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HEALTH SCIENCES

Depression and anxiety among the University community during the Covid-19 pandemic: a study in Southern Brazil

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Abstract: This study aimed to assess the mental health of a University community in South Brazil during the COVID-19 pandemic. A cross-sectional web-based survey was conducted between July-August 2020 through a self-administered questionnaire. All University staff and students were eligible. Depression was measured using the Patient Health Questionnaire-9 and anxiety by the Generalized Anxiety Disorder-7. To evaluate the effect of social distancing and mental health factors on outcomes, Poisson regression models with robust variance were performed, estimating Prevalence Ratios (PR) and 95% Confidence Intervals (95%CI). 2,785 individuals participated in the study. Prevalence of depression and anxiety were 39.2% (95%CI 37.3-41.1) and 52.5% (95% CI 50.6-54.4), respectively. Undergraduate students showed a higher prevalence of the outcomes. Not leaving the house routinely, mental health care, and previous diagnosis of mental illness were associated with both outcomes. Those with a previous medical diagnosis of depression had a 58% (PR 1.58; 95%CI 1.44; 1.74) and anxiety a 72% (PR 1.72; 95%CI 1.56; 1.91) greater prevalence of depression than their peers. An alarming prevalence of psychopathologies was observed. Despite the well-known benefits of social distancing to public health, it requires a surveillance on the population's mental health, especially students and those with previous mental illness diagnosis.

Key words: COVID-19, mental health, mental disorders, depressive symptoms, universities, student health services.

INTRODUCTION

In March 2020, the World Health Organization declared the COVID-19 outbreak as a pandemic after 118,000 cases and 4,291 deaths reported in 114 countries (World Health Organization 2020). In November 2021, more than 250,000,000 cases and 5,000,000 deaths have been reported. Brazil is the third leading country in relation to number of cases and the second in relation to deaths, with cases and deaths in the country representing around 9% and 12% of the global figures, respectively, despite having only 2.7% of the world population (Dataset 2021).

During an extreme situation such as a pandemic, the focus and efforts of health professionals, scientists and government naturally turn to the biological risks of the disease, seeking to understand the pathophysiological mechanisms and proposing measures to prevent, contain and treat the disease, such as potential medications and vaccines. In this context, the secondary effect, although also highly relevant, on individual and societal mental health, tends to be underestimated and neglected (Ornell et al. 2020).

The SARS-CoV-2 virus, responsible for COVID-19, is highly infectious in humans and

has a worrisome mortality rate. The SARS-CoV-2 virus and the related disease have induced widespread panic and anxiety, due to its still unknown characteristics (Banerjee 2020), in addition to the well-known high transmissibility of the virus and the recommendations for social distancing.

The COVID-19 pandemic has been associated with anxiety, depression, stress, sleep disorders and suicide (Sher 2020). In a pandemic, fear increases anxiety and stress levels in healthy individuals and intensifies the symptoms of those with pre-existing psychiatric disorders (Shigemura et al. 2020). The COVID-19 pandemic also affects several aspects of individuals' lives, such as family organization, changes in routine, with the closure of schools, universities and commerce, and the recommendation of social distancing, with possible feelings of abandonment and loneliness. There is also insecurity and fear regarding the socioeconomic implications of the pandemic (Ornell et al. 2020). The United Nations Secretary-General, António Guterres, draws attention to the impacts of the pandemic on the individuals' mental health, not only during the problem, but also when it is already under control. As highlighted by the Secretary-General, even after the pandemic, mourning, anxiety, and depression related to COVID-19 will continue to affect people and communities (United Nations 2020).

Since the beginning of the pandemic, University routines were significantly changed. Most of the Universities around the world were closed and teaching and learning process needed to be modified for the remote digital environment (UNESCO 2020). In Brazil, most Universities ceased in person activities during the entire year of 2020, especially due to the lack of pandemic control. Although a needed measure to contain the spread of COVID-19, this closure-imposed challenges to all involved, such as lack of experience with and time to prepare online courses, the infrastructure required at home, and figuring out how to make use of support from educational technology teams (Bao 2020). The literature also indicates that the rapid and unexpected transition to the remote digital environment generated stress and anxiety to the higher education sector, impacting both staff and students (Lischer et al. 2021).

University students are characterized as especially vulnerable to the effects of the pandemic on mental health (Zhu et al. 2021). They constitute a population in transition, entering adult life and experiencing economic and social changes. In addition, with the implementation of a single national examination as the main mean of entry into Brazilian institutions, a large proportion of university students move intercity or interstate to attend a Federal University, which is public and free of charge. Adapting in a new city, often with limited social support, can increase the emotional vulnerability of these students. Indeed, the UN identifies adolescents and young people as especially at-risk populations, and recognizes concerns about family health, closure of schools and universities, loss of routine and loss of social connection as the main sources of distress (United Nations 2020). Indeed, students' mental health was already an important concern before the pandemic. A study with first year students from the Federal University of Pelotas (UFPel) showed that 32% of them had at least one major depressive episode, with it being more frequent among women, who had a family history of depression, who belonged to sexual minorities or who lived with friends and colleagues (Flesch et al. 2020).

