Ansiedad y Estrés

Original

Predictive factors of the psychological impact of the COVID-19 pandemic on university students: a study in six Ibero-American countries

María Paola Jiménez-Villamizar[1], Anna Muro-Rodríguez[1], José-Blas Navarro[2], Meritxell Carmona-Cervelló[1], Ramon Cladellas[1], Albert Feliu-Soler[3], Elvira Reche-Camba[1], Daniel López-Fernández[4], Jorge Luis Méndez-Ulrich[5], Clara Selva[6] and Antoni Sanz[1]

[1] Department of Basic, Developmental and Educational Psychology
[2] Department of Psychobiology and Methodology of Health Sciences
[2] Department of Clinical and Health Psychology
[4] Faculty of Health Sciences
[5] Department of Methods of Research and Diagnosis in Education
[6] Open University of Catalonia

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ABSTRACT

Background/Objective: During Covid-19, high prevalences of anxiety and depression were reported among university students, suggesting that they may be at higher risk than the general population of developing psychological disorders in lockdown situations. This study aimed to analyze how sociocultural factors and individual differences contributed to explaining the psychological impact of the pandemic among Ibero-American university students from Argentina, Colombia, Ecuador, Spain, Mexico, and Uruguay. *Method:* The study was carried out on 7601 university students (72% women). Data were collected through an online questionnaire that measured anxiety (GAD-2), depression (PHQ-2), somatic symptoms (SSQ-5), post-traumatic growth (PTGI), loneliness (UCLS), personality (NEO-FFI), Resilience (CD-RISC-2), Perceived Competences (PCS) and sociodemographic data. Descriptive statistics and multiple linear regression model were performed. *Results:* Analysis indicated a high prevalence (46.15%) of distress among university students, regardless of country and significantly higher than in the general population (28.27%). Greater feelings of loneliness and greater neuroticism were significantly associated with anxiety, depression, and somatization. Likewise, male gender and higher levels of resilience were found to be protective factors, while post-traumatic growth was also higher in men and was associated with higher levels of resilience, perceived competence, and responsibility. *Conclusions:* The results suggest the need to consider individual risk factors such as being a woman, presenting higher levels of neuroticism and loneliness in understanding the psychological impact of the pandemic on university students. It is concluded that universities should offer specific interventions to address mental health problems and manage the added complications of crisis events on the health of students.

Factores predictivos del impacto psicológico de la pandemia de COVID-19 en estudiantes universitarios: un estudio en seis países iberoamericanos

RESUMEN

Antecedentes/Objetivo: Durante el Covid-19, se informaron altas prevalencias de ansiedad y depresión entre estudiantes universitarios, lo que sugiere que pueden tener un mayor riesgo que la población general de desarrollar trastornos psicológicos en situaciones de encierro. Este estudio tuvo como objetivo

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* Corresponding author.
   E-mail address: mariapaola.jimenez@autonoma.cat (M. P. Jiménez-Villamizar); anna.muro@uab.cat (A. Muro-Rodríguez).

analizar cómo los factores socioculturales y las diferencias individuales contribuyeron a explicar el impacto psicológico de la pandemia entre estudiantes universitarios iberoamericanos de Argentina, Colombia, Ecuador, España, México y Uruguay. *Método:* El estudio se realizó en 7601 estudiantes universitarias (72% mujeres). Los datos fueron recolectados a través de un cuestionario en línea que midió ansiedad (GAD-2), depresión (PHQ-2), síntomas somáticos (SSQ-5), crecimiento postraumático (PTGI), soledad (UCLS), personalidad (NEO-FFI), Resiliencia (CD-RISC-2), Competencia Percibida (PCS) y datos sociodemográficos. Se realizó estadística descriptiva y modelo de regresión lineal múltiple. *Resultados:* Los análisis indicaron una alta prevalencia (46,15%) de angustia entre los estudiantes universitarios, independientemente del país y significativamente mayor que en la población general (28,27%). Mayores sentimientos de soledad y mayor neuroticismo se asociaron significativamente con ansiedad, depresión y somatización. Asimismo, el género masculino y mayores niveles de resiliencia resultaron ser factores protectores, mientras que el crecimiento postraumático también fue mayor en los hombres y se asoció con mayores niveles de resiliencia, competencia percibida y responsabilidad. *Conclusiones:* Los resultados sugieren la necesidad de considerar factores de riesgo individuales como ser mujer, presentar mayores niveles de neuroticismo y soledad en la comprensión del impacto psicológico de la pandemia en estudiantes universitarios. Se concluye que las universidades deben ofrecer intervenciones específicas para abordar los problemas de salud mental y manejar las complicaciones añadidas de los eventos de crisis sobre la salud de los estudiantes.

