicas relacionadas aos pacientes com Covid-19.

**Resultado:** A pesquisa foi composta de 63 voluntários, aproximadamente 26,35% dos residentes em medicina de emergência no Brasil. Apenas 39,6% dos residentes se sentiram seguros enquanto trabalhavam com pacientes com Covid-19. Encontraram-se sintomas leves de depressão em 68,2%, seguidos de sintomas de ansiedade em 50,7% e burnout em 54,0%. Aproximadamente 12% dos residentes não fazem nada relação à própria saúde mental, alguns preferem conversar com familiares e amigos (36,1%), e outros discutem com a equipe de suporte (24,3%) quando precisam de atendimento.

**Conclusão:** Os residentes de medicina de emergência possuem altos índices de adoecimento mental, e isso pode piorar quando submetidos a situações estressantes e desconhecidas, como a pandemia da Covid-19. Iniciativas devem ser tomadas para melhorar a saúde mental desses médicos. Propõe-se que as instituições de saúde ofereçam aos supervisores médicos uma visão mais próxima e exclusiva sobre os médicos em treinamento. A proposta de um programa de mentoria é uma oportunidade de refletir sobre melhorias técnicas e pessoais para médicos residentes.

**Palavras-chave:** Medicina de Emergência; Residência; Saúde Mental.

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## INTRODUCTION

Emergency Medicine (EM) is a relatively new specialty in the United States, as well as in other parts of the world, including Brazil. More than 2,700 physicians are currently attending the 132 Emergency Medicine residency training programs approved by the Accreditation Council for Graduate Medical Education (ACGME) in the United States of America. The Emergency Medicine residency training program at the University of Cincinnati Medical Center was the first EM program in the USA<sup>1</sup>.

Brazil implemented the medical residency program in 1977 as the most appropriate way to train specialist physicians<sup>2</sup>. This country offers residency training in most medical specialties. It was only in 2016 that EM was approved as a medical specialty in Brazil and, since then, residency training in this field has been established in several hospitals across the country<sup>2,3</sup>. In 2019, Brazil recorded 239 physicians in the EM residency programs and 52 physicians had the title of specialist in this area<sup>2</sup>.

In December 2019, a disease called coronavirus disease 2019 (Covid-19) was identified in China. It has a high infectivity and transmissibility rate, with a reproductive number greater than one. Around the world, physicians of various specialties were called up to work in the fight against Covid-19, but EM was one of the areas that was most affected by the pandemic. Among these professionals, resident physicians were reallocated to the emergency department, intensive care units and Covid-19 wards to supply the need of medical personnel<sup>4-6</sup>.

The psychological effects on healthcare workers must be discussed in the medical residency training. During the last decade, motivated by alarming numbers of mental illness and suicide cases, mental health and the need for a new perspective of care has come to light within the medical community<sup>7-9</sup>. Risk factors included younger age and less experience, two aspects that may be related to medical residents, a group that needs to achieve the required knowledge and ethical maturity to deal with the difficulties and feelings inherent to this period<sup>10</sup>. A review and meta-analysis indicated the psychological effects of the emerging virus outbreaks on healthcare workers and found that staff in high-risk areas exhibited increased levels of acute or post-traumatic stress and psychological distress<sup>20</sup>. A global systematic review and meta-analysis from 2015 reported that the prevalence of depression or depressive symptoms among resident physicians was 28.8%, ranging from 20.9% to 43.2%<sup>8</sup>. In 2014, the prevalence rates for anxiety, depression and burnout were 41.3%, 21.6% and 58.4%, respectively, among Brazilian residents<sup>21</sup>. According to the American College of Emergency Physicians, more than 65% of emergency physicians and EM resident physicians report that they have experienced burnout during their career<sup>23</sup>.

The aim of this study is to assess the symptoms of burnout, depression and anxiety among Brazilian medical residents of Emergency Medicine during the Covid-19 pandemic and compare the residents' beliefs regarding clinical practice related to Covid-19 patients during their medical residency training.

## METHODS

A quantitative survey was conducted to assess the psychological impact of Covid-19 pandemic on EM residents in Brazil, as they are the ones in the frontline of patient care. This study used a convenience sample from an anonymous online survey advertised on social media and distributed through e-mails from residency committees of university hospitals throughout the country and from national residency and medical associations. Given that a convenience sample was used, no calculation of sample size was performed. According to the 2020 Brazilian medical demography, there were 239 EM residents enrolled in residency programs in Brazil<sup>2</sup>. The research was advertised using good practices guidelines<sup>11</sup>. There was no compensation or incentives of any kind for the volunteers.