The COVID-19 pandemic is recognized as an aggravating factor for the mental health of University students, which already face challenges such as academic pressures to

succeed and economic and social difficulties (Gavurova et al. 2022). For instance, 87% of the University students participating in a survey reported that the COVID-19 pandemic impaired their mental health, and this was especially important among those who self-reported mental health problems prior to the pandemic (Jafari et al. 2021). Another study comparing students' mental health before and during the COVID-19 pandemic reported that the prevalence of moderate to severe symptoms of anxiety and depression doubled during this time, and identified characteristics such as loneliness, having a close person infected, and perceived stress as influencing this increased burden. This pattern of expressive worsening was observed for almost all anxiety and depression symptoms. For example, the prevalence of students reported having concentration problems nearly every day increased from 8% in 2018 to 19% in 2020, and anhedonia nearly every day went from 13% to 29% (Hajduk et al. 2022). Considering the potential impacts of COVID-19 on the mental health of the population in general and the increased vulnerability of the University population, it is important to monitor the impact of the pandemic on this group. Additionally, University students have expressed a need for more financial, academic, and mental health support from academic institutions during the COVID-19 pandemic (Jafari et al. 2021). Therefore, the aim of this study is to assess the mental health of the academic community of a University in South Brazil during the Covid-19 pandemic, to monitor the problem and to inform local policies to support students and staff during and after the pandemic. Based on the literature, we expect a high burden of mental health problems among the academic community. Higher prevalence of anxiety and depression are expected among students and those with a previous diagnosis of a mental illness.

MATERIALS AND METHODS

Study site

This study was carried out with the community of the Federal University of Pelotas (UFPel), a public university located in the city of Pelotas, Southern Brazil. Pelotas has a population of approximately 350,000 inhabitants, being considered a reference in the Southern region of Brazil in terms of education, since it has five higher education institutions and four large technical schools (IBGE 2010). UFPel is an important federal institution on the national scenario in terms of teaching, community service and research. In 2020, UFPel was ranked 40th among universities in Latin America in the WHO Latin America Ranking, and among the 800-1000 best universities in the world.

Study design

This was a cross-sectional web-based survey conducted between July-August 2020 through a self-administered questionnaire about the impact of the pandemic on the mental health. All students and staff were eligible to take part in this study (n=25,220), comprising 18,814 undergraduate students, 3,781 graduate students, 1,369 academic staff and 1,256 administrative staff.

Sample size calculation

The sample sizes for the prevalence of depression and anxiety were calculated considering a confidence interval of 95%. The sample size required given a prevalence of depression of 32% in the undergraduate population (Flesch et al. 2020), an error margin of 2 percentage points and adding 10% for losses was 2,123 people. For the study of anxiety, considering a prevalence of 28.4%, the largest sample size needed was 1,994 individuals.

Outcome variables

Major depressive episode was evaluated using the 'Patient Health Questionnaire-9 (PHQ-9) which assesses nine depressive symptoms according with the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV): depressed mood; anhedonia, sleep disturbances; fatigue or lethargy; changes in appetite or body weight; feelings of guilt or worthlessness; difficulty in concentration; feelings of being slow or restless; and suicidal thoughts. Total score ranges from 0 to 27 points. Each question has four answer categories: 0 (not once), 1 (several days), 2 (more than half of the days), 3 (almost every day). For analysis purposes, an algorithm was calculated. The algorithm defines depression as present when the participant reports five or more symptoms, among which at least one is depressed mood or anhedonia, and that each symptom corresponds to answers 2 or 3 ('more than half the days' and 'almost every day', respectively), except for symptom 9 (suicidal thoughts), for which any value from 1 to 3 ('less than a week', 'a week or more' and 'almost every day', respectively) is considered as a depression symptom (Santos et al. 2013).

Anxiety disorders were assessed using the 'Generalized Anxiety Disorder-7' (GAD-7). This scale assesses the occurrence of seven symptoms of Generalized Anxiety Disorder in the two weeks prior to the interview. In summary, symptoms of GAD relate to feeling nervous/anxious or on edge, not being able to stop/control worrying, worrying too much, trouble relaxing, easily annoyed/irritable and feeling afraid as if something awful might happen. Total score ranges from 0 to 21 points. Each question has four answer categories: 0 (not once), 1 (several days), 2 (more than half of the days), 3 (almost every day). For analysis purposes, the cut-off 9/10 (No/Yes) was adopted (Moreno et al. 2016, Spitzer et al. 2006).

Covariates

Gender, age group (number of years, stratified as 18-21, 22-24, 25-30, 31-41; and ≥42), skin color according to the Brazilian Census (White, Black, Mixed, East Asian, Indigenous), and family income (categorized into quintiles) were the socioeconomic and demographic variables collected.