Introduction

As the global COVID-19 pandemic unfolded, numerous studies conducted between 2020 and 2022 highlighted the widespread negative psychological impact on the general population (Brooks et al., 2020; Gloster et al., 2020; Sanabria-Mazo et al., 2021). Stringent measures, such as social distancing, mobility restrictions, complete lockdowns, and quarantines, were implemented to contain the spread of the pandemic, forcing citizens to stay at home for months. The large number of infected patients and deaths, the uncertainty about the future, concerns about becoming infected or infecting others, or the disruption to daily routines emerged as stressors that affected mental health. Several studies reported that factors such as youth (Benatov et al., 2022), female gender, personality traits including neuroticism, and longer confinements were risk factors for distress (Muro et al., 2021; Otten et al., 2021). The psychological impact of the pandemic was influenced by the duration of the restrictions (Brooks et al., 2020; Castellà & Muro, 2022), a factor that also varied among countries. There was a notable heterogeneity in the reported prevalence of distress, ranging from 8% to 75% depending on the country (Adamson et al., 2020; Benatov et al., 2022; Campo et al., 2021; Gloster et al., 2020; Xiong et al., 2020).

Higher education was one of the sectors most profoundly impacted by these abrupt changes, with universities and colleges closing their doors and swiftly shifting to online teaching methods, disrupting the daily routines of students and academic staff (Alomyan, 2021; De Boer, 2021). By early 2020, over 1.5 billion students worldwide were affected by the lockdowns (UNESCO, 2020). In response to the disruptions, universities transitioned from traditional to online teaching, presenting new challenges for the university community, particularly students. In particular, they had to adapt to unfamiliar learning methods, deal with technological challenges, and navigate changes in assessment formats, among other difficulties (Mateo et al., 2023). Although universities reorganized to address the challenges of online teaching, the mental health of college students during the COVID-19 outbreak underwent significant changes (Aristovnik et al., 2020). A substantial number of university students reported experiencing depressive and somatic symptoms, stress, and anxiety. Moreover, most studies suggest that loneliness, health concerns, and financial uncertainty were major predictors of distress (Gloster et al., 2020; Solomou & Constantinidou, 2020; Zhai & Dub, 2020). Similar phenomena were observed in previous epidemics, such as SARS (Main et al., 2011). Approximately 30% of university students presented symptoms of somatization, including fear related to the thought of infection, engaging in the physical exploration of symptoms, along with reading and discussing possible symptoms (Egoavil et al., 2021; Kecojevic et al., 2020; Morales et al., 2020; Sánchez et al., 2021). These behaviors contributed to more severe conditions related to depression and anxiety, leading to the increased utilization of healthcare systems (Schlarb et al., 2017).

