

# Anxiety and insecurity in medical interns: the impact of the pandemic COVID-19

Ansiedade e insegurança em estudantes de medicina no internato: o impacto da pandemia da COVID-19

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## ABSTRACT

**Purpose:** We aimed to assess anxiety among medical interns and to identify changes regarding their perspective about the profession during the pandemic period in Brazil, between November 2020 and February 2021.

**Methods:** This is a cross-sectional descriptive study which medical interns answered an online survey questionnaire. The assessment was performed using the validated questionnaire General Anxiety Disorder Scale (GAD-7).

**Results:** 162 responses were collected, mean age of 24.9 years, majority female (66.7%); 83.3% had the option of returning to practical assistance. Among these, 35% claimed to have had contact with suspects COVID-19 patients and 13% had a positive test for COVID-19. GAD-7 scores showed that 33.4% were qualified as "Normal", while mild (37%), moderate (22.8%) or severe symptoms of anxiety (6.8%). A GAD-7 score positive for TAG was found in 29.6% of them. Anxiety was significantly associated ( $p=0.013$ ) with questioning the choice of Medicine as a profession.

**Conclusions:** We found a high frequency of interns with symptoms of anxiety, higher compared to similar studies prior to the pandemic. In addition, medical interns with anxiety were the ones who most questioned the choice of profession.

**Keywords:** COVID-19, Pandemic, Medical students, Mental health, Anxiety.

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## RESUMO

**Objetivo:** Objetivou-se avaliar a ansiedade de estudantes de medicina – internos e identificar mudanças em relação à perspectiva sobre a profissão durante o período pandêmico no Brasil, entre novembro de 2020 e fevereiro de 2021.

**Métodos:** Trata-se de um estudo transversal descritivo no qual os estudantes internos responderam a um questionário de pesquisa online. A avaliação foi realizada por meio do questionário validado General Anxiety Disorder Scale (GAD-7).

**Resultados:** Participaram 162 estudantes, com média de idade de 24,9 anos, maioria do sexo feminino (66,7%); 83,3% tiveram a opção de retornar ao atendimento prático. Destes, 35% afirmaram ter tido contato com pacientes suspeitos para COVID-19 e 13% tiveram teste positivo para COVID-19. Os escores do GAD-7 mostraram que 37% apresentaram sintomas de ansiedade leve, 22,8% moderado, e 6,8% grave. Um escore GAD-7 positivo para TAG foi encontrado em 29,6% deles. A ansiedade associou-se significativamente ( $p = 0,013$ ) ao questionamento da escolha da Medicina como profissão.

**Conclusões:** Encontramos alta frequência de internos com sintomas de ansiedade, superior à observada em estudos semelhantes anteriores à pandemia. Além disso, os acadêmicos com ansiedade foram os que mais questionaram a escolha da profissão.

**Palavras-chave:** COVID-19, Pandemia, Estudantes de medicina, Saúde mental, Ansiedade.

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## INTRODUCTION

The new SARS-CoV-2 disease, COVID-19, is a highly contagious illness, which had the first confirmed case documented in December 2019, in Wuhan, China.<sup>1</sup> In January 2020, COVID-19 was considered by the World Health Organization an international public health emergency and, on March 11<sup>th</sup>, 2020, a pandemic.<sup>2,3</sup> Countless measures were adopted by governments around the world, such as social distancing, lockdowns and mandatory mask wearing, to reduce transmission rates and prevent the collapse of health systems.<sup>4</sup>

Schools and universities were also affected by the pandemic, mostly because of the suspension in-person activities, with the need to adapt to an online teaching model. Medical schools suffered a huge impact, because of the dependence of practical scenarios, like hospitals and clinics. Several universities around the world opted to cancel classes in patient care settings, causing students to feel deterioration of their abilities, mainly due to the lack of practical activities. On the other hand, the maintenance of practical classes held in direct care environments for patients with COVID-19 could be a source of stress for students who carry out practical health care activities in hospitals and clinics.<sup>5</sup> Senior students are exposed to biological risks and face the possibility of transmitting the virus to their families, when in direct contact with potentially infected patients.<sup>4,6</sup> Those situations, associated with daily events related to pandemic life, such as movement limitation, economic difficulties, and family distress could lead to an environment conducive to the development of psychological disorders. The interns, students of the last two years of medical graduation, are known as a vulnerable group for mental illness.<sup>7</sup> Because of the greater dependence of practical scenarios between interns, we believe that this group may suffer a significant impact during the pandemic.