Participants were questioned about social distancing in the period of pandemic. This information was assessed through four questions related to compliance of the authority's guidelines for social distancing, routine of activities during the period of social distancing and perception about the importance of social distancing (Barros et al. 2020). Regarding the compliance with social distancing measures, the participant was asked 'To what extent are you managing to follow the social distancing guidance from the health authorities, i.e., staying at home and avoiding contact with others?'. The answer was collected on a five-point scale, later combined in very little/little, some, and quite/isolated from everyone. Participant's routine was assessed by the question 'What have your routine activities been?', which had as potential answers the following alternatives 'staying home all the time', 'only leaving home only for essentials, such as groceries', 'leaving home from time to time to run errands and stretch legs', 'going out every day for regular activities', and 'out of the house all day, every day, either for work or for other regular activities'. The perception of importance of social distancing was assessed with a five-point scale related to the degree of importance attributed to social distancing by the participant. Answers were later categorized as 'little/very little (answers 1-2)', 'some (3)', and 'quite/extremely (4-5)'. Finally, the

degree of social distancing was also measured with a five-point scale and categorized into three groups: 'not isolated/very little' (1-2), 'some' (3), and 'quite/isolated' (4-5).

Questions also evaluated the history of mental health, as following: a) regular visit to the psychiatrist/psychologist; b) time of last psychiatric and/or psychological assistance, categorized as 'never', 'less than a year ago', and 'a year or more'; c) previous medical diagnosis of depression; d) previous medical diagnosis of anxiety.

Data collection

The questionnaire had 65 mandatory close-ended items and was hosted online (RedCap Corporation). All eligible participants received an email through the University system with information about the survey and the questionnaire link. This link was also made available on the Survey official social media page on Instagram® and on Facebook®. The first page of the questionnaire contained an informed consent form. To access the questionnaire, participants had to confirm they agreed to participate.

Prior to data collection, a pre-test of the questionnaire was carried out with four researchers, assessing the understanding of the questionnaire and the time for completion. This study was approved by the Human Research Ethics Committee of the Federal University of Pelotas (#4.103.085) and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. This study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement and the SURGE reporting guideline (Grimshaw 2014).

For individuals who were identified as at risk of symptoms of depression and anxiety according to the criteria previously described, the online software presented a message indicating places to seek for remote and face-to-face assistance within the University and the municipality social services networks.

Statistical analysis

Statistical analyses were performed using Stata 16.0 (Stata Corporation, College Station, TX, USA). Firstly, a descriptive analysis to estimate absolute and relative frequencies of the variables of interest was performed. Distribution of variables were presented into following categories: academic or administrative staff, undergraduate and graduate students. Associations between covariates and the outcomes were assessed through chi-square test for categorical variables. Poisson regression models with robust variance were performed to estimate the magnitude of the effect of social distancing and mental health factors on the two outcomes (depression and anxiety symptoms), assessing prevalence ratios and their 95% confidence intervals (CIs). One model was fit for each exposure-outcome relationship, adjusting for the following sociodemographic confounding factors: type of enrollment with the university (academic or administrative staff, undergraduate and graduate students), sex, age (continuous variable), and family income (quintiles).

RESULTS

A total of 2,822 individuals participated in this study, of which 1,637 were undergraduate students, 517 were graduate students, 229 were administrative staff and 439 were academic staff. Table I shows the sample representativeness in relation to the UFPel community. Women and white skin color were the majority among all subgroups who participated in the survey.

Table I. Sample representativeness.

	Undergraduate students				Graduate students				Administrative staff				Academic staff			
	UFPel		Study sample		UFPel		Study sample		UFPel		Study sample		UFPel		Study sample	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender	p<0.001				p<0.001				p=0.245				p<0.001			
Male	8,509	45.2	501	30.6	1,635	43.2	124	24.0	540	43.0	89	38.9	681	49.7	174	39.6
Female	10,305	54.8	1,136	69.4	2,146	56.8	393	76.0	716	57.0	140	61.1	688	50.3	265	60.4
Total	**18,814**	**100.0**	**1,637**	**100.0**	**3,781**	**100.0**	**517**	**100.0**	**1,256**	**100.0**	**229**	**100.0**	**1,369**	**100.0**	**439**	**100.0**
Skin color	p=0.411				p=0.031				p= 0.691				p=0.653			
White	12,764	75.9	1,235	75.7	1,502	87.1	434	83.8	1,096	87.9	206	90.8	1,253	94.1	411	94.1
Black	1,824	10.8	169	10.4	109	6.3	28	5.4	74	5.9	11	4.9	18	1.4	3	0.7
Brown	2,092	12.4	210	12.9	99	5.7	50	9.7	71	5.7	10	4.4	56	4.2	21	4.8
East Asian	96	0.6	15	0.9	8	0.5	3	0.6	5	0.4	0	0	1	0.1	0	-
Indigenous	45	0.3	3	0.2	7	0.4	3	0.6	1	0.1	0	0	3	0.2	2	0.5
Total	**16,821**	**100.0**	**1,632**	**100.0**	**1,725**	**100.0**	**518**	**100.0**	**1,247**	**100.0**	**227**	**100.0**	**1,331**	**100.0**	**437**	**100.0**
Age	p<0.001				p<0.001				p<0.001				p<0.001			
18-21	5,063	27.0	667	40.9	6	0.2	2	0.4	0	**-**	2	0.9	0	-	2	0.5
22-24	5,206	27.7	427	26.2	396	10.5	75	14.6	3	0.2	0	-	0	-	0	**-**
25-30	4,418	23.5	272	16.7	1,519	40.5	231	44.8	68	5.4	21	9.3	13	1.0	10	2.3
31-41	2,498	13.3	131	8.0	1,321	35.2	155	30.1	433	34.5	97	42.7	447	32.6	176	40.3
≥42	1,603	5.8	133	8.2	512	13.6	52	10.1	752	59.9	107	47.1	909	66.4	249	57.0
Total	**18,788**	**100.0**	**1,630**	**100.0**	**3,754**	**100.0**	**515**	**100.0**	**1,256**	**100.0**	**227**	**100.0**	**1,369**	**100.0**	**437**	**100.0**