While extensive analyses have explored differences between countries within the general global population in the context of the COVID-19 pandemic (Nochaiwong et al., 2021), fewer specific studies have focused on the university population to evaluate the psychological impact of the crisis. These studies have revealed significant variations in the prevalence of depression and anxiety, ranging from 14% to 56%. This diversity suggests that individual and cultural differences play a crucial role in explaining this observed heterogeneity (Appleby et al., 2022; Musa et al., 2020; Ochnik et al., 2021; Yehudai et al., 2020). For instance, some studies suggest that the emotional and psychological impact has been more pronounced in Arab and Latin American countries (Moret & Murphy, 2022; Ruiz et al., 2022). Independent studies conducted within the university population also highlight variations between Latin American countries, with the prevalence of distress ranging from 8% to 11% among Argentine students (Leonangeli et al., 2022), 33% and 34% in the case of Colombia and Ecuador (Arévalo & Vega, 2022; Ochnik et al., 2021), 42% in Mexico (Cortés & Vuelvas, 2022) and 52% in Spain (Marques et al., 2021). Notably, these countries implemented similar measures during the reopening of higher education institutions. However, differences in economic and health development, as well as the population's confidence in the health measures, could influence this differential impact (Wang et al., 2020). Consequently, variations in prevalence could be attributed to the distinct measures adopted by each country to mitigate the spread of the virus, as well as methodological inconsistencies related to the quality of the studies, the instruments used, and the interpretation of the data (Sun et al., 2023).

Similarly, individual differences have played a pivotal role in the psychological response to mobility restriction measures (Ceccato et al., 2021; Modersitzki et al., 2020; Muro et al., 2021), as they serve as predictors of personal cognitive-behavioral regulation strategies that can influence both physical and emotional well-being. Neuroticism and low perceived competence have been identified as predictive of heightened worry and negativism during a pandemic (Kroencke et al., 2020; Garbe et al., 2020). These traits are also associated with increased feelings of loneliness, along with

lower well-being and life satisfaction (Gubler et al., 2021). In a study involving Polish and Ukrainian university students, higher levels of neuroticism were observed in women and were correlated with greater burnout (Długosz & Kryvachuk, 2021). Moreover, elevated levels of neuroticism were linked to increased feelings of loneliness (Labrague et al., 2021; Torres et al., 2022) and showed a stronger association with depressive symptomatology, greater difficulties in emotional regulation, and lower levels of social support and resilience during the pandemic (Jeste et al., 2020; Labrague et al., 2021; Torres et al., 2022).

However, the pandemic saw not only the emergence of distress but also new coping skills that facilitated posttraumatic growth (PTC), resilience, perceived competence, and responsibility (Vázquez et al., 2021). These factors are considered protective against the distress generated by the restriction measures and the health threat posed by the spread of the virus (Lechner et al., 2020; Nowicki et al., 2020).

Globally, there is growing interest in promoting well-being through initiatives that address global challenges, such as the 2030 Agenda for Sustainable Development (United Nations, 2022) and the creation of healthy educational and academic environments (World Health Organization, 2022). This interest is particularly directed toward the young population due to the impact of COVID-19, with a focus on increasing psychosocial support in universities and reducing the risk of psychological distress (Mattijssen et al., 2021). Consequently, universities have initiated the implementation of wellness programs (Copeland et al., 2021; Muro et al., 2022), although there is a recognized need for greater institutional investment for the sustainable implementation of these programs, as they often rely on resources from projects and grants (Kismihok et al., 2022; Metcalfe et al., 2022). Studies such as this one contribute toward exploring the psychological impact of the pandemic among university students in Ibero-American countries, which are among the most affected worldwide (Moret & Murphy, 2022; Ruiz et al., 2022). This research reinforces the importance of envisioning and implementing wellness programs in educational contexts (Morgan & Simmons, 2021).

Consequently, this study aimed to analyze the extent to which sociocultural factors and individual differences contribute to explaining the variability in the psychological impact of the pandemic among Ibero-American university students. Additionally, we compared the incidence of mental health disorders between university students and a sample of the general population from these same countries to elucidate the relevance of individual differences in predicting the differential psychological responses to the pandemic.

