

Anxiety level of public university employees with suspected or confirmed COVID-19 infection

Níveis de ansiedade de profissionais de uma universidade pública com suspeita ou confirmação de infecção por COVID-19

Aline Bicalho **Matias**^{1,2} , Isabela Saura Sartoreto **Mallagoli**¹ , Marta Gonçalves **Arão**¹ ,
Patrícia Emerich **Gomes**¹ , Rosana **Sacolito**¹ , Solange Severina Barbosa da **Palma**¹ ,
Angélica Gonçalves Silva **Belasco**³ 

ABSTRACT | Introduction: Workers on leave awaiting confirmation of coronavirus infection may experience worry and anticipatory stress. **Objectives:** The objective of this study was to assess the anxiety levels of employees at a public university in the state of São Paulo who were put on leave due to suspected or confirmed SARS-CoV-2 infection and to correlate their anxiety levels with personal and work-related variables. **Methods:** This cross-sectional study used an online survey to collect data from employees who took a diagnostic test for COVID-19. The participants' anxiety level was measured using Greenberger and Padesky's Anxiety Inventory, while data on personal and work-related variables were collected through a socio-demographic questionnaire. **Results:** Most of the 153 participants (76.5%) reported anxiety symptoms. COVID-19 infection was confirmed in 51%. The highest prevalence of severe anxiety (27%) was among employees who had indirect contact with COVID-19 patients. Three variables – being a woman, being a regular employee, and previous physical health problems – were responsible for a higher risk of anxiety. **Conclusions:** This study's findings indicate the need to protect the mental health of the university's employees.

Keywords | anxiety; symptom assessment; coronavirus infections; sick leave.

RESUMO | Introdução: Trabalhadores afastados do trabalho à espera da confirmação ou não do diagnóstico de infecção pelo novo coronavírus (SARS-CoV-2) podem vivenciar preocupações e estresse antecipatórios com o provável adoecimento. **Objetivos:** Avaliar os níveis de ansiedade dos profissionais de uma universidade pública do estado de São Paulo afastados do trabalho por suspeita ou confirmação de infecção por SARS-CoV-2 e correlacionar o nível de ansiedade a variáveis individuais e de trabalho. **Métodos:** Trata-se de um estudo transversal, com coleta de informações via *web-survey*, com os funcionários que realizaram o teste para o diagnóstico da doença do coronavírus 2019 (COVID-19). O grau de ansiedade foi mensurado através do Inventário de Ansiedade de Greenberger e Padesky, e as variáveis individuais e de trabalho foram obtidas por um questionário sociodemográfico. **Resultados:** Participaram do estudo 153 funcionários. A maioria dos funcionários apresentou sintomas de ansiedade (76,5%). O diagnóstico de COVID-19 foi confirmado em 51% dos participantes. Funcionários com trabalho de contato indireto com pacientes com COVID-19 apresentaram maior prevalência de ansiedade grave (27%). Ser mulher, celetista e apresentar problemas prévios de saúde física foram variáveis responsáveis por aumentar o risco de ansiedade. **Conclusões:** Os achados deste estudo são importantes indicadores da necessidade de atenção e proteção à saúde mental dos funcionários da universidade estudada.

Palavras-chave | ansiedade; avaliação de sintomas; infecções por coronavírus; licença médica.

¹ Departamento de Saúde do Trabalhador, Universidade Federal de São Paulo (Unifesp), São Paulo, SP, Brazil.

² Departamento de Medicina Preventiva, Universidade de São Paulo, São Paulo, SP, Brazil.

³ Escola Paulista de Enfermagem, Unifesp, São Paulo, SP, Brazil.