In this study, we aimed to assess anxiety among interns and to identify changes regarding their perspective about the profession during the pandemic period in Brazil, between November 2020 and February 2021.

## METHODS

This is a cross-sectional descriptive study, with data collection performed by an online survey questionnaire, after approval by the Institution's Research Ethics Committee, under number 4.316.689. All the participants accessed the informed consent text before the first section of the forms. The STROBE (Strengthening The Reporting of Observational Studies in Epidemiology) checklist was followed.

### Sample

Fifth and sixth year medical students (interns) enrolled in Brazilian institutions were invited to participate in the research. The invitation to participate in the study was carried out through WhatsApp, and students were invited to answer the Google forms questionnaire anonymously.

All participants agreed to participate in the study by signing the consent form. Data were collected between the months of November 2020 and February 2021. Incomplete or duplicate questionnaires were excluded.

## QUESTIONNAIRE

The online questionnaire was divided in 3 sections:

**Section 1:** The epidemiological data collected were sex, age, race, type of university (public or private), semester of enrolment and whether the respondent had private health insurance.

**Section 2:** Behavioral data and personal perceptions about the pandemic. It was asked if the participants were living alone or accompanied, if someone close to them contracted COVID-19 or died of the disease, if the student returned to practical activities in patient care settings, as well as their perception of safety regarding the use of Personal Protective Equipment (PPE). It was also asked whether the participant questioned the choice of his/her future profession during the pandemic.

**Section 3:** The General Anxiety Disorder Scale (GAD-7) was applied, which is validated

and translated into Portuguese, for the identification of individuals with Generalized Anxiety Disorder and anxiety symptoms. The GAD-7 score is a questionnaire consisting of 7 items related to anxiety symptoms in the 14 days before answering the questionnaire. Its score ranges from 0 to 21, with 0-4 being considered normal; 5-9 as mild symptoms of anxiety; 10-14, moderate symptoms of anxiety; 15-21, severe anxiety symptoms. A GAD-7 greater than or equal to 10 has a sensitivity of 89% and a specificity of 82% for Generalized Anxiety Disorder (GAD).<sup>3,8,9</sup>

### Statistical analysis

After collection, the data were statistically analyzed using GraphPadPrism 6.0. Continuous variables were expressed as mean  $\pm$  standard deviation and compared with the t and Mann-Whitney tests. Categorical variables were expressed as percentages and compared with the chi-square test or Fisher's exact test, as appropriate and p values less than 5% were considered statistically significant.

## RESULTS

During the study period, 197 responses were collected, of which 35 were eliminated because they were incomplete or duplicated, leaving 162 valid responses. The mean age of the participants was  $24.9 \pm 3.9$  years, with the majority being female (66.7%) and from private universities (75.3%). A total of 73.4% of the

participants claimed to have private health insurance (Table 1).

Of the total number of students, 135/162 (83.3%) had the option of returning to patient care or simulation activities. Among these, 134/135 (99.2%) chose to return. Considering the total number of students who returned to practical fields, 35% claimed to have had contact with COVID-19 positive patients and 13% tested positive for COVID-19. In addition, 105/162 (64.8%) stated that someone close to them was diagnosed with COVID-19 and approximately 9.8% reported that someone close died from COVID-19. About data on donning and doffing PPE and the possibility of error, we observed that 28.4% of interns often make mistakes during this procedure and 45.0% occasionally (table 1).

