PREVALENCE OF COMMON MENTAL DISORDER (CMD) AND FACTORS ASSOCIATED WITH THE HEALTH OF UNIVERSITY STUDENTS AFTER SOCIAL DISTANCING IN THE COVID-19 PANDEMIC

PREVALÊNCIA DE TRANSTORNO MENTAL COMUM (TMC) E FATORES ASSOCIADOS À SAÚDE DE UNIVERSITÁRIOS PÓS-DISTANCIAMENTO SOCIAL NA PANDEMIA DA COVID-19

PREVALENCIA DEL TRASTORNO MENTAL COMÚN (TMC) Y FACTORES ASOCIADOS A LA SALUD DE ESTUDIANTES UNIVERSITARIOS TRAS EL DISTANCIAMIENTO SOCIAL EN LA PANDEMIA DE COVID-19

Francisco Valter. M. SILVA[1]
e-mail: valtermiranda15@gmail.com
Ticiana M. de O. FONTENELE[2]
e-mail: ticimesquita@unifor.br
Ana Valeska S. e SILVA[3]
e-mail: ana.valeska@uece.br
Ana Paula de V. ABDON[4]
e-mail: paulaabdon@unifor.br

Editors: Prof. Dr. Célia Tanajura Machado
Prof. Dr. Kathia Marise Borges Sales
Prof. Dr. Rosângela da Luz Matos
Deputy Executive Editor: Prof. Dr. José Anderson Santos Cruz

[1] University of Fortaleza (UNIFOR) – Fortaleza – CE – Brazil. Master's degree in Public Health from UNIFOR. State University of Ceará (UECE), Fortaleza – CE – Brazil. Doctoral degree candidate in the Postgraduate Program in Clinical Health Care (UECE).
[2] University of Fortaleza (UNIFOR) – Fortaleza – CE – Brazil. Doctoral degree candidate in the Postgraduate Program in Public Health.
[3] State University of Ceará (UECE), Fortaleza – CE – Brazil. Professor in the Postgraduate Program in Clinical Health Care (UECE).
[4] University of Fortaleza (UNIFOR) – Fortaleza – CE – Brazil. Professor in the Postgraduate Program in Public Health at UNIFOR.

ABSTRACT: The objective was to investigate the prevalence of Common Mental Disorders and their relationship with factors associated with the health of university students after social distancing during the COVID-19 pandemic. This is a cross-sectional study, at two universities in Fortaleza-CE, Brazil. 358 university students from health sciences and technology centers participated. Multiple logistic regression was applied using SPSS Statistics. The prevalence of CMD was 59.3% and was related to age <25 years (OR=2.18; p=0.029), poor self-rated health (OR=4.29; p<0.001), smoking (OR=3.02; p=0.028), cell phone dependence (OR=3.10; p<0.001), poor sleep quality (OR=3.92; p<0.001), musculoskeletal pain in the shoulder (OR=2.46; p=0.001) and elbow (OR=2.96; p=0.012). A high prevalence of CMD and its association with multiple health-related factors was found.

KEYWORDS: Common Mental Disorder. College students. Associated Factors. COVID-19.

RESUMO: Objetivou-se investigar a prevalência de Transtorno Mental Comum e sua relação com fatores associados à saúde de universitários pós-distanciamento social na pandemia da COVID-19. Trata-se de um estudo transversal, em duas universidades de Fortaleza-CE, Brasil. Participaram 358 universitários dos centros de ciências da saúde e de tecnologias. Aplicou-se a regressão logística múltipla através do SPSS Statistics. A prevalência de TMC foi 59,3% e apresentou relação com idade <25 anos (OR=2,18; p=0,029), autoavaliação de saúde ruim (OR=4,29; p<0,001), tabagismo (OR=3,02; p=0,028), dependência do celular (OR=3,10; p<0,001), qualidade do sono ruim (OR=3,92; p<0,001), dor musculoesquelética no ombro (OR=2,46; p=0,001) e cotovelo (OR=2,96; p=0,012). Constatou-se elevada prevalência de TMC e sua associação com múltiplos fatores relacionados à saúde.

PALAVRAS-CHAVE: Transtorno Mental Comum. Universitários. Fatores Associados. COVID-19.

RESUMEN: El objetivo fue investigar la prevalencia del Trastorno Mental Común y su relación con factores asociados a la salud de los estudiantes universitarios y al distanciamiento social durante la pandemia de COVID-19. Se trata de un estudio transversal, en universidades de Fortaleza-CE, Brasil. Participaron 358 estudiantes universitarios de centros científicos y tecnológicos de la salud. Se aplicó regresión logística múltiple mediante SPSS Statistics. La prevalencia de TMC fue de 59,3% y se relacionó con edad <25 años (OR=2,18; p=0,029), mala autoevaluación de salud (OR=4,29; p<0,001), tabaquismo (OR=3,02; p= 0,028), dependencia del teléfono celular (OR=3,10; p<0,001), mala calidad del sudor (OR=3,92; p<0,001), dolor musculoesquelético en el hombro (OR=2,46; p=0,001) y código (OR=2,96; p=0,012). Se encontró una alta prevalencia de TMC y su asociación con múltiples factores relacionados con la salud.

PALABRAS CLAVE: Trastorno mental común. Estudiantes universitarios. Factores asociados. COVID-19.