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INTRODUCTION

Coronavirus 2, which causes severe acute respiratory syndrome (SARS-CoV-2) and is responsible for coronavirus 2019 disease (COVID-19), was discovered in December 2019 in China. By the end of January 2020, the disease had spread to a number of countries, and an international emergency was declared by the World Health Organization (WHO).¹ As of early October 2020, COVID-19 remains a threat to public health worldwide, having infected more than 35 million people and killed more than 1 million. Early detection is important to contain the spread of the disease. There has been much research on the disease's form of transmission, diagnosis, treatment, and prevention. However, emotional response to the illness has not yet been fully mapped and characterized.² Globalized outbreaks of contagious diseases, such as COVID-19, are associated with psychological distress and have a negative impact on mental health.³

Professionals who cannot perform their activities remotely, especially those in essential services such as hospitals, transportation, and security, remain exposed to infection. Those who deal with seriously ill patients, their family members, and disease prevention can also suffer work overload. Such daily challenges and stress can trigger common mental disorders, such as anxiety and depression, which can have devastating consequences.⁴ Often associated with a variety of somatic symptoms that reflect autonomic nervous system activity, anxiety is traditionally perceived through increased heart rate, dry mouth, palpitations, and sweating.⁵ In individuals suspected of infection, being put on leave and waiting for laboratory results can be a painful process and can trigger anticipatory stress.⁶ In addition, health-related work leave can lead to stigma, especially for regular employees or outsourced workers, and trigger fear of dismissal and isolation from the labor market, which increases the anxiety level.⁷ During work leave and quarantine to confirm COVID-19 infection, individuals may fear the consequences of the disease, feel lonely, angry, and bored, as well as guilty for having been infected.⁸

Thus, the present study assessed the anxiety level in employees of a public university with a teaching hospital in the state of São Paulo who were put on work leave due to suspected or confirmed SARS-CoV-2 infection, correlating their anxiety level with personal and occupational variables.

METHODS

This cross-sectional study was conducted in the Federal University of São Paulo, SP, Brazil in the second half of 2020, collecting data via online survey.⁹ For convenience, we opted for a non-statistical sampling method. After approval by the institutional research ethics committee, we sent an invitation to 500 employees who had been put on work leave for COVID-19 testing at the university's specialty clinic during the study period. Active employees of either sex, any professional category, or any age who underwent reverse transcriptase polymerase chain reaction testing were eligible to participate. Exclusion criteria were failure to retrieve the test results to confirm or exclude the diagnosis and categorization as a non-active employee (eg, dependents, retirees, etc.). Of the 500 employees invited to participate in the survey, 204 (40.8%) tested positive for COVID-19 and 296 (59.2%) tested negative.

Their anxiety level was measured using Greenberger and Padesky's Anxiety Inventory.¹⁰ The responses to this 24-item instrument are provided on a Likert scale, describing the degree to which symptoms are experienced (0 = not at all; 1 = sometimes; 2 = often; 3 = most of the time). The final score was converted into an anxiety level classification according to the Beck and Steer Manual (no symptoms = 0 to 10; mild = 11 to 19; moderate = 20 to 30; severe = \geq 31 symptoms).¹¹ A dichotomous classification was also considered, ie, with or without anxiety symptoms, regardless of the level.

Individual and work variables were measured using a specially developed socio-demographic questionnaire. Employee function was classified as involving direct

contact with patients at the teaching hospital, indirect contact with patients, or no patient contact.

Descriptive data analysis was used to determine the distribution and frequency of the outcome and covariates. Chi-square and Fisher's exact tests were used to determine the association between anxiety level and the variables. ANOVA or the Kruskal-Wallis test was used to determine whether age, length of employment, and days absent behaved differently in individuals with different anxiety levels. A multinomial model was used to determine whether the anxiety level changed depending on associated variables according to Fisher's exact test. Bivariate and multivariate logistic regression was then performed to determine the association between covariates and the presence or absence of anxiety. Variables with significance levels ≤ 0.20 in the bivariate model were included in the multivariate model.

This study followed the ethical guidelines of Resolution N^o 466/12 of the Brazilian National Health Council and was approved by the institutional research ethics committee (CAAE: 38824320.0.0000.5505).

RESULTS

The questionnaire response rate was 30.6%, with 153 employees participating in the study. Among those invited to participate who were diagnosed with COVID-19, 78 (38.2%) answered the questionnaire. Among those with a negative diagnosis, 75 (25.3%) answered the questionnaire. Most participants (76.5%) had anxiety symptoms (26.1% mild, 30.1% moderate and 20.3% severe). Thus, COVID-19 infection was confirmed in 51% of the participants (Table 1).