We hypothesized that college students would experience higher levels of psychological distress than the general population during the COVID-19 pandemic. Furthermore, we focused on examining how individual differences are related to distress, somatization, and post-traumatic growth in college students, moderated by country. These hypotheses were based on the findings reported in previous research. However, they were tentative, given certain inconsistencies, limitations in moderation testing, and uncertainties regarding the effects of the pandemic.

Materials and methods

Method

The current study is an analytical observational research project derived from the PSY-COVID project (Sanabria-Mazo et al., 2021) involving the distribution of an anonymous online survey coordinated by the Autonomous University of Barcelona, Spain. It was conducted across 32 countries (13 in the Americas, 11 in Europe, 4 in Asia, and 4 in Africa) and involved more than 150 international researchers from 56 scientific institutions. This article specifically presents and analyzes the results related to university students during the period of confinement.

Participants

For the present study, data from 58750 participants were analyzed. The final sample consisted of 7539 participants from six Ibero-American countries: Argentina (N = 695), Colombia (N = 3125), Ecuador (N = 173), Mexico (N = 750), Spain (N = 2401), and Uruguay (N = 395), which formed a significant sample of university students. The initial number of participants was 7683, of which 144 were excluded because they were under 18. The general population sample consisted of 51211 participants (62.2% female) aged 18-99 years, representing the same six countries as the student sample and showing a comparable distribution by country.

Instruments

Distress: Participants completed the Patient Health Questionnaire-2 (PHQ-2) (Kroenke et al., 2003), which explores the risk of depressive disorder and is the ultra-brief version of the PHQ-9. The PHQ-2 consists of two 4-point Likert scale items, where 0 corresponds to *"not at all"* and 3 to *"almost every day"*. The total score ranges from 0 to 6. In addition, participants also completed the Generalized Anxiety Disorder Scale (GAD-2), which evaluates the risk of anxiety disorder by measuring anxiety symptoms, which is the ultra-brief version of the GAD-7 (Löwe et al., 2010). The GAD-2 consists of two items with a 4-point Likert-type response format, where 0 corresponds to *"not at all"* and 3 to *"almost every day"*. The total score on the GAD-2 ranges from 0 to 6. Participants were at risk of anxiety if the GAD-2 score was 3. Given that depression and anxiety scores were strongly correlated (r = .64, p < .001), a composite distress score was created by summing the scores of the four individual items, with a cutoff score of 3. The PHQ-2 and GAD-2 presented good psychometric properties in previous studies (Byrd-Bredbenner et al., 2021; Coakley et al., 2022; Heumann et al., 2023; Sapra et al., 2020). The internal consistency in this study was assessed with Cronbach's α, yielding a score of .85.

Somatic Symptoms: The Somatic Symptoms Questionnaire (SSQ-5; Nomura et al., 2007) measures somatic symptoms. It was developed by the authors of the PSY-COVID questionnaire, considering the results of the meta-analysis by Zijlema et al. (2013) on scales measuring somatization. This instrument contains five items with a 4-point Likert-type response format where 0 corresponds to *"not at all"* and 3 to *"almost every day"*. The total score of the SSQ-5 ranges from 0 to 15, with higher scores indicating higher somatization. Participants were at risk of somatization if the SSQ-5 score was 5. A Cronbach's α of .76 demonstrated internal consistency in this study.

Posttraumatic Growth: The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), in its original version, consists of 10 questions. A unidimensional Principal Component Analysis evaluated the five questions with the highest factorial saturation in this adaptation. This scale addresses relationships with others, new possibilities, personal strength, spiritual change, and appreciation for life. Respondents choose from four response options: *not at all"*, *"a little"*, *"quite a bit"*, and *"a lot"*. Total scores ranged from 0 to 15, with higher scores indicating greater posttraumatic growth. Internal

consistency for this study, measured by Cronbach's α, was .82.