Introduction

The COVID-19 pandemic has brought unexpected changes to people's lifestyles, such as the adoption of remote work, restrictions on daily activities, and the suspension of non-essential outings such as trips to the supermarket and in-person classes, resulting in lasting side effects such as distress, anxiety, and fear (Couto; Couto; Cruz, 2020). This new reality is reflected in mental health, where COVID-19 acts as a global stressor, characterized as an environmental stimulus generating a unique psychological and physiological response, triggering individual reactions due to uncertainty associated with the unknown scenario. Severe psychological stress can even lead to sleep disturbances and physical discomfort (Kaparounaki *et al.*, 2020).

In various countries, the pandemic has caused a significant mental health crisis, resulting in a substantial increase in psychological suffering. A study in the United Kingdom, involving 53,351 participants, reported an increase from 19% to 27% in this aspect (Pierce *et al.*, 2020). Furthermore, a meta-analysis highlighted high levels of post-traumatic stress disorder, depression, and anxiety across various populations (Vindegaard; Benros, 2020). This crisis has not been limited to mental health and has extended to various areas, including economic, industrial, professional, and educational impacts. Globally, over 1.5 billion students have been affected, transitioning to online classes, including in Brazil (Unesco, 2022).

Among the mental health repercussions triggered by the pandemic is Common Mental Disorders (CMD), which corresponds to a pattern of psychological suffering of clinical significance often associated with distress or incapacity. It is characterized by disorders of psychological distress, acute clinical cases with spontaneous remission, of a depressive, anxious, and dissociative nature, with main symptoms including insomnia, fatigue, irritability, forgetfulness, difficulty concentrating, and somatic complaints (Moraes *et al.*, 2017).

According to Steel et al. (2014), the global prevalence of CMD stands at a rate of 29.2%, with a higher prevalence among females due to domestic obligations, work, and family (Steel *et al.*, 2014). In Brazil, prevalence ranges from 39% (Almeida; Barbosa; Avena, 2022) to 71.52% (Barros; Peixoto, 2023). Mental disorders are commonly diagnosed in university students, with anxiety being the most prominent, related to the academic routine involving exams, seminars, assignments, and internships (Mclafferty *et al.*, 2017).

Thus, university life is marked as a challenging period, full of learning opportunities and the expansion of professional and personal skills and competencies. However,

considering that in many cases, the transition and adaptation to higher education are linked to the psychosocial development phase of adolescence or young adulthood, it can also lead to a scenario of vulnerability, being a time of high stress and pressure, exacerbated by the pandemic context, which can trigger CMD (Lopes *et al.*, 2022). Factors such as academic pressure, poor sleep quality (Al-Khani *et al.*, 2019), poor nutrition (Sousa *et al.*, 2021), complaints of pain (Serbic; Friedrich; Murray, 2023) and mobile device use (Grant; Lust; Chamberlain, 2019) have been individually described in the literature as possible predictors of CMD.

Despite the above, to the best knowledge of the authors, there is limited research assessing suspected CMD and associated factors in Brazilian university students post-social distancing. Therefore, the present study aims to investigate the prevalence of Common Mental Disorders and their relationship with associated factors in the health of university students post-social distancing during the COVID-19 pandemic.

Methodology

This is a cross-sectional and analytical study conducted at two universities (public and private) located in Fortaleza, Ceará, Brazil, both recognized as state references. It constitutes a segment of a larger project titled "Smartphone Use and Associated Factors in the Health of University Students Post-Social Distancing during the Covid-19 Pandemic." Data collection took place virtually between September and December 2022.

The study population consisted of university students from the Health Sciences (CCS) and Technology (CCT) Centers. These centers were chosen because they maintained classes in remote/hybrid formats from 2020 until mid-2021 to comply with social distancing decrees. A sample size of 358 participants was estimated to represent the population, based on finite population sampling calculation (N = 12,677 university students), standard deviation (σ) of 3.2 hours in the smartphone usage variable (Callou Filho, 2021), margin of error (E) of 20 minutes (0.33 hours), and a 95% confidence interval, using the formula $n = \frac{Z^2.\sigma^2.N}{E^2(N-1)+Z^2\sigma^2}$ (Martins, 2010). To maintain proportions, 155 participants were from the public institution and 203 from the private institution.

Inclusion criteria were enrollment in courses from the aforementioned centers and participation in online classes offered from 2020 to 2021. Exclusion criteria included absence from classes due to medical leave or enrollment suspension during the 2020-2021 period, and

visually impaired students due to the inadaptability of the data collection instrument used in the study. Recruitment was conducted through in-person invitations on the campuses of the selected institutions. After providing study explanations, participants could access a QR code to be directed to the electronic form.

Data collection was conducted through a Google Forms® questionnaire, comprising the following instruments: 1) Socioeconomic and general health questionnaire; 2) Self-Report Questionnaire (SRQ-20) to detect suspicion of Common Mental Disorders (CMD); 3) Smartphone Addiction Inventory (SPAI-BR) to investigate cellphone dependency; 4) International Physical Activity Questionnaire - short form (IPAQ) to assess physical activity levels; 5) Pittsburgh Sleep Quality Index (PSQI-BR) to evaluate sleep quality; 6) Nordic Musculoskeletal Questionnaire (NMQ) to assess musculoskeletal symptoms.

The socioeconomic and general health questionnaire collected variables based on data extracted from the National Health Survey (IBGE, 2019), including age, gender, self-reported skin color, socioeconomic status, employment status, type of educational institution, course center, self-rated health, alcohol consumption, and smoking habits.