The mean participant age was 42 years [standard deviation (SD) = 10.43 years]. Most were female (83.6%), had no other job (83%), and used more than one means of public transportation when commuting to work (57.5%). A total of 86.9% had no prior mental health problems, 59.5% had no prior physical health

problems, and 58.8% found it impossible to maintain social isolation in the home environment (Table 1).

An association was found between anxiety symptoms, being female, and previous physical and mental health problems (Table 1). When the multinomial model was adjusted for statistically significant variables ($p \leq 0.05$), prior mental health problems were not significant. Being male decreased the odds that an asymptomatic individual would develop mild anxiety symptoms by 86.6% [odds ratio (OR) = 0.134; 95% confidence interval (95%CI) 0.033-0.537] and moderate symptoms by 88.5% (OR = 0.115; 95%CI 0.029-0.461). Previous health problems increased the chance that an asymptomatic individual would develop mild anxiety symptoms by 3.4 times (OR = 3.369; 95%CI 1.141-9.945), moderate symptoms by 3.8 times (OR = 3.778; 95%CI 1.308-10.912), and severe symptoms by 3.4 times (OR = 3.363; 95%CI 1.106-10.227) (Table 2).

The mean time the participants had been employed at the university was 10.9 years (SD = 9.1 years). Most of the teaching hospital staff (88.9%) worked directly with patients (58.8%) and were regular employees (55.5%). The majority reported having sufficient access to personal protective equipment (77.8%) and having received sufficient information from the institution about the virus (69.3%) and work-related issues during the pandemic (66.7%). There were no associations between occupation and anxiety level (Table 3).

When anxiety symptoms were classified dichotomously (ie, absent or present at any level) in the bivariate logistic regression, only sex, employment status, previous health problems, confirmed/excluded COVID-19 diagnosis, and sufficient/insufficient information about work issues had a significance level ≤ 0.20 . In the multivariate logistic regression, being male (OR = 0.15; 95%CI 0.05-0.43) and a positive COVID-19 diagnosis (OR = 0.38; 95%CI 0.15- 0.94) decreased the chance of anxiety symptoms. On the other hand, regular employment (OR = 2.55; 95%CI 1.05-6.22) and previous health problems (OR = 4.11; 95%CI 1.48-11.44) increased the risk (Table 4).

DISCUSSION

The present study sought to estimate anxiety levels and investigate the relationship between personal and occupational characteristics and anxiety in public university employees in the state of São Paulo who

were on leave for suspected or confirmed SARS-CoV-2 infection. A total of 153 employees were included in the investigation, and a high prevalence of anxiety was found. Previous health problems and regular employment were significantly associated with an increased risk of anxiety. Being male and a having a

Table 1. Association between personal characteristics and anxiety level in public university employees in the state of São Paulo, Brazil