The most prevalent age category among undergraduate students was between 18 to 21 years (40.9%), and among graduate students it was between 25 to 30 years (44.9%). In both academic and administrative staff, most participants were 42 years old or more. In relation to family income, a crescent gradient was observed. Among undergraduate students, the 2nd quintile of family income was the most prevalent (36.8%), among graduate students it was the 3rd quintile (33.1%), 4th quintile of family income among administrative staff (40.1%), and the 5th quintile of family income among academic staff (72.2%) (Table II). While no important differences were observed regarding a previous diagnosis of depression, a higher proportion of undergraduate students reported a previous diagnosis of anxiety, compared to the other groups (46.7% of undergraduate students, compared to 41.2% of graduate students, 35.4% of professional staff and 38.0% of academic staff – data not shown).

Prevalence of depression and anxiety were 39.2% (95% Confidence Interval (CI) 37.3-41.1) and 52.5% (95% CI 50.6-54.4), respectively. When stratified by staff and students, prevalence of depression was 49.1% (95% CI 46.5-51.6), 38.7% (95% CI 34.4-43.1), 15.5% (95% CI 11.1-21.2), and 14.7% (95% CI 11.6-18.5) among undergraduate and graduate students, administrative and academic staff, respectively. Prevalence of anxiety was 60.5% (95% CI 58.0-63.0), 53.7% (95% CI 49.3-58.1), 32.4% (95% CI 26.3-39.0), and 31.1% (95% CI 26.8-35.7) among undergraduate and graduate students, administrative and academic staffs, respectively (Figure 1).

Table III presents the association between covariates and depression. For all groups, it

Table II. Sample characteristics.

	Undergraduate students	Graduate students	Administrative staff	Academic staff
	N (%)	N (%)	N (%)	N (%)
Gender				
Male	501 (30.6)	124 (24.0)	89 (38.9)	174 (39.6)
Female	1,136 (69.4)	393 (76.0)	140 (61.1)	265 (60.4)
Age				
18-21	667 (40.9)	2 (0.4)	2 (0.9)	2 (0.5)
22-24	427 (26.2)	75 (14.6)	0 (-)	0 (-)
25-30	272 (16.7)	231 (44.9)	21 (9.3)	10 (2.3)
31-41	131 (8.0)	155 (30.1)	97 (42.7)	176 (40.3)
≥42	133 (8.2)	52 (10.1)	107 (47.1)	249 (57.0)
Skin color				
White	1,235 (75.7)	434 (83.8)	206 (90.8)	411 (94.1)
Black	169 (10.4)	28 (5.4)	11 (4.9)	3 (0.7)
Brown	210 (12.9)	50 (9.7)	11 (4.4)	21 (4.8)
East Asian	15 (0.9)	3 (0.6)	0 (-)	0 (-)
Indigenous	3 (0.2)	3 (0.6)	0 (-)	2 (0.5)
Family income				
1st quintile	235 (16.7)	19 (3.9)	2 (0.9)	1 (0.2)
2nd quintile	517 (36.8)	151 (31.2)	4 (1.8)	1 (0.2)
3rd quintile	378 (26.9)	160 (33.1)	74 (34.1)	7 (1.7)
4th quintile	172 (12.2)	105 (21.7)	87 (40.1)	108 (25.7)
5th quintile	103 (7.3)	49 (10.1)	50 (23.0)	304 (72.2)

was observed that those who did not regularly visit the psychiatrist/psychologist, those whose time of last psychiatric and/or psychological assistance was less than a year ago and those with previous medical diagnosis of depression and/or anxiety presented higher prevalence of signals and symptoms of depression. Regarding the official recommendations about social distancing, academic staff that followed the recommendations presented higher prevalence of depression. Considering the routine activities during the pandemic, undergraduate and graduate students who did not leave their home or left their home only for essential activities presented higher prevalence of depression.

Table IV shows the association between covariates and signals and symptoms of anxiety. Our findings identified that undergraduate students who never or almost never leave their home present higher prevalence of anxiety. Anxiety symptoms were also associated with non-regular visits to the psychiatrist/psychologist, to time of last psychiatric and/or psychological assistance lower than a year, and to previous medical diagnosis of depression and/or anxiety for both staff and students.