The SRQ-20 consists of 20 binary questions (yes = 1 point, no = 0 points) assessing psychosomatic symptoms to screen for Common Mental Disorders (CMD), validated for Brazil (Moraes *et al.*, 2017). Scores are summed, with an optimal cutoff point of 7/8, demonstrating a sensitivity of 86.3% and specificity of 89.3%. In this study, a cutoff score of 8 was adopted for suspicion of CMD, irrespective of gender, based on other studies in Brazil (Moraes *et al.*, 2017). This variable serves as the outcome measure in this study.

The SPAI-BR comprises 26 questions assessing cellphone dependency, with responses of yes (1) or no (0), validated in Portuguese with university students. The final score is the sum of responses, with a cutoff of ≥ 7 indicating cellphone dependency, demonstrating a sensitivity of 90.54% and specificity of 59.93% (Khoury *et al.*, 2017).

The short form IPAQ includes eight open-ended questions estimating weekly time spent on different dimensions of physical activity, such as walking and moderate-to-vigorous intensity exercises, as well as time spent in sedentary behavior, such as sitting periods (Matsudo *et al.*, 2001). This instrument was validated in Portuguese (Pinto Guedes; Correa Lopes; Pinto Guedes, 2005). Physical activity levels were categorized in this study as active (>150 minutes/week of any physical activity) and sedentary ($\leq$ 150 minutes/week of any physical activity) (Franco *et al.*, 2021).

The Nordic Musculoskeletal Questionnaire (NMQ) consists of a human figure divided into nine anatomical areas, covering all parts of the body: cervical region, shoulders, thoracic region, elbows, wrists/hands, lumbar region, hips/thighs, knees, ankles/feet. It provides a binary response, yes or no, for the occurrence of chronic musculoskeletal pain in each anatomical region over the past twelve months. This instrument was adapted into Portuguese (Pinheiro; Tróccoli; Carvalho, 2002).

The Pittsburgh Sleep Quality Index (PSQI-BR) comprises 19 self-rated questions distributed across 7 components: 1) sleep quality, 2) sleep latency, 3) sleep duration, 4) sleep efficiency, 5) sleep disturbances, 6) use of sleeping medication, and 7) daytime dysfunction. Each component is scored from 0 to 3, totaling a global score ranging from 0 to 21. A cutoff score of ≤ 5 indicates good sleep quality, while a score above 5 indicates poor quality (Bertolazi *et al.*, 2011).

Data were analyzed using descriptive and inferential statistics with IBM® SPSS Statistics version 23.0. Categorical variables were presented as absolute frequency (n) and relative frequency (%), while numerical variables were presented as mean ± standard deviation (SD). Pearson's chi-square test was applied for inferential analysis, comparing the CMD outcome with variables of interest, followed by the calculation of odds ratios (OR) and their respective confidence intervals.

Subsequently, multiple logistic regression analysis was performed to build the final model using the stepwise backward method, including associations with significance up to <0.10 in the inferential analysis. Adjusted ORs and their respective confidence intervals (CI) were estimated. A significance level of 5% ($p < 0.05$) was adopted.

This study was approved by the Research Ethics Committee of both public and private institutions (approval numbers 5,526,758 and 5,739,427, respectively). Participants provided informed consent by signing the Informed Consent Form.

Results

Regarding socioeconomic characteristics, the majority of university students were below 25 years of age (81.8%, n=293), with a mean age of 22.7 (±4.5) years. Females constituted a significant proportion (57.5%, n=206), self-reported race as mixed (46.9%, n=168), socioeconomic class D (33.0%, n=118), and engaged in remunerative activities (37.7%, n=135). Regarding the type of educational institution, 56.7% (n=203) attended

private institutions, and 43.3% (n=155) attended public institutions, with 41.6% (n=149) enrolled in health courses and 58.4% (n=209) in technology courses (Table 1).

In terms of overall health assessment, 39.9% (n=143) rated their health as poor, 54.2% (n=194) reported alcohol consumption, and 9.5% (n=34) were smokers. Among the total, 68.9% (n=250) exhibited smartphone dependency, 15.1% (n=54) were classified as sedentary, and 69.6% (n=249) reported poor sleep quality. Complaints of chronic musculoskeletal pain and their respective proportions in body regions were as follows: 69.0% (n=247) in the neck, 52.2% (n=187) in the shoulders, 58.9% (n=211) in the upper back region, 15.9% (n=57) in the elbows, and 50.8% (n=182) in the wrists/hands (Table 1).

Table 1 - Distribution of socioeconomic variables and general health assessment among university students. Fortaleza, Ceará, Brazil, 2022

Variables	n	%
Socioeconomic variables		
Age		
≥ 25 years	65	18,2
< 25 years	293	81,8
Sex		
masculine	152	42,5
feminine	206	57,5
Self-reported skin color		
brown	168	46,9
white	153	42,7
black	27	7,5
Yellow	7	2,0
indigenous	3	0,9
Social class by minimum wage (SM)		
A (> 20 SM)	20	5,8
B (10 to 20 SM)	67	18,4
C (4 to 9 SM)	98	27,4
D (2 to 3 SM)	118	33,0
E (≤ 1 SM)	55	15,4
Paid activity (yes)	135	37,7
Type of institution		
particular	203	56,7
public	155	43,3
Course center		
Health Sciences	149	41,6
Technological Sciences	209	58,4
General health assessment		
Self-rated health (poor)	143	39,9
Consumption of alcoholic beverages (yes)	164	48,8
Smoking (yes)	34	9,5
Factors associated with health		
Cell phone dependence (yes)	250	68,9
Level of physical activity (sedentary)	54	15,1
Sleep quality (poor)	249	69,6
Complaint of chronic musculoskeletal pain		
neck	247	69,0
shoulders	187	52,2

Variables	n	%
Socioeconomic variables		
Cell phone dependence (yes)	211	58,9
Level of physical activity (sedentary)	57	15,9
Sleep quality (poor)	182	50,8

*Note: n=absolute frequency; %=percentage; SD=standard deviation. minimum wage of R$ 1,212.00.
Source: Research data.