Loneliness: The item with the highest factorial load on the loneliness scale (UCLS; Russell et al., 1978) was used to measure loneliness. Respondents used a four-point scale with options ranging from 0 to 3: *"never, some days, more than half of the days, and almost every day"*. Scores ranged between 0 and 3, with higher scores indicating greater feelings of loneliness.

Personality traits: The NEO Five-Factor Inventory (NEO-FFI; McCrae & Costa, 2004) was used to measure the five personality dimensions, using the item with the highest factor saturation for each dimension. In the present investigation, only neuroticism and responsibility were used, with five response options ranging from -2 to +2: *"Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree"*. Higher values indicate greater traits in each personality dimension assessed.

Resilience: The short version of the Connor-Davidson Resilience Scale (CD-RISC-2; Vaishnavi et al., 2007) assessed resilience as the ability to bounce back and adapt successfully to change. This scale comprises two items with four response options: *"nothing =0, a little=1, quite a lot=2, and a lot=3"*. The total score ranges from 0 to 6, with higher scores indicating greater resilience. Given the low internal consistency (Cronbach's α = .70), a separate analysis of the two items, namely "capacity to adapt" and "capacity to recover from illness," was conducted for the present study.

Perceived competence: The item with the highest factorial load ("I can achieve what I set out to do") of the Perceived Competence Scale (PCS) (Fernández et al., 1998) was used to measure perceived competence. This item has five response options: *"Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree"*, with scores ranging between -2 and 2. Higher scores indicate greater perceived competence.

The online survey and standardized questionnaires included a sheet to collect specific sociodemographic data from the students (Table 1). A single question was asked to assess the absolute and comparative confinement levels: approximately how often have you left the house?

Procedure

A group of international researchers conducted this study to generate a dataset of psychosocial aspects of the COVID-19 pandemic. The PSY-COVID project was carried out across different stages. In the first stage, the assessment instrument was developed and validated by a panel of 30 international researchers from 8 countries, all experts in clinical psychology and public health. After the linguistic and content validation, the usability test of the online survey was also carried out to ensure comprehension of the questions. The second phase consisted of a field study where

the online questionnaire was disseminated worldwide using the snowball method, with a completion time of approximately 15 minutes. The survey was distributed mainly through social networks (Facebook, Instagram, WhatsApp, Twitter, etc.), media (newspapers, television, radio, etc.), and institutional contacts (universities, foundations, health organizations, etc.). A total of 88734 people participated in the study worldwide.

The data obtained correspond to the first wave of COVID-19, collected between May and August 2020 in six countries: Colombia (from May 20 to June 19), Spain (from May 14 to June 21), Argentina (from July 13 to August 13), Mexico (from June 14 to July 2), Uruguay (from July 10 to August 8) and Ecuador (from June 15 to July 31).

The online survey included consent to participate in the study and statements on data protection laws. This study was approved by the Ethical Committee on Animal and Human Experimentation of the Autonomous University of Barcelona (CEEAH-5197). All procedures followed the ethical standards in the 1964 Declaration of Helsinki and subsequent updates.

Statistical analyses

All statistical analyses were conducted with Stata 17 on a dataset extracted from the PSY-COVID study (available at https://figshare.com/s/4997cfc605c496da1a0a). To preserve the population distribution based on gender and nationality, the analysis of the global sample data was weighted by within-country gender distribution and total country population. Analyses segmented by country were weighted only by gender. The description of gender distribution was the only unweighted analysis.

A comparison of means for mental health outcomes (anxiety, depression, and somatization) between students and the general population was conducted using Student's *t*-test. Cohen's *d*-effect size was calculated for each comparison of means. Following Cohen's (1992) guidelines, absolute values were interpreted as a null effect for values < 0.20, a small effect for values from 0.20 to 0.50, a medium effect for values from 0.50 to 0.80, and a large effect for values > 0.80. Additionally, distress and somatization variables were dichotomized based on the cut-off points explained in the instruments section. This allowed for a prevalence comparison between students and the general population using the chi-square test, with Pearson's contingency coefficient serving as an indicator of effect size.