The assessment of anxiety symptoms using the GAD-7 scale showed that 108/162 (66.7%) of the participants had mild, moderate, or severe symptoms. Of the total participants, 60/162 (37%) had mild symptoms; 37/162 (22.9%) had moderate symptoms; 11/162 (6.8%) had severe symptoms. Only 54 participants (33.3%) had a GAD-7 below 5, considered a minimum status or lack of anxiety symptoms. A GAD-7 score positive for GAD (GAD-7  $\geq$  10) was found in 48/162 (29.6%) of the interns (Table 1). About the PPE use

When asked about having questioned their choice of profession during the pandemic, 83/162 (51.2%) said they did. The presence of mild, moderate, or severe symptoms of anxiety was a factor significantly associated with questioning the choice of Medicine as a profession ( $p = 0.013$ ), as show in **Table 2**.

**Table 1**

Demographic, behavioral and pandemic experiences data from the medical students studied.

Profile	n=162
Age	
average $\pm$ SD	24.9 $\pm$ 3.9
minimum-maximum	21 - 54
Sex n (%)	
Female	108 (66.7)
Male	54 (33.3)

(Continuação)

**Table 1***(continuação)*

Profile	n=162
Race n (%)	
White	149 (92.0)
African american	4 (2.5)
Asian	4 (2.5)
Other	5 (3.0)
Institution n (%)	
Private	122 (75.3)
Public	40 (24.7)
GAD-7 Score n (%)	
Mild	60 (37.0)
Normal	54 (33.3)
Moderate	37 (22.9)
Severe	11 (6.8)
Did you return to practical activities?*	
Yes	134 (99.2)
No	1 (0.8)
Did you question your career choice during the pandemic?	
Yes	83 (51.2)
No	79 (48.7)
Did you come in contact with patients diagnosed with COVID-19?*	
Yes	47 (35)
No	83 (61.9)
Not sure	4 (2.9)
Have you been diagnosed with COVID-19?	
Yes	21 (12.9)
No	135 (83.3)
Not sure	6 (3.7)
Do you have private health insurance?	
Yes	119 (73.4)
No	43 (26.5)
Who did you live with during the pandemic?	
Alone	114 (70.3)
With someone else	48 (29.6)
Has someone close to you passed away because of COVID-19?	
Yes	16 (9.8)
No	146 (91.2)
Has someone close to you been diagnosed with COVID-19?	
Yes	105 (64.8)
No	56 (34.5)
Not sure	1 (0.6)
How likely are you to make mistakes concerning PPE usage?	
Frequently	46 (28.4)
Very likely	12 (7.4)
Rarely	31 (19.1)
Occasionally	73 (45)

PPE= Personal Protective Equipment.

\*Analysis considering the institutions that gave the option to return to practical activities

**Table 2**

Analysis of anxiety levels, and demographic, behavioral and pandemic experiences data from the medical students studied.

	GAD-7 SCORE				COMPARISONS		
	Normal (N) n (%)	Mild n (%)	Moderate (Mod) n (%)	Severe n (%)	Mod x Severe P Value	N + Mild x Mod + Severe P Value	N x Mild + Mod + Severe P Value
Sex n (%) <sup>§</sup>							
Female	32	41	27	8	1.000	0.362	0.163
Male	22	19	10	3			
Age (years)							
Mean ± SD	24.8 ± 4.5	24.9 ± 2.7	25.5 ± 3.5	23.7 ± 1.3	0.133	0.467	0.236
Institution n (%) <sup>§</sup>							
Private	43	47	23	9	0.293	0.112	0.577
Public	11	13	14	2			
Did you return to practical activities? * <sup>§</sup>							
Yes	48	46	30	10	NA	1.000	1.000
No	0	1	0	0			
Did you question your career choice during the pandemic? <sup>§</sup>							
Yes	20	35	21	7	0.741	0.302	0.013
No	34	25	16	4			
Did you come in contact with patients diagnosed with COVID-19? * <sup>##</sup> <sup>§</sup>							
Yes	13	19	14	1	0.057	0.916	0.851
No	34	25	15	9			
Not sure	1	2	1	0			
Have you been diagnosed with COVID-19? * <sup>§</sup>							
Yes	8	7	4	2	0.609	1.000	0.801
No	45	48	33	9			
Not sure	1	5					
Do you have private health insurance? <sup>§</sup>							
Yes	40	45	27	7	0.707	0.697	1.000
No	14	15	10	4			
Who did you live with during the pandemic? <sup>§</sup>							
Alone	42	39	25	8	1.000	0.859	0.201
With someone else	12	21	12	3			
Has someone close to you passed away because of COVID-19? <sup>§</sup>							
Yes	3	8	5	0	0.576	1.000	0.267
No	51	52	32	11			
Has someone close to you been diagnosed with COVID-19? * <sup>§</sup>							
Yes	36	41	23	5	0.487	0.278	0.861
No	18	18	14	6			
Not sure	0	1	0	0			