The prevalence of Common Mental Disorder was 53.9% (n=193) among university students. Analysis of instrument responses revealed that 67% (n=240) felt nervous, tense, or worried, 58.9% (n=211) easily became tired, 54.7% (n=196) had difficulty making decisions, and 51.4% (n=184) felt sad recently (Table 2).

Table 2 - Distribution of questions for screening Common Mental Disorders among university students. Fortaleza, Ceará, Brazil, 2022

Variables	n	%
Tracking questions		**Yes**
Have frequent headaches	156	43,6
Has a lack of appetite	76	21,2
Sleep poorly	189	52,8
Scares easily	156	43,6
Has hand tremors	94	26,3
Feeling nervous, tense, or worried	240	67,0
Have poor digestion	101	28,2
Has difficulty thinking clearly	143	39,9
Have you been feeling sad lately	184	51,4
Been crying more than usual	117	32,7
You find it difficult to carry out your daily activities satisfactorily	179	50,0
Has difficulty making decisions	196	54,7
Has difficulties at work (his work is painful, and causes suffering)	1	0,3
Is unable to play a useful role in your life	76	21,2
You have lost interest in things	149	41,6
You feel like a worthless, useless person	101	28,2
Have you had ideas about ending your life?	53	14,8
Feel tired all the time	203	56,7
You have unpleasant sensations in your stomach	127	35,5
You get tired easily	211	58,9
Common Mental Disorder (CMD) (yes)	193	53,9

*Note: n=absolute frequency; %=percentage; SD=standard deviation. minimum wage of R$ 1,212.00.
Source: Research data.

In inferential analysis between Common Mental Disorder (CMD) and the variables of interest, significant associations were found with the female sex (OR=1.58; p=0.033), self-

rated poor health (OR=4.45; p<0.001), smoking (OR=3.69; p=0.002), cell phone dependence (OR=4.04; p<0.001), poor sleep quality (OR=6.50; p<0.001), and chronic musculoskeletal pain in the neck (OR=2.88; p<0.001), shoulders (OR=2.40; p<0.001), upper back (OR=2.59; p<0.001), elbows (OR=3.87; p<0.001), wrists/hands (OR=3.00; p<0.001), and lower back (OR=1.83; p=0.003) (Table 3).

Table 3 - Bivariate analysis between CMD and associated factors in university students' health. Fortaleza, Ceará, Brazil, 2022

Variables	TMC		crude OR (IC95%)	p-value
	No n (%)	Yes n (%)		
Age				0,097
≥ 25 years	36 (21,8)	29 (15,0)	1	
< 25 years	129 (78,6)	164 (85,0)	1,57 (0,919-2,710)	
Sex				0,033*
masculine	80 (48,5)	72 (37,3)	1	
feminine	58 (51,5)	121 (62,7)	1,58 (1,037-2,413)	
Paid activity				0,055
no	94 (57,0)	129 (66,8)	1	
Yes	71 (43,0)	64 (33,2)	0,65 (0,427-1,010)	
Type of institution				
particular	101 (61,2)	102 (52,8)	1	0,111
public	64 (38,8)	91 (47,2)	1,40 (0,923-2,147)	
Course center				0,617
Health Sciences	71 (43,0)	78 (40,4)	1	
Technological Sciences	97 (57,0)	115 (59,6)	1,11 (0,731-1,697)	
Health self-assessment				<0,001*
Good	129 (78,2)	86 (44,6)	1	
Bad	36 (21,8)	107 (55,4)	4,45 (2,798-7,104)	
Alcohol consumption				0,234
No	95 (57,6)	99 (51,3)	1	
Yes	70 (42,4)	98 (48,7)	1,28 (0,848-1,958)	
Smoking				0,002*
No	158 (95,8)	165 (85,9)	1	
Yes	7 (4,2)	27 (14,1)	3,69 (1,564-8,724)	
Level of physical activity				0,392
Active	143 (86,7)	161 (83,4)	1	
Sedentary	22 (13,3)	32 (16,6)	1,29 (0,718-2,325)	
Cell phone dependence				<0,001*
No	75 (45,5)	33 (17,1)	1	
Yes	90 (54,5)	160 (82,9)	4,04 (2,490-6,556)	
Sleep quality				<0,001*
Good	83 (50,9)	26 (15,5)	1	
Bad	82 (49,7)	167 (86,5)	6,50 (3,890-10,867)	
Complaint of chronic musculoskeletal pain				
Neck				<0,001*
No	71 (43,0)	40 (20,7)	1	
Yes	94 (57,0)	153 (79,3)	2,88 (1,815-4,599)	
Shoulders				
No	98 (59,4)	73 (38,7)	1	<0,001*
Yes	67 (40,6)	120 (62,2)	2,40 (1,571-3,680)	

Upper back region				<0,001*
No	88 (53,3)	59 (30,6)	1	
Yes	77 (46,7)	134 (69,4)	2,59 (1,684-4,001)	
Elbows				
No	153 (92,7)	148 (76,7)	1	<0,001*
Yes	12 (7,3)	45 (23,3)	3,87 (1,972-7,619)	
Fists/hand				<0,001*
No	105 (63,6)	71 (36,8)	1	
Yes	60 (36,4)	122 (63,2)	3,00 (1,953-4,630)	
Lower back region				0,003*
No	87 (52,7)	73 (37,8)	1	
Yes	78 (47,3)	120 (62,2)	1,83 (1,202-2,796)	

*OR=odds ratio; 95% CI=95% Confidence Interval; p<0.05.
Source: Research data.