Crude and adjusted associations between social distancing and mental health factors and depression signals and symptoms are displayed in Table V, while associations with anxiety signals and symptoms are presented in Table VI. Results were consistent for both outcomes, and the same factors which were associated with depression symptoms were also identified to be associated with anxiety. After adjustments for sociodemographic variables, it was observed

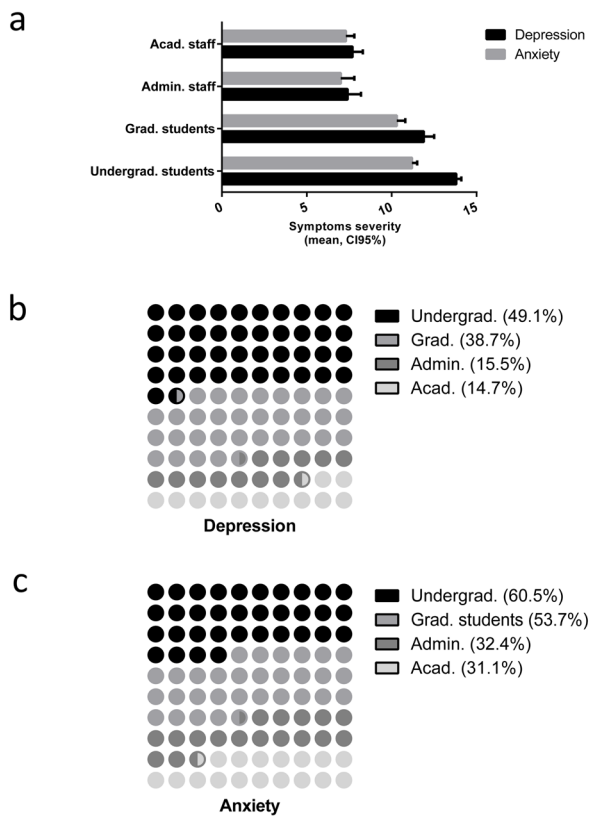

Figure 1. Prevalence of depression and anxiety among University staff and students.

that people who reported a higher social activity outside of their home had a lower prevalence of both outcomes, and a gradient was identified: the more often the person reported going out, the lower the outcome prevalence. Variables related to psychiatric and/or psychological assistance and previous mental issues were associated with a higher prevalence of depression and anxiety; for instance, individuals who regularly visit a mental health practitioner presented around a 30% higher prevalence of current psychopathologies (depression PR 1.31; 95%CI 1.17; 1.45; anxiety PR 1.30; 95%CI 1.20; 1.41). Additionally, those who reported a previous medical diagnosis of depression and anxiety had a 58% (PR 1.58; 95%CI 1.44; 1.74) and 72% (PR 1.72; 95%CI 1.56; 1.91) greater prevalence of signals and symptoms of depression during the COVID-19 pandemic than those who did not report these previous mental issues. When anxiety signals and symptoms was the outcome, the prevalence was 50% (PR 1.50; 95%CI 1.10; 1.61) and 67% (PR 1.67; 95%CI 1.55; 1;81) increased among those with previous medical diagnoses of depression and anxiety, respectively.

DISCUSSION

The prevalence of depression and anxiety among undergraduate students was 49.1% and 60.5%, respectively. These estimates were considerably higher than recent systematic reviews with meta-analysis evaluating depression and anxiety among university students during COVID-19 (Deng et al. 2021, Zhu et al. 2021). These differences may be due to methodological particularities, such as the instruments used to measure the outcomes, or to the fact that the population of the current study already presented a high mental health burden prior to the pandemic. In this study, rates of both psychopathologies were higher among those students who had previously been diagnosed with depression/anxiety and who reported visiting healthcare providers in the previous year. In relation to social distancing, higher prevalence of anxiety and depression mental illness was associated to strictly following the authority's guidelines for social distancing and to not leaving the house routinely.

Large-scale, disruptive crises such as a pandemic have profound short and long-term impacts on population mental health, including depression, anxiety, post-traumatic stress disorder, psychological distress, and stress (Taquet et al. 2021, Xiong et al. 2020). Alarming

Table III. Association between sociodemographic characteristics and social distancing and depression among students and staff.