*(Continuação)*

**Table 2***(continuação)*

	GAD-7 SCORE				COMPARISONS		
	Normal (N) n (%)	Mild n (%)	Moderate (Mod) n (%)	Severe n (%)	Mod x Severe P Value	N + Mild x Mod + Severe P Value	N x Mild + Mod + Severe P Value
How likely are you to make mistakes concerning PPE usage? <sup>&amp;</sup>							
Frequently	16	16	11	3	0.184	0.787	0.623
Very likely	4	4	3	1			
Rarely	13	7	6	5			
Occasionally	21	33	17	2			

GAD-7= General Anxiety Disorder-7

\*Analysis considering the institutions that gave the option to return to practical activities

#Analysis considering "yes" and "no" answers

\$: Fisher's exact test;

&amp;: Chi-squared test

## DISCUSSION

Our study demonstrates in an unprecedented way the impact of the SARS-COV-2 pandemic on the frequency and levels of anxiety in medical students enrolled in the last two years of the program. A GAD-7 score suggestive of generalized anxiety disorder (moderate and severe anxiety symptoms) was found in almost one third of the participants (29.6%), while the general prevalence of anxiety symptoms (mild, moderate, and severe) was present in 66.7% of the participants. Such data draw attention to the impact of the pandemic on this population.

When analyzing the presence of positive GAD-7 scores for GAD, the frequency was higher in females, however this difference was not statistically significant. This was also found in a pre-pandemic metanalysis.<sup>9</sup> Studies with a similar population during the pandemic found a significantly higher prevalence of anxiety symptoms in women.<sup>11,12</sup> This association was also observed in studies with medical students outside the pandemic.<sup>13,14</sup> Other study using the same questionnaire, attributed this finding to fact that women are more prone to anxiety than men because of their thought control strategies and metacognitive beliefs, which lead them to emotional and neurotic problems.<sup>15</sup>

The variables age, race, institution of origin, return to practical activities and having health insurance are also not associated with anxiety levels in our study. However, a study carried out

on medical students in Vietnam observed that the presence of health insurance (or, as defined, access to medications and treatments) influenced the prevalence of anxiety symptoms.<sup>16</sup>

No associations were found between high GAD-7 score and direct contact with patients diagnosed with COVID-19, which is in line with a previous study, which assessed the prevalence of anxiety with the same tool in medical students and residents in India.<sup>11</sup> The diagnosis or death of someone close due to COVID-19 was also unrelated to the symptoms of anxiety.

In relation to the use of PPE, it was found that most students think it is possible to make mistakes during donning and doffing. This finding reiterates the importance of medical schools in adequate training, focusing on the correct use of PPE, as well as its availability by health services or universities. Previous studies show student's fear a possible lack of PPE for working in the health system during the pandemic.<sup>17</sup>

The presence of anxiety symptoms was significantly associated with questions about the choice of profession. Due to the cross-sectional design of the study, it is not possible to affirm the causal relationship between the two. The presence of anxiety can be related to a feeling of anguish during university activities, leading to doubts about the choice of Medicine. The opposite is also possible, with the questioning itself causing anxiety. A third hypothesis is a possible worse academic performance among the most anxious

students, leading them to question their own ability within the profession. In a study conducted in the United States with 336 medical students, 32% of the participants reported impaired school performance due to anxious symptoms.<sup>18</sup> Another possible cause is the decrease in the quality of practical activities during the pandemic, as pointed out by a British study. In this study, 60% of the participants stated that they did not feel able to start their professional career and 22.7% of the participants stated that they did not feel safe to start working in hospitals before the end of the program, with the interruption of the internships and other practical activities being the main impact factor.<sup>19</sup> In our study, more than half of the participants stated that they had doubts about their choice of profession, which may be related to changes in the academic schedule, similarly to results obtained in Great Britain.