In multiple regression analysis, CMD showed significant associations with age <25 years (OR=2.18; p=0.029), self-rated poor health (OR=4.29; p<0.001), smoking (OR=3.02; p=0.028), cell phone dependence (OR=3.10; p<0.001), poor sleep quality (OR=3.92; p<0.001), and chronic musculoskeletal pain complaints in the shoulder (OR=2.46; p=0.001) and elbow (OR=2.96; p=0.012) regions (Table 4).

Table 4 - Multiple logistic regression analysis between Common Mental Disorders and associated factors in university students' health. Fortaleza, Ceará, Brazil, 2022

Variables	TMC	p-value
	Adjusted OR (95%CI)	
Age (<25 years)	2,18 (1,084-4,408)	0,029
Self-rated health (poor)	4,19 (2,396-7,331)	<0,001
Smoking (yes)	3,02 (1,125-8,147)	0,028
Cell phone dependence (yes)	3,10 (1,726-5,571)	<0,001
Sleep quality (poor)	3,92 (2,206-6,998)	<0,001
Complaint of chronic musculoskeletal pain (yes)		
shoulder	2,46 (1,449-4,200)	0,001
elbow	2,96 (1,273-6,881)	0,012

OR=odds ratio; 95% CI=95% Confidence Interval.
Source: Research data.

Discussion

This study aimed to investigate the prevalence of CMD and its association with health-related factors following social distancing measures due to COVID-19 among university students. The university environment, while a time of intellectual exploration and personal growth, also presents significant challenges that can impact students' mental health. This period, compounded by the COVID-19 pandemic context, serves as a potential stressor contributing to mental health issues. Addressing these concerns, the WHO recognizes that the COVID-19 pandemic predisposes the emergence of a syndemic related to mental health,

characterized as a global public health issue, and encourages scientific research on contributing factors to inform public policy interventions (WHO, 2022).

In this study, a high prevalence of CMD (53.9%) was observed among university students. To facilitate comparison with findings from similar studies conducted during the pandemic, it is important to consider global studies. For instance, a meta-analysis assessing global prevalence and risk factors for mental health issues identified high rates of depression (37%-45%), anxiety (34%-42%), and stress (27%-42%) among university students across various countries (Peng *et al.,* 2022). Other research highlights significant psychological impacts stemming from the COVID-19 pandemic in this population, particularly heightened symptoms of anxiety and depression, as evidenced in studies conducted in China (Cao *et al.*, 2020), the United States (Wang *et al.*, 2020) and Poland (Debowska *et al.*, 2022).

In the Brazilian context, the reported prevalence of CMD ranges between 58.5% and 66.9% among university students across different fields of study during the pandemic (Mota *et al.*, 2021; Arar *et al*., 2023). underscores the worsening of mental health, exacerbated by social isolation, the shift away from in-person academic activities, uncertainties regarding the academic process, and other stressors. Furthermore, academic life demands responsibilities and pressures, compounded by study routines, deadlines, and obligations, which can trigger health issues (Mclafferty *et al.*, 2017), particularly mental health concerns (Rathakrishnan *et al.*, 2021).

Analyzing health factors and CMD among university students revealed associations with age under 25 years, poor self-rated health, smoking, cell phone dependency, poor sleep quality, and chronic musculoskeletal pain in the shoulder and elbow regions.

There is a close relationship between poor self-perceived health and signs of psychological distress in university students, which may predispose them to developing mental disorders, making it an essential variable for describing the current health status of individuals (Ramos *et al.*, 2023). In this study, it was found that 39.4% of university students rated their health as poor post-social distancing, with a fourfold increased likelihood of CMD occurrence. Furthermore, a slight increase in negative self-rated health was observed compared to other studies conducted in the Southeast (Ramos *et al.*, 2023) and South Brazil (Carlos *et al.*, 2023), ranging from 32.7% to 32.4%, respectively. This finding may be explained by the potential delayed effects of the pandemic and online classes, given that data collection for the present study occurred in 2022, whereas other studies were conducted in 2020 and 2021.

Another factor that showed an association with CMD was cigarette smoking. The literature still presents limitations in understanding the repercussions of the pandemic on dependency-related processes. Regarding tobacco use, a highly addictive substance widely used, studies indicate that mental health issues, notably depressive symptoms, and hostility in smokers, are significantly higher than in non-smokers during the COVID-19 pandemic (Taş; Üneri, 2023). As a precedent, a multinational survey conducted in low- and middle-income countries found a considerable prevalence of smoking and its association with psychological distress in young people (Berg *et al.*, 2018).

As highlighted in the literature, there is a bidirectional relationship between smoking and mental health problems, focusing on multiple mechanisms to explain it. Two of these mechanisms include smoking to alleviate depressive symptoms and the self-medication theory, which posits smoking as a way to increase vulnerability to stress, thereby generating a neurocyclic effect (Taş; Üneri, 2023).