Variables	Total [n (%)]	Anxiety [n (%)]				p-value
		No symptoms	Mild symptoms	Moderate symptoms	Severe symptoms	
Age range (years)						
19-29	20 (13.1)	4 (11.1)	6 (15.0)	5 (10.9)	5 (16.1)	0.694
30-39	46 (30.1)	10 (27.8)	15 (37.5)	10 (21.7)	11 (35.5)	
40-49	43 (28.1)	10 (27.8)	10 (25.0)	17 (37.0)	6 (19.4)	
50-59	40 (26.1)	11 (30.6)	9 (22.5)	11 (23.9)	9 (29.0)	
≥ 60	4 (2.6)	1 (2.7)	0 (0.0)	3 (6.5)	0 (0.0)	
Sex						
Female	128 (83.7)	22 (61.1)	37 (92.5)	43 (93.5)	26 (83.9)	<0.001*
Male	25 (16.3)	14 (38.9)	3 (7.5)	3 (6.5)	5 (16.1)	
Has another job						
No	127 (83.0)	30 (83.3)	32 (80.0)	40 (87.0)	25 (80.6)	0.828
Yes	26 (17.0)	6 (16.7)	8 (20.0)	6 (13.0)	6 (19.4)	
Isolated in residence						
No	63 (41.2)	13 (36.1)	20 (50.0)	20 (43.5)	10 (32.3)	0.502
Yes	90 (58.8)	23 (63.9)	20 (50.0)	26 (56.5)	21 (67.7)	
Means of transportation						
Personal vehicle	44 (28.8)	11 (30.6)	16 (40.0)	8 (17.4)	9 (29.0)	0.284
Uses 1 means of public transportation	21 (13.7)	4 (11.1)	7 (17.5)	6 (13.0)	4 (12.9)	
Uses > 1 means of public transportation	88 (57.5)	21 (58.3)	17 (42.5)	32 (69.6)	18 (58.1)	
Lives with people with a history of illness						
No	93 (60.8)	24 (66.7)	26 (65.0)	26 (56.5)	17 (54.8)	0.652
Yes	60 (39.2)	12 (35.0)	14 (35.0)	20 (43.5)	14 (45.2)	
Previous health problems						
No	91 (59.5)	28 (77.8)	22 (55.0)	24 (52.2)	17 (54.8)	0.652
Yes	61 (39.9)	7 (19.4)	18 (45.0)	22 (47.8)	14 (45.2)	
No response	1 (0.6)	1 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)	
Previous mental health problems						
No	133 (86.9)	36 (100.0)	36 (90.0)	41 (89.1)	20 (64.5)	<0.001*
Yes	20 (13.1)	0 (0.0)	4 (10.0)	5 (10.9)	11 (35.5)	
Diagnosis confirmed						
No	75 (49.0)	14 (38.9)	24 (60.0)	23 (50.0)	14 (45.2)	0.307
Yes	78 (51.0)	22 (61.1)	16 (40.0)	23 (50.0)	17 (54.8)	

* Significance level: $p \leq 0.05$.

confirmed diagnosis of COVID-19 were associated with a lower risk of anxiety. Being male was also associated with a lower risk of worsening symptoms, while previous health problems were associated with a higher risk. The prevalence of anxiety (76.5%) in these participants was higher than that of the general population found in most studies.

A 2015 WHO study estimated that the global prevalence of anxiety disorders was 3.6% (264 million people), with North and South America having the second highest number of cases (21%) and the highest prevalence of anxiety among women (7.7% versus 3.6% in men). Like the present study, the WHO report found no significant variations between anxiety and age.¹²

Table 2. Estimated behavior of personal and occupational characteristics and anxiety level among public university employees in the state of São Paulo, Brazil: multinomial model

Variables/anxiety levels	OR (95% CI)	p-value
Male		
No symptoms	1	
Mild symptoms	0.134 (0.033-0.537)	0.005*
Moderate symptoms	0.115 (0.029-0.461)	0.002*
Severe symptoms	0.318 (0.095-1.062)	0.063
Previous health problems		
No symptoms	1	
Mild symptoms	3.369 (1.141-9.945)	0.028*
Moderate symptoms	3.778 (1.308-10.912)	0.014*
Severe symptoms	3.363 (1.106-10.227)	0.033*

95% CI = 95% confidence interval; OR = odds ratio.

* Significance level: p ≤ 0.05.

Table 3. Association between occupation type and anxiety levels in public university employees in the state of São Paulo, Brazil

Variables	Total [n (%)]	Anxiety [n (%)]				p-value
		No symptoms	Mild symptoms	Moderate symptoms	Severe symptoms	
Occupation						
Direct patient contact	90 (58.8)	21 (58.3)	24 (60.0)	28 (60.9)	17 (54.8)	0.834
Indirect patient contact	26 (17.0)	8 (22.2)	5 (12.5)	6 (13.0)	7 (22.6)	
No patient contact	37 (24.2)	7 (19.5)	11 (27.5)	12 (26.1)	7 (22.6)	
Workplace						
Hospital	136 (88.9%)	31 (86.1)	34 (85.0)	44 (95.6)	27 (87.1)	0.315
Other	17 (11.1%)	5 (13.9)	6 (15.0)	2 (4.4)	4 (12.9)	
Employment status						
Civil servant	65 (42.5)	19 (52.7)	20 (50.0)	17 (36.9)	9 (29.0)	0.174
Regular employee	85 (55.6)	16 (44.5)	20 (50.0)	27 (58.7)	22 (70.9)	
Outsourced	3 (1.9)	1 (1.9)	0 (0.0)	2 (4.4)	0 (0.0)	
Sufficient personal protective equipment						
No	34 (22.2)	5 (13.9)	9 (22.5)	11 (23.9)	9 (29.0)	0.502
Yes	119 (77.8)	31 (86.1)	31 (77.5)	35 (76.1)	22 (71.0)	
Sufficient information about the virus						
No	47 (30.7)	10 (27.8)	9 (22.5)	18 (39.1)	10 (32.3)	0.395
Yes	106 (69.3)	26 (72.2)	31 (77.5)	28 (60.9)	21 (67.7)	
Sufficient information about work issues						
No	51 (33.3)	8 (22.2)	15 (37.5)	16 (34.8)	12 (38.7)	0.430
Yes	102 (66.7)	28 (77.8)	25 (62.5)	30 (65.2)	19 (61.3)	

