REVISTA DE ENFERMAGEM REFERÊNCIA
homepage: https://rr.esenfc.pt/rr/
ISSNe: 2182.2883

RESEARCH ARTICLE (ORIGINAL)

The mental health of polytechnic higher education students in the COVID-19 pandemic

Saúde mental em estudantes do ensino superior politécnico na pandemia COVID-19

Salud mental de los estudiantes de educación superior politécnica en la pandemia COVID-19

Lia Araújo [1, 2]
https://orcid.org/0000-0001-8212-9235

Susana Fonseca [1, 3]
https://orcid.org/0000-0002-5930-5381

Maria João Amante [1, 3]
https://orcid.org/0000-0003-0138-5865

Paula Xavier [1, 3]
https://orcid.org/0000-0001-6140-1228

Carla Silva [3, 4]
https://orcid.org/0000-0001-6251-9113

Leandra Cordeiro [1]
https://orcid.org/0000-0001-9456-1447

Cátia Magalhães [1, 3, 5]
https://orcid.org/0000-0001-8018-4249

[1] Polytechnic Institute of Viseu, School of Education (ESEV-IPV), Viseu, Portugal

[2] Center for Health Technology and Services Research (CINTESIS), Porto, Portugal

[3] Centre for Studies in Education and Innovation (CI&DEI), Viseu, Portugal

[4] Polytechnic Institute of Viseu, School of Technology and Management (ESTGV-IPV), Viseu, Portugal

[5] Environmental Health Institute (ISAMB), Lisbon, Portugal

Corresponding author
Lia Araújo
E-mail: liajaraujo@esev.ipv.pt

Received: 09.09.21
Accepted: 21.03.22

Abstract
Background: The pandemic significantly changed social and academic routines of higher education students.
Objective: Identify the mental health levels of higher education students and the associated factors.
Methods: Cross-sectional study with a convenience sample of 567 students (mean age 23.92, ± 8.36; 63.8% female), that answered an online survey at the beginning of the second lockdown, which included the General Health Questionnaire (GHQ-28), sociodemographic and academic aspects, and main changes that occurred during the pandemic.
Results: The mean score of the GHQ was 29.18 (±12.99) and the lowest and highest scores were obtained in severe depression (3.55±4.46) and social dysfunction (11.44±3.81). 60.5% indicated risk for mental problems. Participants identifying changes at labor level had better mental health. The ones identifying changes at familiar routines had higher depressive symptomatology and changes in familiar relationships had higher anxiety symptomatology and insomnia.
Conclusion: It is urgent to consider the mental health of students, promoting strategies to minimize the impact of the pandemic, namely in social dysfunction.

Keywords: mental health; COVID-19; higher education; students

Resumo
Enquadramento: A pandemia mudou significativamente as rotinas sociais e académicas dos estudantes do ensino superior.
Objetivo: Identificar os níveis de saúde mental de estudantes do ensino superior e fatores associados.
Metodologia: Estudo transversal com amostra de conveniência de 567 estudantes (idade média 23,92, ± 8,36; 63,8% feminino), que responderam a um questionário online no início do segundo confinamento, que incluiu o General Health Questionnaire (GHQ-28), aspetos sociodemográficos, académicos e as principais mudanças ocorridas durante a pandemia.
Resultados: A pontuação média do GHQ foi 29,18 (± 12,99) e as menores e as maiores pontuações médias foram obtidas nas subescalas depressão grave (3,55 ± 4,46) e disfunção social (11,44 ± 3,81), respetivamente. 60,5% registou risco para problemas mentais. Os participantes que identificam alterações laborais têm melhor saúde mental. Quem identifica alterações nas rotinas familiares tem maior sintomatologia depressiva e quem identifica alterações nas relações familiares maior sintomatologia ansiógena e insónia.
Conclusão: Urge considerar a saúde mental dos estudantes, promovendo estratégias para minimizar o impacto da pandemia, nomeadamente na disfunção social.