	Signals and symptoms of depression (PHQ-9 algorithm)							
	Undergraduate students		Graduate students		Administrative staff		Academic staff	
	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value
	N (%)		N (%)		N (%)		N (%)	
Compliance with social distancing measures		0.619		0.137		0.146		0.022
Little/Very little	34 (45.9)		8 (33.3)		0 (-)		1 (100.0)	
Some	94 (46.5)		16 (27.6)		0 (-)		5 (25.0)	
Quite/Isolated	602 (49.6)		162 (40.7)		31 (17.1)		53 (14.0)	
What have your routine activities been?		<0.001		0.040		0.102		0.524
At home/Leaving for essentials	524 (52.8)		136 (42.5)		26 (18.1)		44 (15.4)	
Leaving home from time to time	133 (44.8)		30 (29.7)		5 (14.7)		13 (13.4)	
Go out every day/All day out	71 (36.1)		19 (32.2)		0 (-)		1 (5.9)	
Do you consider social distancing important?		0.784		0.963		0.755		0.579
Little/Very little	8 (47.1)		2 (33.3)		1 (25.0)		0 (-)	
Some	18 (43.9)		2 (40.0)		1 (25.0)		2 (22.2)	
Quite/Extremely	706 (49.3)		182 (38.7)		29 (15.2)		57 (14.7)	
To what extent are you socially distancing?		0.376		0.145		0.586		0.361
Not isolated/Very little	28 (41.8)		7 (35.0)		0 (-)		0 (-)	
Some	158 (51.1)		27 (30.0)		3 (12.0)		9 (22.0)	
Quite /Isolated	546 (48.9)		152 (41.1)		28 (16.4)		50 (14.0)	
Regular visit to the psychiatrist/ psychologist		0.022		0.017		0.020		<0.001
No	559 (47.5)		131 (35.8)		20 (12.6)		35 (11.3)	
Yes	171 (54.8)		55 (48.3)		11 (27.5)		24 (26.1)	
Time of last psychiatric and/or psychological assistance		<0.001		<0.001		0.014		0.003
Less than a year	268 (53.9)		78 (49.4)		15 (27.8)		28 (24.1)	
A year or more	245 (53.6)		56 (40.9)		8 (12.5)		20 (12.4)	
Never	217 (40.9)		51 (27.9)		8 (9.9)		11 (9.1)	
Previous medical diagnosis of depression		<0.001		<0.001		0.115		<0.001
No	424 (41.9)		114 (31.8)		18 (12.9)		30 (10.3)	
Yes	290 (63.7)		67 (56.8)		13 (21.7)		29 (23.4)	
Previous medical diagnosis of anxiety		<0.001		<0.001		0.021		<0.001
No	294 (37.8)		76 (26.9)		15 (11.4)		24 (9.6)	
Yes	427 (61.4)		107 (54.9)		16 (23.9)		35 (23.2)	

prevalence of depression and anxiety were observed in this study, with figures considerably higher in comparison to a systematic review and meta-analysis of mental health consequences of COVID-19, which identified overall prevalence of depression and anxiety of 31.4% and 31.9%, respectively (Wu et al .2021). Not surprisingly, an association between mental health issues and

Table IV. Association between sociodemographic characteristics and social distancing and anxiety among students and staff.

	Signals and symptoms of anxiety (GAD-7 ≥10)							
	Undergraduate students		Graduate students		Administrative staff		Academic staff	
	Yes	p-value	Yes	p-value	Yes	p-value	Yes	p-value
	N (%)		N (%)		N (%)		N (%)	
Compliance with social distancing measures		0.066		0.458		0.647		0.277
Little/Very little	43 (59.7)		14 (64.0)		3 (42.9)		1 (100.0)	
Some	109 (53.2)		29 (49.1)		3 (23.1)		5 (25.0)	
Quite/Isolated	768 (61.7)		221 (53.9)		61 (32.4)		121 (31.2)	
What have your routine activities been?		<0.001		0.223		0.832		0.278
At home/Leaving for essentials	652 (63.7)		183 (55.8)		50 (33.6)		97 (33.2)	
Leaving home from time to time	172 (58.1)		49 (46.2)		11 (31.4)		25 (25.8)	
Go out every day/All day out	96 (48.0)		33 (55.0)		6 (27.3)		4 (22.2)	
Do you consider social distancing important?		0.761		0.493		0.898		0.337
Little/Very little	10 (55.6)		2 (33.3)		1 (25.0)		0 (-)	
Some	23 (56.1)		2 (40.0)		1 (25.0)		2 (22.2)	
Quite/Extremely	889 (60.7)		262 (54.1)		65 (32.8)		125 (31.6)	
To what extent are you socially distancing?		0.197		0.934		0.834		0.650
Not isolated/Very little	33 (50.0)		12 (57.1)		2 (40.0)		0 (-)	
Some	191 (60.4)		48 (52.8)		7 (28.0)		11 (26.8)	
Quite /Isolated	699 (61.2)		206 (53.9)		58 (32.8)		116 (31.7)	
Regular visit to the psychiatrist/ psychologist		<0.001		<0.001		<0.001		0.016
No	697 (58.2)		183 (48.7)		43 (26.5)		88 (28.0)	
Yes	224 (68.9)		83 (70.3)		24 (54.6)		39 (41.1)	
Time of last psychiatric and/or psychological assistance		<0.001		<0.001		<0.001		<0.001
Less than a year	357 (69.7)		107 (65.2)		31 (53.5)		51 (43.2)	
A year or more	297 (63.9)		77 (55.0)		20 (29.8)		50 (30.3)	
Never	265 (49.2)		80 (42.5)		15 (18.5)		24 (19.5)	
Previous medical diagnosis of depression		<0.001		<0.001		0.015		<0.001
No	542 (52.7)		175 (48.1)		38 (27.0)		68 (23.3)	
Yes	364 (77.1)		86 (68.8)		29 (43.9)		57 (49.6)	
Previous medical diagnosis of anxiety		<0.001		<0.001		<0.001		<0.001
No	381 (47.7)		121 (42.0)		28 (20.7)		49 (19.4)	
Yes	533 (75.2)		143 (70.4)		38 (53.5)		77 (49.4)	

previous medical diagnosis of depression and/or anxiety was identified. The scientific literature suggests the COVID-19 pandemic may impact on the mental health of the general population and worse the psychiatric symptoms of those with pre-existing psychiatric disorders (Shigemura et al. 2020, Vindegaard & Benros 2020), and this finding was corroborated by the present study.