The study also evidenced an association with the outcome of cell phone dependency. Abruptly, during the pandemic, in-person studies were replaced by online classes. In this context, to adapt to the new routine and teaching model, the smartphone emerged as the most used device (Cetic, 2022). Regarding the impacts of cell phone use on mental health, studies conducted in China have identified anxiety and depression problems associated with excessive device use during the pandemic period (Cao *et al.*, 2020). Earlier research in Hungary (Körmendi, 2015) and Turkey (Fischer-Grote; Kothgassner; Felnhofer, 2019) found that smartphone usage time is directly related to impulsivity, anxiety, depression, and hostility symptoms. This is consistent with studies in Japan (Nishida; Tamura; Sakakibara, 2019) and Korea (Kim *et al.*, 2020), where longer usage times were associated with higher risks of depressive symptoms and suicidal thoughts.

In the present study, it was found that 69.6% of university students reported poor sleep quality, associated with a fourfold increased chance of CMD. Additionally, 52.8% reported sleeping poorly, indicating a negative self-perception of sleep. Consistent with these findings, a study conducted across seven countries revealed a high prevalence of unsatisfactory sleep (55.3%) and inadequate sleep duration (7.5 hours) (Du *et al.*, 2021). Health risks, stringent preventive measures, and radical lifestyle changes, characteristic of the period of social isolation, are possible factors that interfere with sleep quality and the mental state of students (Eleftheriou *et al.*, 2021).

The complaint of musculoskeletal chronic pain showed an association with CMD. Studies highlight that social isolation and changes in daily routines have contributed to the onset or worsening of musculoskeletal pain and mental health problems in university students. The significant increase in the prevalence of neck and shoulder pain among individuals aged 20 to 34 in recent decades is largely attributed to the pandemic scenario. Repetitive movements and prolonged use of portable devices during home-office educational activities are identified as contributing factors. This behavioral pattern makes this population more susceptible to musculoskeletal injuries, manifested through symptoms such as fatigue and shoulder, neck, and hand pain, as observed in the present study (Oliveira *et al.*, 2022).

Given the findings, attention is drawn to the potential impacts of the COVID-19 pandemic on the mental health of university students. Among the observed effects are the increased prevalence of CMD and possible related factors. It is believed that the burden of responsibilities, high academic expectations, and the need to balance personal life and studies can create intense pressure, contributing to the onset and worsening of these disorders. From this perspective, exploring and understanding this dynamic is essential for developing effective mental health support strategies and promoting academic environments that consider the specific challenges faced by students during the pandemic. Even with the easing of the health crisis, its repercussions on mental health may extend for long periods.

Additionally, this study acknowledges limitations such as data collection restricted to students from only two fields (Health Sciences and Technology) and the lack of adaptation of instruments for visually impaired individuals, which may hinder the generalization of results to other populations. Moreover, the study design has weaknesses that preclude causal inferences. However, the presented results can contribute to the discussion of the topic and encourage future research.

Final considerations

A high prevalence of suspected CMD and its possible association with multiple factors related to the health of university students post-social distancing during the COVID-19 pandemic was observed. It was found that age under 25 years, smoking, smartphone dependency, poor sleep quality, and complaints of musculoskeletal chronic pain are significantly related to CMD. In light of these findings, monitoring CMD in universities and

possible related factors is advised so that strategies can be adopted to address this health issue in crisis scenarios.

REFERENCES

AL-KHANI, Abdullah Murhaf *et al.* A cross-sectional survey on sleep quality, mental health, and academic performance among medical students in Saudi Arabia. **BMC Research Notes**, *[S. l.],* v. 12, n. 1, p. 665, 2019. DOI: 10.1186/s13104-019-4713-2.

ALMEIDA, Larissa; BARBOSA, De Oliveira; AVENA, Kátia De Miranda. Prevalence of common mental disorders among medical students during the Covid-19 pandemic. **Revista Brasileira de Educação Médica**, *[S. l.],* v. 46, n. 1, p. 1–9, 2022. DOI: 10.1590/1981-5271v46.1-20210242.ING.

BERG, Carla. *et al.* The impact and relevance of tobacco control research in low-and middle-income countries globally and to the US. **Addictive Behaviors**, *[S. l.],* v. 87, p. 162–168, 2018. DOI: 10.1016/j.addbeh.2018.07.012.

BERTOLAZI, Alessandra Naimaier *et al.* Validation of the Brazilian Portuguese version of the Pittsburgh Sleep Quality Index. **Sleep Medicine**, *[S. l.],* v. 12, n. 1, p. 70–75, 2011. DOI: 10.1016/j.sleep.2010.04.020.

CALLOU FILHO, Cesario Rui. **Impacto do smartphone na disfunção musculoesquelética do pescoço em adultos**. 2021. 120 f. Tese (Doutorado em Saúde Coletiva) - Universidade de Fortaleza, Fortaleza 2021.

CAO, Wenjun *et al.* The psychological impact of the COVID-19 epidemic on college students in China. **Psychiatry Research**, [*S. l.*], v. 287, p. 112934, 2020. DOI: 10.1016/j.psychres.2020.112934.

CARLOS, Jean *et al.* Autopercepção de saúde negativa e fatores associados em estudantes de uma universidade do oeste catarinense. **Saúde (Santa Maria)**, [*S. l.*], v. 49, n. 2, e74481, 2023. DOI: 10.5902/2236583474481.

CETIC; BR, Núcleo de Informação e Coordenação do Ponto. Painel TIC Covid-19. **Painel TIC COVID-19**, [*S. l.*], v. 1, p. 1–28, 2022.