Palavras-chave: saúde mental; COVID-19; ensino superior; estudantes

Resumen
Marco contextual: La pandemia ha cambiado significativamente las rutinas sociales y académicas de los estudiantes de educación superior.
Objetivo: Identificar los niveles de salud mental de los estudiantes de educación superior y los factores asociados.
Metodología: Estudio transversal con una muestra de conveniencia de 567 estudiantes (edad media de 23,92, ± 8,36; 63,8% mujeres), que completaron un cuestionario en línea al inicio del segundo confinamiento, que incluía el Cuestionario de Salud General (GHQ-28), aspectos sociodemográficos y académicos, y los principales cambios ocurridos durante la pandemia.
Resultados: La puntuación media del GHQ fue de 29,18 (± 12,99) y las puntuaciones medias más bajas y más altas se obtuvieron en las subescalas depresión grave (3,55 ± 4,46) y disfunción social (11,44 ± 3,81), respectivamente. El 60,5% registró riesgo de problemas mentales. Los participantes que identifican cambios en el trabajo tienen una mejor salud mental. Los que identifican cambios en las rutinas familiares tienen más síntomas depresivos y los que identifican cambios en las relaciones familiares tienen más síntomas de ansiedad e insomnio.
Conclusión: Se debe considerar urgentemente la salud mental de los estudiantes, así como promover estrategias para minimizar el impacto de la pandemia, especialmente en la disfunción social.

Palabras clave: salud mental; COVID-19; educación superior; estudiantes

How to cite this article: Araújo, L., Fonseca, S., Amante, M. J., Xavier, P., Silva, C., Cordeiro, L., & Magalhães, C. (2022). The mental health of polytechnic higher education students in the COVID-19 pandemic. *Revista de Enfermagem Referência*, *6*(1), e21109. https://doi.org/10.12707/RV21109

Introduction

The COVID-19 pandemic.marks the year 2020. Despite having originated in 2019 in the Chinese city of Wuhan, the first case was registered in Portugal only in March 2020. Initially, it was treated as a public health crisis, with emphasis on the physical health problems associated with it. Months later, the social and economic impact of the pandemic resulting from the restrictive consequences of the lockdown, isolation, quarantine, movement restrictions, and closure of commercial and service establishments began to be studied, and warnings were issued about the effects of these measures on mental health. Current publications already express concerns regarding this theme, as data point to the increase in mental health issues. Although the pandemic affected the lives of almost everyone, higher education students saw their daily routine significantly altered with the suspension of in-person classes and the implementation of distance learning. Concerns about family members' health, school closure, the breakdown in routine, and social distancing were pointed out as significant sources of stress for these students (YoungMinds, 2020). Recognizing the pandemic's repercussions on the lives of higher education students and its possible impact on mental health, this study aimed to identify the mental health levels of higher education students and associated factors.

Background

The COVID-19 pandemic has impacted the world on social, financial, and health levels. Many countries provide, often daily, reports to their populations with updated information on physical health. However, studies on mental health are scarce, particularly in Portugal.

The World Health Organization [WHO] defines mental health as "a state of well-being whereby individuals recognize their abilities, are able to cope with the normal stresses of life, work productively and fruitfully, and make a contribution to their communities" (WHO, 2003, p. 7). It considers mental health essential to the development of human potential and inseparable from both health and psychological well-being. Mental health is influenced by the life cycle phase and multiple interdependent conditions (biological, psychosocial, cultural, and environmental). It results from the balance between individual characteristics, living conditions, behaviors, and social and family networks, demonstrating that some of these variables predict better or worse mental health (WHO, 2012).

Mental health is studied based on a two-dimensional construct consisting of a positive dimension - Psychological Well-Being, and a negative dimension - Psychological Stress. The latter is defined as a state of emotional distress characterized by symptoms of depression and anxiety, sometimes associated with somatic complaints (Ware et al., 1984).

Most studies on mental health during the COVID-19 pandemic analyzed the whole population or specific groups, such as patients, health care workers, children, and older adults.