Predictive models for each of the three mental health outcomes were initially estimated with multilevel linear mixed models. Following Snijders and Bosker (2012), a multilevel random intercept was initially estimated with the country as a random factor and restricted maximum likelihood. Intraclass correlation (ICC) was then calculated for the three mental health outcomes.

Table 1. Sociodemographic characteristics of university students

		Total N=7539	Argentina N=695	Colombia N=3125	Ecuador N=173	Mexico N=750	Spain N=2401	Uruguay N=395
Age		M = 25.02 (SD = 7.69)	M = 25.58 (SD = 6.59)	M = 22.95 (SD = 5.03)	M = 24.33 (SD = 5.43)	M = 26.25 (SD = 9.08)	M = 23.36 (SD = 6.60)	M = 28.85 (SD = 9.60)
		%	%	%	%	%	%	%
Gender [a]	Female	72.26	77.55	71.90	20.81	75.47	72.97	77.97
	Male	27.74	22.45	28.10	79.19	24.53	27.03	22.03
Leaving home	Less than twice a month	50.46	37.67	64.71	50.67	50.08	50.74	16.39
	Twice or more a month	49.54	62.33	35.29	49.33	49.92	49.26	83.61
Income	Low	35.27	35.31	41.34	37.62	24.49	57.72	30.55
	Medium+High	64.73	64.69	58.66	62.38	75.51	42.28	69.45

[a] non-weighted.

Table 2. Descriptive mental health of university students

	Total $N = 7539$	Argentina $N = 695$	Colombia $N = 3125$	Ecuador $N = 173$	Mexico $N = 750$	Spain $N = 2401$	Uruguay $N = 395$
	M(SD)	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*
Loneliness (0-3)	1.07(1.04)	1.15(1.08)	1.11(1.06)	1.02(0.96)	1.04(1.03)	1.07(0.10)	0.66(0.88)
Neuroticism (1-5)	3.18(1.12)	3.35(1.07)	3.11(1.13)	2.10(1.07)	3.16(1.12)	3.26(1.16)	3.12(1.10)
Responsibility (1-5)	3.51(1.03)	3.55(1.03)	3.36(1.06)	3.80(0.94)	3.51(1.00)	3.53(1.11)	3.53(0.96)
Illness recovery capacity (0-3)	2.28(0.59)	2.41(0.60)	2.23(0.61)	2.09(0.59)	2.26(0.56)	2.32(0.58)	2.33(0.57)
Adaptability (0-3)	2.19(0.66)	2.21(0.65)	2.16(0.69)	2.12(0.70)	2.20(0.65)	2.22(0.66)	2.27(0.64)
Perceived competence (1-5)	3.99(0.84)	3.97(0.80)	3.98(0.89)	3.90(0.94)	4.05(0.83)	3.91(0.83)	4.01(0.78)
Distress (0-6)	2.73(1.58)	2.82(1.54)	2.64(1.63)	2.75(1.52)	2.69(1.57)	2.91(1.63)	2.09(1.46)
Somatization (0-15)	3.79(2.89)	3.90(2.82)	4.17(3.06)	4.56(3.78)	3.41(2.69)	4.04(2.79)	3.22(2.44)
Post-traumatic growth (0-15)	7.45(3.42)	6.69(3.44)	7.85(3.47)	9.7 (3.01)	7.72(3.21)	6.16(3.37)	7.07(3.51)

The ICC associated with distress as an outcome was ICC = .013 (95% CI = .001 to .193); with somatization, this was .019 (95% CI = .007 to .049); and with posttraumatic growth this was .108 (95% CI = .036 to .283). Given the low variability of results by country, the multilevel approach was discarded, and the most parsimonious linear regression model was selected. Therefore, separate multiple linear regression models were estimated using loneliness, neuroticism, responsibility, resilience, perceived competence, and home abandonment as predictors and the three mental health predictors (distress, somatization, and posttraumatic growth) as outcomes. All models were adjusted for age and socioeconomic status.