There are few articles for comparing the prevalence of anxiety among medical interns, either due to the heterogeneity of the sample or the instrument used, considering the adopted questionnaire, cut-off point and selection criteria of participants. When considering articles that used the GAD-7 score as a tool, prevalence ranging from 20.3% to 24.9% was found in a period prior to the COVID-19 pandemic, considering a score of 10 as a cutoff.<sup>13,18,20-22</sup> A study conducted in the United Arab Emirates applied the GAD-7 score to 1428 medical students during the pandemic. The prevalence of positive screening for GAD was 30.6%, similar to that found in our study.<sup>12</sup>

In a study carried out with 57 Brazilians during the pandemic, the observed prevalence of GAD (18%) seems to be lower than the present study (30%) and this may be related to the small sample size used in the study.<sup>23</sup> Interestingly, the prevalence of GAD observed in our study seems to be higher compared to similar study prior to the pandemic and pre-pandemic. A study including 300 medical students from US, described a frequency of 20% of GAD among students in periods prior to the pandemic.<sup>18</sup>

No Brazilian studies were found that evaluated anxiety levels in students enrolled in the final two years of medical school prior to the pandemic, with the exception of one study that assessed anxiety levels in sixth-year students.<sup>13</sup> The authors

showed a prevalence of anxious symptoms (mild, moderate, and severe) in 9.1% of participants, which is higher than the general population, but lower than our results.<sup>24</sup> The prevalence found in our study, considering mild to severe symptoms in sixth-year students, was 62.26%, a number almost seven times higher. In a study carried out in Libya with medical students (of all years), during the COVID-19 pandemic and the ongoing civil war in the country, the prevalence of anxious symptoms (mild, moderate, and severe) was 54, 5%.<sup>25</sup> GAD values above 15 were found in 11% of the participants - an index higher than the 6.8% found in this study. Age and presence of infected family members (or students who were themselves infected) were not influencing factors on the value of the GAD-7 score, a correlation that agrees with the results obtained here.<sup>24</sup> Despite this, one must consider the civil context in which the study was carried out so that comparisons can be made. Therefore, the high rates found in that study, which are comparable to those found here, can be provided with the influence of different stressors, such as the civil war itself and the associated changes in housing.

Our study has some limitations related to its cross-sectional design. The fact that it was done online can cause misinterpretation of the questions. However, the fact that it is self-administered and completely anonymous can make responses more reliable, without fear of judgment of the answers. The comparison with previous studies is also limited, considering the different population backgrounds.

We observed high prevalence of anxiety among medical students in the final two years of the program, which seems to be higher compared to similar groups in the literature prior to the pandemic. Among the variables studied, only the choice of profession was associated with higher levels of anxiety. Academics with mild, moderate, and severe anxiety questioned the choice of profession more than students without signs of anxiety. Considering the current literature, it is possible that this result is related to the interruption of the internship and assistance programs, which affects the self-perception of readiness of these students regarding their professional future, leading to questions about their choice of medicine as a profession.

The start of activities related to well-being and mental health - or, at least, their encouragement - in medical schools is a measure that must be vigorously implemented. Measures to recover the training lost during the period, such as the use of OSCE's and simulations, can also be beneficial in the perception of readiness by students. Further studies are needed to measure the ongoing impact of the pandemic on the mental health of medical students.

Concluding, our study found a high frequency of interns with symptoms of anxiety, higher compared to similar studies prior to the pandemic. In addition, medical interns with anxiety were the ones who most questioned the choice of profession.

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All the authors conceived and carried out the study. ESJ, DMD, GSD and OAL collected data; FA and RN organized and analyzed data. All authors were involved in writing the paper and had final approval of the submitted and published versions.

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