However, few studies were carried out on higher education students who can be considered a high-risk group for mental health issues, as their personal and academic routines were suddenly altered. According to Kitzrow's (2003) literature review, before the pandemic, several studies had pointed out that this population had observed a significant increase in severe psychological issues in recent decades. The American College Health Association report (2020) highlighted this situation, pointing out that more than one third of American students had been diagnosed with at least one mental health issue, with anxiety (27.7%) and depression (22.5%) as the most frequently reported.

When examining mental health predictors in a study with 560 Portuguese higher education students, Nogueira and Sequeira (2020) verified that being female, being in a higher age group, and having a lower socioeconomic status were associated with lower levels of psychological well-being. On the other hand, having a good dating relationship, better self-assessment of academic performance, practicing physical exercise, sleeping seven or more hours, and higher satisfaction with social support and academic life were associated with higher values of psychological well-being.

Considering these predictors and that the age group between 18 and 30 years revealed higher risks for mental health issues during the pandemic (Li & Wang, 2020), it is crucial to know its impact on higher education students. An estimated 220 million students have been affected by the disruption of in-person classes (Farnel et al., 2021). Educational institutions and policies have focused on the challenges posed by distance learning and the safe reopening of school facilities, neglecting the issue of mental health, despite studies, which are now beginning to be presented, showing that young people are particularly vulnerable (Cao et al., 2020; Lee et al., 2021).

Cao et al. (2020) observed that 25% of their student sample reported symptoms of anxiety related to the delays in academic activities, the economic effects of the pandemic, and its impact on daily life, and alert to the importance of monitoring the mental health of higher education students during the pandemic. Lee et al. (2021) described the prevalence of stress, anxiety, and depression in undergraduate students at a public research university during the six weeks after the COVID-19 outbreak, concluding that more than eight in ten students experienced modest or severe stress and between 36% and 44% demonstrated moderate or severe anxiety and depression.

Thus, mental health assessment, previously recommended as essential in educational settings (Hashemian et al., 2015), becomes imperative in atypical academic years such as the ones we have been experiencing.

Research question

What are the mental health levels of higher education students during the pandemic and associated factors?

Methodology

This is a cross-sectional study approved by the Ethics Committee of the Higher Education Institution, where the data was collected (13/SUB/2020).

The convenience sample consisted of 567 students from a Polytechnic Higher Education Institution in the central area of Portugal, aged between 18 and 68 years (mean age of 23.9 ± 8.36 years) and primarily female (63.8%). Regarding their marital status, 64.7% of the participants were single, 23.1% were in a relationship, 10.9% were married, 1.1% were divorced, and 0.2% were widowed. In terms of residence, 54.5% lived in rural areas and 45.5% in urban areas. Most participants (86.8%) attended Undergraduate Degree Programs, 9.9% Master Degree Programs, and 3.4% Higher Technical Professional Courses [CTeSP]. Eighty-two percent of the study participants were full-time students, and 18.8% were working students or had another status.

Data began to be collected online in early January 2021, as students were in distance learning during the second lockdown. Students were invited to participate in the study through an email sent to the student email database by the President of the five Organic Units that are part of the Higher Education Institution where the study was conducted. Data collection was extended until the end of March 2021, when it was realized that the dissemination of the study would not contribute to more data. Also, a significant number of participants had been reached (n = 567) considering the total number of students in the Higher Education Institution where the study was carried out (N = 6071).