* Significance level: p ≤ 0.05.

During the COVID-19 pandemic, a study of 45,161 adults from all regions of Brazil found that 52.6% were anxious.¹³ A literature review published in August 2020 found the prevalence of anxiety and/or depressive symptoms in the adult population was 16 to 28%.¹⁴ Data from Wuhan, China at the beginning of the pandemic showed that 20.1% of 330 front-line health professionals had anxiety symptoms, and the prevalence was higher among women.¹⁵ Another multicenter study conducted online in China during the COVID-19 pandemic found that 44.7% of the medical staff were anxious.¹⁶

In the present study, the most frequent level of anxiety among professionals who had direct contact with patients was moderate (31%); this was also the case among those who had no contact with patients (21%). Among those who had indirect contact with patients, the most frequent level was severe (27%).

A Brazilian study conducted months prior to the COVID-19 pandemic found the following anxiety levels in a group of health professionals: mild 23%,

moderate 8%, and severe 3%.¹⁷ During the pandemic, a meta-analysis of 12 studies conducted in China found an anxiety prevalence of 23.2% among health professionals.¹⁸ A Brazilian study of 88 nursing professionals from a university hospital found an anxiety prevalence of 48.9%, which was more frequent among nursing technicians (44.2%) than among clinical nurses (36.5%) and administrative workers (23.3%).¹⁹ The risk of anxiety was lower among men (OR = 0.15; $p < 0.001$), as was the risk of worsening symptoms.

These findings corroborate the national and international literature, ie, regardless of the pandemic, anxiety-related symptoms are more frequent in women than in men.^{12,13,15,18} In 2015, the global prevalence of anxiety was estimated at 5.1% among women and 3.6% among men.¹² A Brazilian study conducted during the pandemic showed that anxiety symptoms were more frequent among women (HR = 1.9; 95% CI 1.6-2.4), including a higher frequency of worsening symptoms or the onset of sleep problems and depression.¹³ A literature review involving Chinese healthcare

Table 4. Association between individual and occupational characteristics and anxiety symptoms among public university employees in the state of São Paulo, Brazil according to multivariate logistic regression

Variables	Crude OR (95% CI)	P-value	Adjusted OR (95% CI)*	p-value
Sex				
Female	1		1	
Male	0.16 (0.06-0.41)	<0.001 [†]	0.15 (0.05-0.43)	<0.001 [†]
Employment status				
Civil servant	1		1	
Regular employee	1.78 (0.83-3.81)	0.138 [†]	2.55 (1.05-6.22)	0.039 [†]
Outsourced	0.82 (0.07-9.66)	0.879	1.51 (0.11-19.8)	0.750
Previous physical health problems				
No	1		1	
Yes	3.43 (1.38-8.47)	0.008 [†]	4.12 (1.48-11.44)	0.007 [†]
Diagnosis confirmed				
No	1		1	
Yes	0.58 (0.27-1.25)	0.167 [†]	0.38 (0.15-0.94)	0.036 [†]
Sufficient information about work issues				
No	1		1	
Yes	0.49 (0.20-1.74)	0.110 [†]	0.41 (0.15-1.11)	0.079

95% CI = 95% confidence interval; OR = odds ratio.