Our findings identified that COVID-19 is taking a larger toll on the mental health of university students in comparison to staff: almost half of students were identified to have depression,

Table V. Crude and adjusted associations between social distancing and previous mental health factors and current depression. Poisson regression models.

	Signals and symptoms of depression (PHQ-9 algorithm)					
	Crude analysis			Adjusted analysis*		
	Prevalence Ratio	95% CI	p-value	Prevalence Ratio	95% CI	p-value
			0.733			0.232
Compliance with social distancing measures						
Little/Very little	1.00	-		1.00	-	
Some	0.96	0.73; 1.26		0.91	0.70; 1.19	
Quite/Isolated	0.95	0.75; 1.21		1.03	0.82; 1.30	
What have your routine activities been?			<0.001			<0.001
At home/Leaving for essentials	1.00	-		1.00	-	
Leaving home from time to time	0.82	0.72; 0.93		0.85	0.74; 0.96	
Go out every day/All day out	0.74	0.62; 0.88		0.77	0.65; 0.92	
Do you consider social distancing important?			0.714			0.551
Little/Very little	1.00	-		1.00	-	
Some	1.10	0.62; 1.95		1.12	0.59; 2.11	
Quite/Extremely	1.11	0.69; 1.78		1.17	0.68; 2.00	
To what extent are you socially distancing?			0.308			0.597
Not isolated/Very little	1.00	-		1.00	-	
Some	1.11	0.84; 1.48		1.11	0.84; 1.46	
Quite /Isolated	1.01	0.78; 1.32		1.11	0.86; 1.44	
Regular visit to the psychiatrist/ psychologist			<0.001			<0.001
No	1.00	-		1.00	-	
Yes	1.26	1.13; 1.40		1.31	1.17; 1.45	
Time of last psychiatric and/or psychological assistance			<0.001			<0.001
Less than a year	1.00	-		1.00	-	
A year or more	1.50	1.33; 1.70		1.48	1.31; 1;67	
Never	1.28	1.13; 1.46		1.32	1.17; 1.49	
Previous medical diagnosis of depression			<0.001			<0.001
No	1.00	-		1.00	-	
Yes	1.65	1.50 1;81		1.58	1.44; 1.74	
Previous medical diagnosis of anxiety			<0.001			<0.001
No	1.00	-		1.00	-	
Yes	1.86	1.69; 2.06		1.72	1.56; 1.91	

***Analyses adjusted for type of enrollment, sex, age, and income quintiles.**

and 60.0% of them presented anxiety symptoms. Four main reasons can be hypothesized to this higher mental health burden among university students. Firstly, staff at Federal Universities in Brazil have permanent positions and standard wages. While the economic impacts of the pandemic are substantial and there are well documented consequences of income instability to mental health (Allen et al. 2014), it is expected that this problem will be less concerning for those who have stable employment and salary, which were not affected by the economic crisis triggered by the Pandemic. Secondly, students have uncertainties about their future, differently

Table VI. Crude and adjusted associations between social distancing and previous mental health factors and current anxiety. Poisson regression models.

	Signals and symptoms of anxiety (GAD-7≥10)					
	Crude analyses			Adjusted analyses*		
	Prevalence Ratio	95% CI	p-value	Prevalence Ratio	95% CI	p-value
Compliance with social distancing measures			0.619			0.934
Little/Very little	1.00	-		1.00	-	
Some	0.82	0.67; 1.00		0.75	0.62; 0.91	
Quite/Isolated	0.88	0.74; 1.03		0.86	0.74; 1.00	
What have your routine activities been?			0.001			0.034
At home/Leaving for essentials	1.00	-		1.00	-	
Leaving home from time to time	0.88	0.80; 0.97		0.88	0.79; 0.97	
Go out every day/All day out	0.85	0.74; 0.96		0.93	0.82; 1.05	
Do you consider social distancing important?			0.150			0.244
Little/Very little	1.00	-		1.00	-	
Some	1.17	0.71; 1.92		1.20	0.71; 2.01	
Quite/Extremely	1.30	0.85; 1.98		1.28	0.83; 1.98	
To what extent are you socially distancing?			0.700			0.362
Not isolated/Very little	1.00	-		1.00	-	
Some	1.08	0.87; 1.34		1.03	0.83; 1.27	
Quite /Isolated	1.03	0.84; 1.27		1.06	0.87; 1.30	
Regular visit to the psychiatrist/ psychologist						<0.001
No	1.00	-	<0.001	1.00	-	
Yes	1.29	1.19; 1.39		1.30	1.20; 1.41	
Time of last psychiatric and/or psychological assistance			<0.001			<0.001
Less than a year	1.00	-		1.00	-	
A year or more	1.55	1.42; 1.70		1.52	1.39; 1.67	
Never	1.29	1.16; 1.42		1.31	1.19; 1.45	
Previous medical diagnosis of depression			<0.001			<0.001
No	1.00	-		1.00	-	
Yes	1.53	1.43; 1.64		1.50	1.10; 1.61	
Previous medical diagnosis of anxiety			<0.001			<0.001
No	1.00	-		1.00	-	
Yes	1.77	1.64; 1.90		1.67	1.55; 1.81	