The questionnaire was made available via Google Forms. It included: sociodemographic (e.g., age, gender, marital status, area of residence, income) and academic (e.g., program attended, type of regimen) characterization questions; (yes/ no) questions on pandemic-related changes at work, family routines, family and personal relationships, academic performance, and self-care from the General Health Questionnaire (GHQ-28, Goldberg & Hillier, 1979; Pais-Ribeiro et al., 2015); and other questions which are not described since they are not analyzed in this study. Before answering the questionnaire, participants were informed about the study's scope, objectives, and type of data collected. The confidentiality and anonymity of the data collected were also guaranteed. The participants had to provide their consent before completing the questionnaire. The General Health Questionnaire (GHQ-28), proposed by Goldberg and Hillier (1979), in its Portuguese version, *Questionário de Saúde Geral* (Pais-Ribeiro et al., 2015), is a screening tool to identify the likelihood of psychiatric disorders among the general population. The version used (GHQ-28) consists of 28 items, organized into four subscales: "Somatic Symptoms" (items 1-7); "Anxiety and Insomnia" (items 8-14); "Social Dysfunction" (items 15-21); and "Severe Depression" (items 22-28). It is worth noting that their dimensions represent symptoms rather than diagnoses. It is a tool designed to screen for mental health changes in non-clinical populations and identify the inability to carry out normal functions usual in a healthy person and the appearance of new and distressing phenomena. The response scale ranges from 0 (*Not at all*) to 3 (*Much more than usual*), with some items reversed, so the total possible score ranges from 0 to 84, with higher scores representing worse mental health. Several studies assessing the psychometric characteristics of this tool show its validity in different cultural contexts, particularly in Portugal, where Cronbach's alpha was 0.94 (Pais-Ribeiro et al., 2015). The collected data were transferred to a database in the IBM SPSS statistics software (version 25.0), where the statistical, descriptive, and inferential ANOVA (when comparing means) and Chi-square (when comparing categorical variables) analyses were performed.

Results

The GHQ mean score was 29.18 (± 12.99) in the total sample. The "Social Dysfunction" subscale had the highest mean score (11.44 ± 3.81), which represents a more significant disability at this level, followed by the subscales "Anxiety and Insomnia" (8.15 ± 5.74), "Somatic Symptoms" (6.04 ± 3.31), and "Severe Depression" (3.55 ± 4.46). Comparing the GHQ subscales and total scale values according to gender, status, the cycle of studies, residence, and income did not reveal statistically significant differences (Table 1).

Table 1

Values of the General Health Questionnaire according to sociodemographic and academic variables

	GHQ-T	GHQ- Somatic Symptoms	GHQ- Anxiety and Insomnia	GHQ- Social Dysfunction	GHQ- Severe Depression
Total	29.18 (12.99)	6.03 (3.31)	8.15 (5.74)	11.44 (3.81)	3.55 (4.46)
Gender					
Male	29.06 (13.73)	5.82 (3.38)	8.02 (5.74)	11.65 (3.99)	3.57 (4.48)
Female	29.27 (12.60)	6.13 (3.25)	8.23 (5.74)	11.36 (3.69)	3.56 (4.47)
Status					
Yes	28.39 (12.39)	5.96 (3.25)	8.15 (5.96)	11.30 (3.78)	2.98 (4.04)
No	29.35 (13.13)	6.05 (3.33)	8.15 (5.70)	11.48 (3.82)	3.68 (4.54)
Cycle of Studies					
CTESP	33.58 (15.49)	7.00 (3.56)	10.42 (6.62)	12.00 (4.28)	4.16 (4.27)
Undergraduate	28.75 (12.76)	5.92 (3.27)	8.00 (5.63)	11.37 (3.84)	3.46 (4.41)
Master	31.46 (13.84)	6.70 (3.49)	8.70 (6.33)	11.93 (3.36)	4.14 (4.97)
Residence Rural					
Urban	28.82 (12.04)	5.97 (3.29)	7.93 (5.59)	11.37 (3.65)	3.55 (4.40)
	29.60 (14.07)	6.10 (3.34)	8.42 (5.92)	11.53 (3.99)	3.55 (4.54)
Income					
Less than 650	28.83 (11.91)	6.18 (3.29)	8.20 (5.46)	11.62 (3.84)	2.83 (3.42)
650-1000	29.37 (14.08)	6.08 (3.37)	8.27 (6.01)	11.08 (4.00)	3.94 (4.89)
1000-2000	28.76 (12.05)	5.79 (3.02)	7.94 (5.58)	11.64 (3.48)	3.40 (4.41)
More than 2000	30.58 (14.44)	6.42 (4.07)	8.42 (6.00)	11.44 (3.81)	4.08 (4.64)