The survey was available during the month of April 2020 in the entire country. This investigation collected sociodemographic information and used the Oldenburg Burnout Inventory (OLBI) to measure burnout, the Patient Health Questionnaire (PHQ-9) to measure depression, and the General Anxiety Disorders (GAD-7) to measure generalized anxiety disorder<sup>12-14</sup>. All three scales were previously adapted and validated for use in the Brazilian context and population.<sup>12-14</sup> The authors also developed a Covid-19 Impact Questionnaire (CIQ-19) to assess the residents' beliefs and clinical practices related to Covid-19 patients, their behaviors concerning the disease prevention and their mental health care. All fields were marked as mandatory, so a participant could move forward only after answering all questions. Therefore, all included participants completed the entire questionnaire, so no data were missing. The protocol was reviewed and approved by Universidade Federal de São Paulo, Brazil (UNIFESP) Research Ethics Committee (Protocol #3,943,348 on March 20, 2020).

This study conducted exploratory analyses using basic contingency tables with ANOVA and Fisher's Exact test. The residents' sociodemographic variables, characteristics of the residency program, clinical practice and beliefs regarding Covid-19 and mental health care were described. Burnout was defined as positive if the total score on OLBI was 21; anxiety was defined as positive if the total score on GAD-7 was 10 or greater. For the variable "depression", the following score system was used to classify it into three categories: no depression or mild depression (PHQ-9 score of 9 or less),

moderate (PHQ-9 score between 10 and 14) and severe depression (PHQ-9 score of 15 or higher).

All analyses were controlled by medical residency year (from the first to the third year – R1 to R3), gender, regions of Brazil, type of hospital (public or private) and contact with Covid-19 patients. The analyses were performed using SPSS Statistics for Windows, Version 22.0 (released 2013, IBM Corp, Armonk, NY, USA) with the level of statistical significance being set at 0.05. The results are presented as proportions and the distribution of the scores in the categories of each scale (frequencies).

## RESULTS

Our sample comprised 63 Emergency Medicine residents from the entire country, representing 26.35% of EM residents in Brazil during the study period<sup>2</sup>. The response rate represented approximately 27% of medical residents in Brazil.

A total of 58 residents had contact with Covid-19 patients. Most were male (68.2%), of white ethnicity (58.7%), medical residents attending programs provided by a public hospital (92.0%) in the southeast region (57.1%). The mean age of the sample was 28.8 years old (SD: 3.7), and the majority was attending the first year of medical residency (Table 1).

The difference between residents with or without contact with Covid-19 patients was significant when analyzing different aspects of clinical practice, mental health scales and mental health care status.

In terms of Covid-19 clinical practice, EM residents who had contact with Covid-19 patients were more likely to be prepared to treat patients with this disease (53.4%) and believed that the hospital was prepared to treat this type of patient (70.6%). Only 39.6% residents felt safe while working with Covid-19 patients. There was no increase in the

**Table 1.** Descriptive statistics of Emergency Medicine residents in Brazil, 2020.

Descriptive	Contact with Covid-19 patients						p-value
	Yes		No		Total		
	n = 58		n = 5		n = 63		
	n	%	n	%	n	%	
<i>Gender</i>							>0.05
Male	39	67.2	4	80.0	43	68.2	
Female	19	32.7	1	20.0	20	31.8	
<i>Ethnicity</i>							>0.05
White	35	60.3	2	40.0	37	58.7	
Non-white	25	43.1	3	60.0	28	22.3	
<i>Regions of Brazil</i>							<0.05
Southeast	31	53.4	5	100.0	36	57.1	
Others	27	46.5	-	-	27	42.8	
<i>Hospital type</i>							>0.05
Public	53	91.3	5	100.0	58	92.0	
Private	5	8.6	-	-	5	8.0	
<i>Year of residency</i>							<0.05
1st	29	50.0	2	40.0	31	49.2	
2nd	11	18.9	-	-	11	17.4	
3rd	18	31.0	3	60.0	21	33.3	
<i>Covid-19-related clinical practice and beliefs</i>							
The hospital is prepared to treat patients with Covid-19	41	70.6	4	80.0	45	71.4	<0.05
I feel prepared to treat Covid-19 patients	31	53.4	1	20.0	32	50.7	<0.05
I feel safe working with Covid-19 patients	23	39.6	1	20.0	24	38.0	<0.05
<i>Substance use after the Covid-19 pandemic</i>							
Increased alcohol consumption	17	29.3	-	-	17	26.9	>0.05
Increased marijuana use	5	8.6	-	-	5	7.9	<0.05
Increased tobacco use	16	27.5	-	-	16	25.3	<0.05

consumption of alcohol, tobacco, and marijuana use among the residents (Table 1).