***Analyses adjusted for type of enrollment, sex, age, and income quintiles.**

than staff in permanent positions. The pandemic affected their way of learning, moving from face-to-face lectures to e-learning, and significantly impacted their expected graduation dates, which may lead to mental health issues. Additionally, students may have moved intercity or interstate to attend University, and the lack of social support in a new city may make these individuals more vulnerable to the mental health effects of a stressful period such as a pandemic. Finally, students are usually younger than staff. A study evaluating the epidemic of a highly infectious equine influenza in Australia identified age as a factor associated with the level of psychological

distress, with those individuals aged 16 to 24 showing the highest levels of mental health impact. A systematic review on the impact of COVID-19 on mental health also showed student status and younger age group to be risk factors associated with mental distress (Xiong et al. 2020). While evidence shows that older people are more susceptible to the physical effects of Covid-19, it seems the long-term mental health burden may be more dangerous to the younger groups.

Social distancing, quarantine and isolation are recommended by public health authorities for the prevention of the transmission of infectious diseases, such as COVID-19 (Brooks et al. 2020). However, social isolation is an established risk factor for mental health, and social support and connections are critical during major health events, including quarantine and isolation (Hossain et al. 2020). Social distancing is the reduction of social contacts, while quarantine is the separation of people potentially exposed to a contagious disease (Brooks et al. 2020). Although with different levels of severity, both are used to minimize the spread of an infectious disease.

In this study, it was observed that those who reported following the recommendations for social distancing were identified to present more symptoms of depression and anxiety. Even though these associations were yield from regression models adjusted for sociodemographic variables, they were not observed when groups were evaluated separately. It is possible that the smaller sample size of some groups, such as administrative staff, limited our ability to identify such an association.

Having said that, this finding may indicate the lack of face-to-face social interaction during pandemic as a cause of depression and anxiety. Before the introduction of vaccines, social distancing, mask use and hand sanitation were the only effective measures to prevent the uncontrolled spreading of the virus, preventing the health systems of collapsing and saving lives (Bedford et al. 2020). Despite these well-known benefits of social distancing and quarantine as a public health measure, its mental health impact should be monitored. Conditions identified as stressors during quarantine include its duration, the fear of becoming infected or transmitting the virus, feelings of frustration and boredom, inadequate information, and inadequate supplies, both general and medical. While social distant, the fear of the infection may predispose individuals to be hypervigilant for symptoms, which may increase their levels of fear and anxiety. Also, the sense of isolation can be distressing and may have psychological impacts. Quarantine may have a considerable, long-term psychological effects for those affected, and measures should be taken to reduce its impact (Brooks et al. 2020).

The full impact of the COVID-19 pandemic on mental health is still unknown, but the evidence that a psychological effect of quarantine may still be detected months or years later is worrisome, and suggests the need to ensure, even during the period, effective governmental and individual efforts to reduce mental health effects. Inefficiently receiving information from public health authorities can be stressful to the population, therefore clear, accurate, and up-to-date communication should be delivered, aiming to promote a good understanding of the disease, reducing insecurities, and increasing awareness. In addition, those with a mental illness history may be more likely to experience psychological distress after experiencing any disaster-related trauma, so they need to be under close watchful eye for any additional support during a stressful period. The pandemic and related quarantine also appear to have a larger impact on health

care workers than non-health care workers, and the society and governments should be responsive to the mental health needs of health workers (Brooks et al. 2020). Additionally, the basic needs, including food, water, and basic medical supplies of those quarantined should be met by the government, to reduce the mental burden of an already stressful experience. Finally, the health system needs to be prepared to deal with the long-term mental health effects of this societal traumatic event.

The strengths of this study include the measurement instruments used and the University's official support to the survey. The PHQ-9 and the GAD-7, used to assess depression and anxiety, respectively, are widely used, validated instruments, therefore granting reliability to our estimates. Additionally, the survey was officially supported by the University, by inviting the academic community to take part on the study via e-mail and by advertising it on the University website and official social media accounts. This is also one of the first studies to be developed in relation to mental health in the University during the Pandemic period and the results shed some light in relation to the effects of pandemic in the academic community and the need to tackle the problem.

The main concern is with the representativeness of the sample. The study sample was younger than the University's community, which may reflect the data collection process, carried out completely online. It also had a higher proportion of women, which corroborates with the literature, which shows that women tend to engage more in online surveys than men (Moore & Tarnai 2002). In addition, the response rate was relatively low, which can also reflect the limitations of online self-administered questionnaires. Another limitation of online self-administered surveys is the impossibility of conducting quality controls. Additionally, individuals with more severe mental health issues may be less likely to engage in web-based surveys, leading to underestimated prevalence of these problems. On the other hand, individuals with a certain degree of anxiety or depression may be more willing to participate in studies on the topic. Also, the cross-sectional nature of our data limits the evaluation of temporality or the mental health monitoring over different moments of the pandemic.

In conclusion, COVID-19 is a global pandemic that may shape the mental health of a whole generation. The overall levels of anxiety and depression during the COVID-19 pandemic are alarming, especially among University students. Individuals with previous medical diagnosis of mental illness and those practicing social isolation appear to have higher prevalence of depression and anxiety symptoms.

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