Considering the total score of 23/24 as the threshold value to be in the presence of a case study (Pais-Ribeiro et al., 2015), it was observed that 60.5% of the participants were considered case studies, i.e., they were at risk of mental health issues. Among the items with more alarming results were: item 3 – "Have you recently been feeling run down and out of sorts?", in the "Somatic Symptoms" subscale, to which 28.4% of the participants answered "rather more than usual" and 6.5% "much more than usual"; item 10 – "Have you recently felt constantly under strain?", in the "Anxiety and Insomnia" subscale, to which 30.3% replied "rather more than usual" and 16.2% "much more than usual"; item 21 – "Have you recently been able to enjoy your normal day-to-day activities?" in the "Social Dysfunction" subscale, in which 15.7% answered "not at all"; and the item 26 "Have you recently found at times you couldn't do anything because your nerves were too bad?", in the "Severe Depression" subscale, to which 18.5% of the participants responded "rather more than usual" and 10.6% "much more than usual." Items 27 – "Have you recently found yourself wishing you were dead and away from it all?" and 28 – "Have you recently found that the idea of taking your own life kept coming into your mind?" did not present the highest frequency values of negative answers. However, it is worth noting that 9.2% and 4.4% of the participants marked "rather more than usual" and "much more than usual," respectively, in item 27, and 5.5% and 1.2% of the same answers in item 28. When comparing these values with the pandemic-related changes in participants' lives, it is possible to observe statistically significant differences, as those who reported changes at work had better mental health (Table 2). More specifically, those who described changes at work had a mean score on the total scale of 27.54 (± 11.34), and those who did not report this type of change had a score of 29.71 (± 13.46; $p \leq 0.1$). Examining the subscales allows realizing that changes at work were also associated with fewer depressive symptoms ($p \leq 0.1$), as students who reported pandemic-related changes at work had a lower mean score (2.96 ± 3.89) than those who did not describe this type of change (3.75 ± 4.62). On the other hand, changes in family routines were associated with more depressive symptoms because students who identified this type of change had higher mean scores (3.85 ± 4.66) than those who did not (3.02 ± 4.04; $p \leq 0.05$). Changes in family relationships were associated with more anxiety-like symptoms and insomnia, as students who identified these types of changes had higher mean scores (8.60 ± 5.77) compared to those who did not report such changes (7.75 ± 5.70; $p \leq 0.1$).

Table 2

Values of the General Health Questionnaire according to pandemic-related changes

	GHQ-T	GHQ- Somatic Symptoms	GHQ- Anxiety and Insomnia	GHQ- Social Dysfunction	GHQ- Severe Depression
Work					
Yes	27.54 (11.34) *	5.80 (3.10)	7.76 (5.55)	11.03 (3.53)	2.96 (3.89) *
No	29.71 (13.46)	6.11 (3.38)	8.28 (5.81)	11.58 (3.89)	3.75 (4.62)
Family routines					
Yes	29.66 (13.48)	5.95 (3.38)	8.34 (5.87)	11.52 (3.62)	3.85 (4.66)**
No	28.31 (12.06)	6.17 (3.19)	7.81 (5.51)	11.22 (3.81)	3.02 (4.04)
Family Relationships					
Yes	30.18 (12.84)	6.16 (3.29)	8.60 (5.77)*	11.61 (3.71)	3.72 (4.56)
No	28.36 (13.10)	5.92 (3.33)	7.75 (5.70)	11.30 (3.89)	3.40 (4.37)
Personal Relationships					
Yes	28.84 (12.73)	5.91 (3.25)	8.05 (5.83)	11.41 (3.84)	3.47 (4.39)
No	29.66 (13.41)	6.21 (3.41)	8.29 (5.61)	11.52 (3.75)	3.64 (4.54)
Academic Performance					
Yes	28.99 (13.21)	5.98 (3.36)	8.01 (5.65)	11.50 (3.78)	3.50 (4.43)
No	29.42 (12.73)	6.10 (3.24)	8.33 (5.87)	11.44 (3.81)	3.62 (4.50)
Self-care					
Yes	30.05 (13.41)	6.26 (3.46)	8.36 (5.93)	11.67 (4.02)	3.76 (4.54)
No	28.62 (12.71)	5.88 (3.21)	8.01(5.62)	11.30 (3.67)	3.42 (4.41)