* Multivariate logistic regression model.

[†] Significance level: $p \leq 0.20$.

[‡] Significance level: $p \leq 0.05$.

professionals during the pandemic found anxiety prevalences of 29.06% and 20.92% among women and men, respectively.¹⁸

Regular employment was associated with a higher risk of anxiety symptoms (OR = 2.55; $p=0.039$). A study on absences from work among health professionals considering two types of employment (civil servants vs. regular employees) identified a higher rate of absenteeism among civil servants.²⁰

A survey of 234 employees of Basic Health Units in Porto Alegre, RS, Brazil found a higher prevalence of common mental disorders among regular employees than civil servants ($p=0.003$).²¹ Another study found that employees without job security had a higher risk of anxiety (OR = 3.73; 95% CI 1.40-9.97).²² Such findings may indicate that the higher rates of anxiety among regular employees were due to lower job security and greater difficulty obtaining sick leave, in addition to fear of dismissal due to absences.²³

The risk of anxiety was higher among professionals who reported previous health problems (PR = 4.12; $p=0.007$). This finding is consistent with a Brazilian study involving 12,196 participants, which also identified a higher prevalence of anxiety among individuals who had health problems prior to social isolation due to the COVID-19 pandemic (OR = 1.51; 95% CI 1.36-1.67).²⁴ Similar results were found in a study of 194 Chinese cities, which found a higher risk of anxiety in individuals with previous health problems.²⁵

An Ecuadorian study involving 759 individuals from the general population found no difference in anxiety symptoms ($p=0.10$) between those with suspected and confirmed COVID-19 diagnosis.²⁶ A Chinese study of 205 individuals from the general population also found no difference in anxiety symptoms between suspected and confirmed cases ($p=0.182$).²⁷ Moreover, no difference in anxiety was found between suspected and confirmed cases in a sample of Chinese pediatricians.²⁸ Despite not identifying significant differences, these three studies did find a higher prevalence of anxiety among individuals with a confirmed diagnosis. In the present study, university employees with a confirmed COVID-19 diagnosis had a lower risk of anxiety symptoms (OR=0.38; $p=0.036$). The higher

prevalence of anxiety among those without a confirmed result might be explained by the fact that they will be exposed again to the virus and could still become ill due to fatigue, overwork, frustration, discrimination, and worry about infecting their family members.²⁹

Most of the studies on mental health during the pandemic involve health professionals or the general population.³⁰ The present study, a heterogeneous sample of workers was included, although it was not possible to separate them into categories due to the low number of participants. The investigation also assessed anxiety according to different levels of employment (civil servants, the regularly employed, and outsourced workers).

One recognized limitation of this study is its cross-sectional design, which cannot identify cause-and-effect relationships between exposure variables and covariates. The low response rate should also be considered. Nevertheless, the results are similar to those of studies with a large sample size.

CONCLUSIONS

The prevalence of anxiety among this sample of workers was high: 76.5% of the participants had some level of anxiety. Indirect contact with COVID-19 patients was associated with the highest prevalence of severe anxiety, while being female, regularly employed, and having previous health problems were associated with a higher risk of anxiety.

The findings of this study indicate the need to protect the mental health of university employees, especially those with previous health problems, including annual exams for disease prevention, regardless of the pandemic context. In addition, technical support networks should be developed to encourage the sharing of instructional materials, guidelines, and technical updates, as well as new studies monitoring the impact of infection on mental health. It is also important that the institution and the community recognize and value the efforts of these workers to keep working despite the fact that social isolation is the best safeguard against COVID-19.

AUTHOR CONTRIBUTIONS

MAB and MISS were responsible for study design, data collection, data curation, formal analysis, writing, review and editing. AMG, GPE, SR and PSSB participated in the study design,

data collection review and editing. Belasco AGS participated in the study design, supervision, revision, review and editing of the text. All authors have read and approved the final version submitted and take public responsibility for all aspects of the work.

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Correspondence address: Aline Bicalho Matias - Rua Sena Madureira, 1500 - Vila Clementino - CEP: 04021-001 - São Paulo (SP) - Brazil - E-mail: aline.matias@unifesp.br