Results

Sociodemographic and psychological characteristics

The study participants were 7,539 university students aged between 18 and 65, with a mean age of 25.02 years (*SD* = 7.69). The majority of participants were female (72.26%). Regarding isolation measures, most participants (50.46%) reported going out to outdoor spaces once or not at all every 15 days. In contrast, Argentine (62.33%) and Uruguayan (83.61%) students reported going out two or more times in less than 15 days (Table 1).

Concerning the psychological characteristics of the sample, Table 2 describes the whole sample, with separate details for each country.

Mental health in University students vs. the general population

The mean scores for the three mental health outcomes were compared between the sample of university students and the general population (Table 3).

The mean distress score in university students was 0.58 points higher than that of the general population (|*t*| = 30.98, *p* < .001) with a moderate effect size (*d* = 0.38). For somatization, the general population mean (*M* = 3.03, *SD* = 2.66) was lower than that of university students (*M* = 3.79, *SD* = 2.89) with a small effect size (|*t*| = 30.98, *p* < .001, *d* = 0.28). Regarding post-traumatic growth, a higher mean score was observed for the non-student population (*M* = 8.17, *SD* = 3.38) compared to the student sample (*M* = 7.45, *SD* = 3.42) with a small effect size (|*t*| = 17.03, *p* < .001, *d* = 0.21).

The prevalence of distress was higher in university students than in the general population (46.2% vs. 28.3%; χ^2 = 998.10; *p* = <.001; *C* = .129). The same pattern occurred with somatization, with a higher prevalence observed in university students than in the general population (39.8% vs. 26.7%; χ^2 = 563.1; *p* = <.001; *C* = .097).

Table 3. Comparison of mental health outcomes between university students and non-students

	Students	*N*	*M*	*SD*	|*t*|	*p*	*d*
Distress (0-6)	No	51211	2.15	1.50	30.98	< .001	0.38
	Yes	7539	2.73	1.58			
Somatization (0-15)	No	51211	3.03	2.66	22.78	< .001	0.28
	Yes	7539	3.79	2.89			
Post-traumatic growth (0-15)	No	51211	8.17	3.38	17.03	< .001	0.21
	Yes	7539	7.45	3.42			

Predictors of mental health outcomes

Table 4 presents the results of multiple linear regression models. The predictors explained 48% of the variance in distress, with the strongest being loneliness (β = 0.45, *p* < .001), neuroticism (β = 0.32, *p* <.001), gender (β = -0.09, *p* < .001), and adaptability (β = -0.08, p < .001).

The predictors explained 23% of the variance in somatization, with loneliness (β = 0.26, *p* < .001), neuroticism (β = 0.20, *p* < .001), male gender (β = -0.20, *p* < .001), and resilience to disease (β = -0.11, *p* < .001) being the most significant.

The predictors explained 15% of the variance in post-traumatic growth, with male gender (β = -0.13, *p* < .001), perceived competence (β = 0.13, *p* < .001), responsibility (β = 0.12, *p* < .001), loneliness (β = -0.12, *p* < .001), neuroticism (β = -0.08, *p* < .001) and leaving the house more frequently (β = 0.04, *p* = .02) having the greatest impact.