** $p \leq 0.05$ and * $p \leq 0.1$

Discussion

This study revealed that the GHQ mean value for higher education students during the second lockdown was 29.18, with the highest (negative) score in the "Social Dysfunction" subscale. Although data on the mental health of these participants were not available before the pandemic, when comparing the values of this study with others published based on the Portuguese population, it is possible to observe that they were very high. For example, in the study conducted by Pais-Ribeiro et al. (2015), with 351 participants over 18 years old, the GHQ mean score was 22.43, 5.90 for the "Somatic Symptoms" subscale, 6.37 for the "Anxiety and Insomnia" subscale, 7.59 for the "Social Dysfunction" subscale and 2.52 for the "Severe Depression" subscale. Although the participants in the study by Pais-Ribeiro et al. had a higher mean age (46.33 vs. 23.9 years), it is worth noting that the authors found "incipient values" (Pais-Ribeiro et al., 2015, p. 283) of correlation between each subscale's score and the total scale score with the participants' age. Nogueira and Sequeira (2017) used the Mental Health Inventory to collect data from a sample of 560 students and observed satisfactory mental health levels, even though the most significant percentage of participants revealed having between moderate (67.7%) and low (16.6%) levels.

The GHQ-28 identifies whether an individual's current mental state differs from their typical state, and it is sensitive to recent psychiatric disorders but not to chronic mental health conditions (Goldberg & Hillier, 1979). Bearing this in mind, this study's results allow regarding the pandemic as a possible explanatory factor. However, given this study's nature, it is impossible to affirm that these differences are exclusively due to the pandemic. Nevertheless, when Maia and Dias (2020) compared the anxiety, depression, and stress levels of Portuguese university students, at two different moments, i.e., a regular period (2018 and 2019) and the pandemic period (between the suspension of classes and the state of emergency in Portugal), the authors observed a significant increase in psychological disorders (anxiety, depression, and stress) among university students during the pandemic.

This study's results are also in line with the international perspective on the impact of the pandemic, which shows that more than eight out of 10 students had moderate to severe stress, and about one third experienced severe anxiety or depression (Lee et al., 2021). Of those with previous mental illness, 32% agreed that their mental health worsened due to the pandemic (YoungMinds, 2020). Thus, the pandemic seems to have changed individuals' position on the mental health continuum. Many, who previously coped well with adversity, may now be less able due to pandemic-related stressors. Those who previously had few experiences of anxiety and stress may experience an increase in the number and intensity of these experiences, and those who already had a mental health issue may experience a worsening of that condition.

Considering the influence of pandemic-related changes in students' lives, some of the results obtained must be discussed. Some assumptions can explain the fact that those who reported changes at work got unexpectedly better mental health scores. First, changes at work were mainly changes in schedules and procedures, which possibly allowed participants to maintain hobbies and daily routines (bedtime, meals, work, etc.) and constituted protective factors (Instituto Nacional de Saúde Doutor