COUTO, Edvaldo Souza; COUTO, Edilece Souza; CRUZ, Ingrid de Magalhães Porto. #Fiqueemcasa: Educação Na Pandemia Da Covid-19. **Interfaces Científicas - Educação**, [*S. l.*], v. 8, n. 3, p. 200–217, 2020. DOI: 10.17564/2316-3828.2020v8n3p200-217.

DEBOWSKA, Agata *et al.* A repeated cross-sectional survey assessing university students' stress, depression, anxiety, and suicidality in the early stages of the COVID-19 pandemic in Poland. **Psychological Medicine**, [*S. l.*], v. 52, n. 15, p. 3744–3747, 2022. DOI: 10.1017/S003329172000392X.

DU, Chen *et al.* Health Behaviors of Higher Education Students from 7 Countries: Poorer Sleep Quality during the COVID-19 Pandemic Predicts Higher Dietary Risk. **Clocks & sleep**, [*S. l.*], v. 3, n. 1, p. 12–30, 2021. DOI: 10.3390/clockssleep3010002.

ELEFTHERIOU, Anna *et al.* Sleep Quality and Mental Health of Medical Students in Greece During the COVID-19 Pandemic. **Frontiers in Public Health**, [*S. l.*], v. 9, p. 1–8, 2021. DOI:

10.3389/fpubh.2021.775374.

FISCHER-GROTE, Linda; KOTHGASSNER, Oswald; FELNHOFER, Anna. Risk factors for problematic smartphone use in children and adolescents: a review of existing literature. **Neuropsychiatrie**, [*S. l.*], v. 33, n. 4, p. 179–190, 2019. DOI: 10.1007/s40211-019-00319-8.

FRANCO, Dayana Chaves *et al.* Validade das medidas do tempo sentado do questionário IPAQ-versão curta em universitários brasileiros. **Revista Brasileira de Atividade Física & Saúde**, [*S. l.*], v. 26, p. 1–9, 2021. DOI: 10.12820/rbafs.26e0223.

GRANT, Jon; LUST, Katherine; CHAMBERLAIN, Samuel. Problematic smartphone use associated with greater alcohol consumption, mental health issues, poorer academic performance, and impulsivity. **Journal of Behavioral Addictions**, [*S. l.*], v. 8, n. 2, p. 335–342, 2019. DOI: 10.1556/2006.8.2019.32.

IBGE. Instituto Brasileiro de Geografia e Estatística. **PNS - Pesquisa Nacional de Saúde**. [*S. l.*], 2019. Available at: https://www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html. Access: 10 Sept. 2023.

KAPAROUNAKI, Chrysi. *et al.* University students' mental health amidst the COVID-19 quarantine in Greece. **Psychiatry Research**, [*S. l.*], v. 290, p. 113111, 2020. DOI: 10.1016/j.psychres.2020.113111.

KHOURY, Julia Machado *et al.* Assessment of the accuracy of a new tool for the screening of smartphone addiction. **PLoS ONE**, [*S. l.*], v. 12, n. 5, p. 1–13, 2017. DOI: 10.1371/journal.pone.0176924.

KIM, Hyunjeong *et al.* Association between Smartphone Usage and Mental Health in South Korean Adolescents: The 2017 Korea Youth Risk Behavior Web-Based Survey. **Korean Journal of Family Medicine**, [*S. l.*], v. 41, n. 2, p. 98–104, 2020. DOI: 10.4082/kjfm.18.0108.

KÖRMENDI, Attila. [Smartphone usage among adolescents]. **Psychiatria Hungarica : A Magyar Pszichiatriai Tarsasag tudomanyos folyoirata**, [*S. l.*], v. 30, n. 3, p. 297–302, 2015.

LOPES, Marcélia Célia Couteiro *et al.* Relationship between depressive symptoms, burnout, job satisfaction and patient safety culture among workers at a university hospital in the Brazilian Amazon region: cross-sectional study with structural equation modeling. **Sao Paulo Medical Journal**, [*S. l.*], v. 140, n. 3, p. 412–421, 2022. DOI: 10.1590/1516-3180.2021.0614.15092021.

MARTINS, Gilberto de Andrade. **Estatística geral e aplicada**: revisada e ampliada. São Paulo: Atlas Editora, 2010.

MATSUDO, Sandra *et al.* Questionário Internacional De Atividade Física (Ipaq): Estupo De Validade E Reprodutibilidade No Brasil. **Revista Brasileira de Atividade Física & Saúde**, [*S. l.*], v. 6, n. 2, p. 5–18, 2001. DOI: 10.12820/rbafs.v.6n2p5-18.

MCLAFFERTY, Margaret *et al.* Mental health, behavioural problems and treatment seeking among students commencing university in Northern Ireland. **PLoS ONE**, [*S. l.*], v. 12, n. 12, p. 1–14, 2017. DOI: 10.1371/journal.pone.0188785.

MORAES, Ramona Sant'Ana Maggi de *et al.* Iniquidades sociais na prevalência de desordens mentais comuns em adultos: Estudo de base populacional no Sul do Brasil. **Revista**

Brasileira de Epidemiologia, [*S. l.*], v. 20, n. 1, p. 43–56, 2017. DOI: 10.1590/1980-5497201700010004.

MOTA, Daniela Cristina Belchior *et al.* Mental health and internet use by university students: Coping strategies in the context of covid-19. **Ciencia e Saude Coletiva**, [*S. l.*], v. 26, n. 6, p. 2159–2170, 2021. DOI: 10.1590/1413-81232021266.44142020.