Regarding the other characteristics of emergency medicine residents, no symptoms or mild depressive symptoms (68.2%) were observed, followed by anxiety (50.7%) and burnout symptoms (54.0%) overall. It is necessary to draw attention to anxiety symptoms (53.4%) among EM residents who had contact with Covid-19 patients and burnout symptoms (60.0%) among residents without contact with these patients (Table 2).

Finally, our sample revealed some responses associated with mental health care among medical residents. In general, these EM physicians prefer to talk with family members or friends (36.1%) and discuss their issues with their team support

(24.3%) when they need mental health care. Unfortunately, in this group, 12.6% of the residents did nothing about their mental health care and 11.0% mentioned undergoing psychotherapy to deal with their personal or professional issues. However, EM residents who had contact with Covid-19 patients were more likely to undergo psychotherapy than residents without contact with these patients, and the latter sought to perform more physical activity (26.6%) (Table 3).

## DISCUSSION

Emergency Medicine is a challenging and complex field requiring specific training in many disciplines. During the pandemic scenario, the medical residents' mental health is a

**Table 2.** Mental health scale scores in 63 EM residents from Brazil, 2020.

Mental Health	Contact with Covid-19 patients						p-value
	Yes n = 58		No n = 5		Total n = 63		
	n	%	n	%	n	%	
<i>Depression<sup>a</sup></i>							>0.05
absent or mild	39	67.2	4	80.0	43	68.2	
moderate	14	24.1	1	20.0	15	23.8	
severe	5	8.6	-	-	5	7.9	
<i>Anxiety<sup>b</sup></i>							<0.05
absent or mild	28	48.2	3	60.0	31	49.2	
moderate or severe	31	53.4	1	20.0	32	50.7	
<i>Burnout<sup>c</sup></i>							<0.05
absent or mild	27	46.5	2	40.0	29	47.4	
moderate or severe	31	53.4	3	60.0	34	54.0	

<sup>a</sup> according to the Patient Health Questionnaire – 9; <sup>b</sup> according to the General Anxiety Disorder – 7; <sup>c</sup> according to the Oldenburg Burnout Inventory.

**Table 3.** Mental health care scores among Emergency Medicine residents from Brazil, 2020.

Mental Health Care	Contact with Covid-19 patients						p-value
	Yes n = 58		No n = 5		Total n = 63		
	n	%	n	%	n	%	
<i>Mental Health Care<sup>a</sup></i>							<0.05
talk with friends/family	39	37.5	4	26.6	43	36.1	
team support	27	25.9	2	13.3	29	24.3	
nothing	13	12.5	2	13.3	15	12.6	
psychotherapy	12	11.5	1	6.7	13	11.0	
physical activity	9	8.6	4	26.6	13	11.0	
others	4	3.8	2	13.3	6	5.0	
<i>Total responses</i>	104	87.3	15	12.6	119	100.0	

<sup>a</sup>Multiple responses.

topic that has been a matter of concern for medical educators worldwide. In this study, almost all of the participants had contact with Covid-19 patients at public hospitals, with a training program that seemed prepared to treat patients with Covid-19 according to our findings<sup>1</sup>.

Conversely, these residents who had contact with Covid-19 patients did not feel safe in the work environment of the medical residency, even though most of them felt prepared to treat a Covid-19 patient. Physicians gain more confidence as they attend more patients with the disease. When treating the first cases of a disease, it is expected that more supervision is required to acquire technical knowledge. Medical education seeks for a balance between supervision, discussion, mentoring and autonomy<sup>15,16</sup>.

Medical residency represents more than a quest to improve professional competence. It is the moment of progressive acquisition of responsibility for professional acts; developing the capacity for initiative, judgment, and evaluation; internalization of precepts and ethical norms; and the development of a critical spirit<sup>17</sup>. To this end, a supervisor may also be an important person to discuss challenging ethical situations, sharing the burden of tough decisions and helping the resident to gain experience and confidence<sup>16</sup>. Moreover, the supervisor can offer a support strategy to the residents.

Mentoring programs are part of this context, being effective as a type of exchange relationship between the supervisor and the physician in training<sup>18</sup>. This practice is commonly used during undergraduate medical school, but we dare saying that it could be used in specific situations, such as working with EM residents during the Covid-19 pandemic.