Ricardo Jorge [INSA], 2021). Second, there was a shift to telework. In this case, the results seem to contradict most studies and reports (e.g., European Agency for Safety and Health at Work, 2021) that point to a negative psychosocial impact of this type of work arrangement. Nevertheless, they also stress that the autonomy telework allows can play a relevant role in coping strategies, preventing stress, and increasing motivation, which can explain the results. The Portuguese study *Saúde Mental em Tempos de Pandemia Covid-19* (INSA, 2021) also concluded that this work arrangement was not associated with anxiety and depression, with 83% of respondents reporting that some alternative forms of work organization can be positive. Finally, despite describing changes and experiencing stress and negative emotions and thoughts, participants appear to have globally and intuitively adjusted their adaptation strategies. A similar conclusion was drawn by Pires et al. (2021), whose majority of study participants focused on the positive aspects (flexible working hours, comfort), invested in themselves, and showed resilience. Considering that most students participating in this study were displaced from their family homes or prevented from moving closer to their families, the association between the changes in family routines and more significant depressive symptoms was expected. According to Romeo et al. (2021), reduced social interaction due to lockdown, concern for personal health, and the health of family members and friends can affect higher education students' psychological well-being and mental health. Moreover, changes in family relationships were associated with more anxiety symptoms and insomnia, consistent with the authors who affirm that these symptoms are more likely to occur in the absence of interpersonal communication and that social support can be a protective factor against adversities (Lee et al., 2021; Nogueira & Sequeira, 2020). These results are even more alarming when compared with the data demonstrating students' low demand for psychological support (Lee et al., 2021).

Conclusion

This study's results reveal worse mental health and psychological well-being in the surveyed students, particularly in terms of social dysfunction. It was impossible to assume that these values were exclusively pandemic-related. Still, considering that the GHQ-28 identifies whether an individual's current mental state differs from their typical state and is sensitive to recent psychiatric disorders but not to chronic mental health conditions, this study generally describes most participants' mental health as alarming. It also observes that the changes in routines and family relationships were the most relevant factors associated with depressive symptoms, anxiety disorders, and insomnia.

Similar to other studies already mentioned, this study's results reinforce the importance and urgency of investing continuously in higher education students' psychosocial support, particularly during times of uncertainty and crisis. This investment can be made by implementing assessment and diagnosis measures and well-being promotion actions, developing skills and adaptation strategies to deal with more adverse situations, and strengthening social support through community cohesion and peer support strategies.

This study is limited by the sampling techniques used, which did not allow data generalization. Further research is recommended to understand this context better. Particular emphasis should be given to the influence of variables that represent a higher risk for mental health, such as being an international student member of the LGBTIQ community, being infected with COVID-19, having worse academic results, and poor eating and sleeping habits. Future studies should also consider the influence of positive mental health indicators. The combination of psychological stress levels and positive mental health is regarded as a better indicator for identifying students who need support. Also, the implementation of longitudinal studies would allow investigating the effect of the pandemic in the medium and long term and demonstrate with more robustness that COVID-19 caused the observed impact. Qualitative studies would also allow further understanding of some results, such as the effect of changes at work.

Funding

This work is funded by national funds through the FCT – Fundação para a Ciência e a Tecnologia, I.P., within the scope of the CINTESIS project, with the following references: UIDB/04255/2020 and UIDP/04255/2020.

Author contributions

Conceptualization: Amante, M., Araújo, L., Fonseca, S., Xavier, P., Silva, C., Cordeiro, L., Magalhães, C.
Data curation and formal analysis: Araújo, L., Fonseca, S.
Project administration: Amante, M.
Writing – original draft: Araújo, L.
Writing – review & editing: Amante, M., Araújo, L., Fonseca, S., Xavier, P., Silva, C., Cordeiro, L., Magalhães, C.

References

American College Health & Association National college health assessment III. (2020). *Undergraduate student reference group executive summary: Executive summary: Spring 2020*. https://www.acha.org/documents/ncha/NCHA-III_SPRING-2020_UNDERGRADUATE_REFERENCE_GROUP_EXECUTIVE_SUMMARY-updated.pdf

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research, 287*, 112984. https://doi.org/10.1016/j.psychres.2020.112934

European Agency for Safety and Health at Work. (2021). *Telework and health risks in the context of the COVID-19 pandemic: Evidence from the field and policy implications*. https://osha.europa.eu/en/publications/telework-and-health-risks-context-covid-19-pandemic-evidence-field-and-policy-implications

Farnell, T., Matijević, A., & Schmidt, N. (2021). *The impact of COVID-19 on higher education: A review of emerging evidence*. https://doi.org/10.2766/069216

Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine, 9*(1), 139–145. https://doi.org/10.1017/s0033291700021644

Hashemian, A., Direkvand-Moghadam, A., & Direkvand-Moghadam, A. (2015). Predictive factors for general health status in Iranian university students an univariate and multivariate logistic regression analysis. *International Electronic Journal of Medicine, 4*, 6–10.