NISHIDA, Tomoko; TAMURA, Haruka; SAKAKIBARA, Hisataka. The association of smartphone use and depression in Japanese adolescents. **Psychiatry Research**, [*s. l.*], vol. 273, n. November 2018, p. 523–527, 2019. Disponível em: 10.1016/j.psychres.2019.01.074.

OLIVEIRA, Elias Barbosa de *et al.* Common mental disorders in nursing students of the professionalizing cycle. **Revista Brasileira de Enfermagem**, [*S. l.*], v. 73, n. 1, 2020. DOI: 10.1590/0034-7167-2018-0154.

PEDROSA LUNA OLIVEIRA, Juliana *et al.* Relationship between musculoskeletal pain, sleep quality and migraine with level of physical activity in college students during the COVID-19 pandemic. **Heliyon**, [*S. l.*], v. 8, n. 10, e10821, 2022. DOI: 10.1016/j.heliyon.2022.e10821.

PIERCE, Matthias *et al.* Mental health before and during the COVID-19 pandemic: a longitudinal probability sample survey of the UK population. **The Lancet Psychiatry**, [*S. l.*], v. 7, n. 10, p. 883–892, 2020. DOI: 10.1016/S2215-0366(20)30308-4.

PINHEIRO, Fernanda Amaral; TRÓCCOLI, Bartholomeu Torres; CARVALHO, Cláudio Viveiros De. Validação do Questionário Nórdico de Sintomas Osteomusculares como medida de morbidade. **Revista de Saúde Pública**, [*S. l.*], v. 36, n. 3, p. 307–312, 2002. Disponível em: https://doi.org/10.1590/S0034-89102002000300008.

PINTO GUEDES, Dartagnan; CORREA LOPES, Cynthia; PINTO GUEDES, Joana Elisabete Ribeiro. Reprodutibilidade e validade do Questionário Internacional de Atividade Física em adolescentes. **Revista Brasileira de Medicina do Esporte**, [*S. l.*], v. 11, n. 2, p. 151–158, 2005. DOI: 10.1590/S1517-86922005000200011.

RAMOS, Sérgio Ricardo Freire *et al.* Pandemia da Covid-19: um evento traumático para estudantes de Ciências Biológicas e da Saúde?. **Revista Brasileira de Educação Médica**, [*s. l.*], v. 47, n. 1, 2023. DOI: 10.1590/1981-5271v47.1-20220172.

RATHAKRISHNAN, Balan *et al.* Smartphone addiction and sleep quality on academic performance of university students: An exploratory research. **International Journal of Environmental Research and Public Health**, [*S. l.*], v. 18, n. 16, 2021. DOI: 10.3390/ijerph18168291.

SERBIC, Danijela; FRIEDRICH, Claire; MURRAY, Romany. Psychological, social and academic functioning in university students with chronic pain: A systematic review. **Journal of American College Health**, [*S. l.*], v. 71, n. 9, p. 2894–2908, 2023. DOI: 10.1080/07448481.2021.2006199.

SOUSA, Antoniel Rodrigues *et al.* Relação entre Transtornos Mentais Comuns e a ingestão dietética de universitários da área da saúde. **Ciência & Saúde Coletiva**, [*S. l.*], v. 26, n. 9, p. 4145–4152, 2021. DOI: 10.1590/1413-81232021269.07172020.

STEEL, Zachary *et al.* The global prevalence of common mental disorders: A systematic review and meta-analysis 1980-2013. **International Journal of Epidemiology**, [*S. l.*], v. 43,

n. 2, p. 476–493, 2014. DOI: 10.1093/ije/dyu038.

TAŞ, Demet; ÜNERI, Özden Şükran. COVID-19 Quarantine Effects on Smoking Behavior and Mental Health of Smoking Adolescents. **The Eurasian journal of medicine**, [*S. l.*], v. 55, n. 1, p. 14–19, 2023. DOI: 10.5152/eurasianjmed.2021.21058.

TEIXEIRA, Larissa de Araújo Correia *et al*. Saúde mental dos estudantes de Medicina do Brasil durante a pandemia da coronavirus disease 2019. **Jornal Brasileiro de Psiquiatria**, [*S. l.*], v. 70, n. 1, p. 21–29, 2021. DOI: 10.1590/0047-2085000000315.

UNESCO. Organização das Nações Unidas. **Educação:** do fechamento das escolas à recuperação. [*S. l.*], 2022. Available at: https://www.unesco.org/pt/covid-19/education-response. Access: 7 Dec. 2023.

VINDEGAARD, Nina; BENROS, Michael Eriksen. COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. **Brain, Behavior, and Immunity**, [*S. l.*], v. 89, p. 531–542, 2020. DOI: 10.1016/j.bbi.2020.05.048.

WANG, Xiaomei *et al*. Investigating mental health of US college students during the COVID-19 pandemic: Cross-sectional survey study. **Journal of Medical Internet Research**, [*S. l.*], v. 22, n. 9, 2020. DOI: 10.2196/22817.

WHO, WORLD HEALTH ORGANIZATION. **OMS destaca necessidade urgente de transformar saúde mental e atenção**. [*S. l.*], 2022. Available at: https://www.paho.org/pt/noticias/17-6-2022-oms-destaca-necessidade-urgente-transformar-saude-mental-e-atencao. Access: 13 Jan. 2023.

CRediT Author Statement

Processing and editing: Editora Ibero-Americana de Educação.
Proofreading, formatting, normalization and translation.