Since avoidance and the fact of not feeling safe are central symptoms of trauma, this highlights the importance of giving attention to physicians who avoid contact with patients, for not feeling prepared to do it, for example<sup>19</sup>. This investigation found that residents who had contact with Covid-19 patients were more likely to develop symptoms of anxiety and burnout. Thus, it is necessary to observe that physicians with these symptoms do not develop a behavior of avoidance related to their patients.

A review and meta-analysis assessed the psychological effects of emerging virus outbreaks on healthcare workers and found that staff in high-risk areas exhibited increased levels of acute or posttraumatic stress and psychological distress<sup>20</sup>. Another review showed that the prevalence rates for anxiety, depression and burnout were 41.3%, 21.6% and 58.4%, respectively, among Brazilian residents<sup>21</sup>. A survey of 1,257 health care workers in contact with Covid-19 patients in China reported high rates of depression (50.4%), anxiety (44.6%), and distress (71.5%), using the same instruments as those used in this study<sup>22</sup>.

A survey of EM physicians and residents conducted by the American College of Emergency Physicians (ACEP), during October 2020, found out that 87% of respondents reported feeling more stress since the start of the Covid-19 pandemic and 72% were experiencing more professional burnout. They reported the cause might be related to the concerns about family and friends contracting Covid-19 (83%), that they felt insecure about their own safety (80%) and the lack of personal protective equipment or other needed resources (60%)<sup>23</sup>.

Our findings suggest the importance of talking with friends and family about medical training problems reported by the participants. Since individuals believe talking to colleagues and immediate line managers protects their mental health, the authors suggest that supervisors and peers pay attention to residents exhibiting signs of risky behavior<sup>15,24</sup>. However, we need to indicate the rate of respondents who did not have any mental health care during the pandemic scenario. According to an ACEP survey, about 40% of EM physicians report they are not comfortable seeking mental health treatment and 73% feel there is a stigma in the workplace when it comes to seeking mental health care<sup>23</sup>.

A review on the psychological impact of quarantine indicates that quarantined healthcare workers had more severe symptoms of posttraumatic stress than the general population. Given that healthcare workers experience more stigma than the general population, healthcare workers also showed more avoidance behaviors after the quarantine, had a greater loss of income and were consistently more affected psychologically<sup>25</sup>.

The proposal of a mentoring program for medical residents is a challenge that contributes to conceiving strategies that allow the implementation of improvements to the program, so that its activities are thought about continuously, as a scenario for significant technical and personal gains. Moreover, the well-known impact of activities on coping with social isolation and promoting mental health among medical residents.

This study design is adequate to investigate associations and provide wide-ranging data for discussion but does not allow for inferences of causality. In addition, since our sample was restricted to Brazil, further studies should investigate whether the abovementioned trend is replicable in other countries among Emergency Medicine physicians in training during the specific scenario. Therefore, one must be cautious with generalizations of these results to distinct populations.

## CONCLUSION

Emergency Medicine physicians have a historically higher rate of mental illness in terms of career burnout and post-traumatic stress disorders than other specialties, because they experience difficult decisions regarding life-and-death

situations. This study corroborates the risk of mental illness in this population and suggests that the number of depression, anxiety and burnout symptoms in EM residents in Brazil has increased during the Covid-19 pandemic.

This study recommends a general need for better access to mental health professionals for resident physicians who worked during the Covid-19 pandemic. It is proposed that health institutions pay medical supervisors a closer and more unique look at physicians in training. The mentoring program proposal is an opportunity to reflect on technical and personal improvements for medical residents.

Emergency Medicine physicians will treat anyone, anywhere, at any time, but they need to take better care of their own mental health to provide the best care to their patients. The residency training program might be the place to discourage the stigma of mental disease and reinforce the need to have access to mental health treatments.

## AUTHORS' CONTRIBUTION

Amanda Steil designed and planned the study; developed the questionnaire; submitted the study to the ethical committee; analyzed data; helped to write the manuscript. Vitor Souza Mendonça developed the questionnaire; submitted the study to the ethical committee; analyzed data; helped to write the manuscript. Aécio Flávio Teixeira de Gois designed and planned the study; revised the manuscript; and was in charge of study orientation.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest related to this study.

## SOURCES OF FUNDING

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## ERRATA

On the first page, where it reads:

Vitor Souza Mendonça<sup>1</sup>

Should read:

Vitor Silva Mendonça<sup>1</sup>

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