Instituto Nacional de Saúde Doutor Ricardo Jorge. (2020). *Saúde mental em tempos de pandemia COVID-1: Dashboard*. https://sm-covid19.pt/dashboard/

Kitzrow, M. (2003). The mental health needs of today's college students: Challenges and recommendations. *NASPA Journal, 41*(1), 165-179. http://ccvillage.buffalo.edu/wp-content/uploads/sites/74/2017/06/NASPA-Mental-Health-Needs-of-College-Students.pdf

Lee, J., Jeong, H., & Kim, S. (2021). Stress, anxiety, and depression among undergraduate students during the COVID-19 pandemic and their use of mental health services. *Innovative Higher Education, 46,* 519-538. https://doi.org/10.1007/s10755-021-09552-y

Li, L., & Wang, S. (2020). Prevalence and predictors of general psychiatric disorders and loneliness T during COVID-19 in the United Kingdom. *Psychiatry Research, 291*, 113267. https://doi.org/10.1016/j.psychres.2020.113267

Maia, B., & Dias, P. (2020). Ansiedade, depressão e estresse em estudantes universitários: O impacto da COVID-19. *Estudos de Psicologia*, *37*, e200067. http://dx.doi.org/10.1590/1982-0275202037e200067

Nogueira, M., & Sequeira, C. (2020). Preditores de bem-estar psicológico em estudantes do ensino superior. *Revista ROL de Enfermaria, 43*(1), 356-363.

Nogueira, M., & Sequeira, C. (2017). A saúde mental em estudantes do ensino superior: Relação com o género, nível socioeconómico e os comportamentos de saúde. *Revista Portuguesa de Enfermagem de Saúde Mental, 5(*Spe.) 51-56. http://dx.doi.org/10.19131/rpesm.0167

Pais-Ribeiro, J., Neto, C., Silva, M., Abrantes, C., Coelho, M., Nunes, J., & Coelho, V. (2015). Ulterior validação do questionário de saúde geral de Goldberg de 28 itens. *Psicologia, Saúde & Doenças, 16*(3), 278-285. http://dx.doi.org/10.15309/15psd160301

Pires, M., Fonseca, C., João, R., & Santos, M. (2021). COVID-19, confinamento e teletrabalho: Estudo qualitativo do impacto e adaptação psicológica em dois estados de emergência. *Investigação Qualitativa em Saúde: Avanços e Desafios, 8*, 26-34. https://doi.org/10.36367/ntqr.8.2021.26-34

Romeo, A., Benfante, A., Castelli, L., & Di Tella, M. (2021). Psychological distress among Italian University students compared to general workers during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health, 18*(5), 2503. https://doi.org/10.3390/ijerph18052503

Ware, J., Manning, W., Wells, K., Duan, N., & Newhouse, J. (1984). Health status and the use of outpatient mental health services. *American Psychologist, 39*(10), 1090–1100. https://doi.org/10.1037//0003-066x.39.10.1090

World Health Organization. (2003). *Investing in mental health*. https://apps.who.int/iris/handle/10665/42823

World Health Organization. (2012). *Risks to mental health: An overview of vulnerabilities and risk factors: Background paper by WHO Secretariat for the development of a comprehensive mental health action*. https://www.who.int/mental_health/mhgap/risks_to_mental_health_EN_27_08_12.pdf

YoungMinds. (2020). *Coronavirus: Impact on young people with mental health needs*. https://www.youngminds.org.uk/about-us/reports-and-impact/coronavirus-impact-on-young-people-with-mental-health-needs/