Discussion

The present study investigated cultural and individual predictors of the psychological impact of the COVID-19 pandemic among university students from six Ibero-American countries. This is the first cross-cultural study to include an extensive student cohort, comparing it with a large general population and including cultural and individual determinants. The findings support the hypothesis that the psychological impact of the COVID-19 pandemic within this demographic surpasses that of the general population. Specifically, 46.2% of students showed notable symptoms of distress, while 39.8% showed somatization symptoms — a prevalence significantly higher than that observed in the general population (with reports estimating 28.3% for distress and 26.7% for somatization symptoms). These results are consistent with previous studies, highlighting undergraduate students' vulnerability to the pandemic's psychological impact (Werner et al., 2021). Notably, the extended duration of the restrictions at the university level, in comparison with other educational levels and the broader population,

Table 4. Predictive model of mental health outcomes and individual differences of university students

Distress	Total (= .48)				Argentina (= .44)	Colombia (= .51)	Ecuador (= .54)	Mexico (=.49)	Spain (= .45)	Uruguay (= .51)
	B	CI 95% (B)	p	β	β	β	β	β	β	B
Loneliness (0-3)	0.69	[0.63; -0.74]	<.001	0.45	0.48	0.45	0.46	0.45	0.41	0.45
Neuroticism (1-5)	0.45	[0.41; -0.50]	<.001	0.32	0.27	0.31	0.36	0.33	0.33	0.30
Male gender	-0.28	[-0.37; -0.18]	<.001	-0.09	-0.11	-0.08	-0.09	-0.08	-0.07	-0.14
Adaptability (0-3)	-0.18	[-0.27; -0.10]	<.001	-0.08	-0.08	-0.10	-0.10	-0.07	-0.08	-0.14
Perceived competence (1-5)	-0.08	[-0.16; -0.004]	.039	-0.04	-0.04	-0.03	-0.22	-0.03	-0.04	0.03
Responsibility (1-5)	-0.06	[-0.11; -0.0004]	.049	-0.04	-0.05	-0.08	0.05	-0.02	-0.06	0.01
Leaving home ≥2 times/month	-0.09	[-0.18; 0.01]	.068	-0.03	-0.01	-0.02	-0.17	-0.03	-0.01	-0.07
Illness recovery capacity (0-3)	-0.02	[-0.11; 0.07]	.669	-0.01	-0.04	-0.02	0.07	0.01	-0.01	0.09
Somatization	Total (= .23)				Argentina (= .22)	Colombia (= .28)	Ecuador (= .36)	Mexico (= .21)	Spain (= .27)	Uruguay (= .26)
	B	CI 95% (B)	p	β	β	β	β	β	β	B
Loneliness (0-3)	0.72	[0.61; 0.84]	<.001	0.26	0.24	0.27	0.29	0.27	0.27	0.20
Neuroticism (1-5)	0.53	[0.43; 0.62]	<.001	0.20	0.21	0.23	0.25	0.18	0.26	0.24
Male gender	-1.16	[-1.37; -0.95]	<.001	-0.20	-0.22	-0.21	-0.26	-0.19	-0.19	-0.24
Illness recovery capacity (0-3)	-0.55	[-0.75; -0.35]	<.001	-0.11	-0.17	-0.08	0.12	-0.11	-0.14	0.08
Leaving home ≥2 times/month	-0.14	[-0.35; 0.07]	.190	-0.02	-0.02	0.02	-0.23	0.001	-0.03	-0.07
Responsibility (1-5)	-0.04	[-0.16; 0.08]	.562	-0.01	-0.01	-0.05	-0.12	0.001	-0.01	-0.05
Perceived competence (1-5)	-0.03	[-0.19; 0.13]	.693	-0.01	-0.001	0.04	0.13	-0.002	0.02	0.08
Adaptability (0-3)	-0.001	[-0.17; 0.16]	.989	-0.0003	0.03	-0.02	-0.13	-0.01	0.03	-0.04
Post-traumatic growth	Total (= .15)				Argentina (= .15)	Colombia (= .23)	Ecuador (= .23)	Mexico (= .14)	Spain (= .15)	Uruguay (= .11)
	B	CI 95% (B)	p	β	β	β	β	β	β	B
Adaptability (0-3)	0.69	[0.47; 0.92]	<.001	0.13	0.23	0.09	0.27	0.12	0.10	0.17
Male gender	-0.89	[-1.15; -0.63]	<.001	-0.13	-0.12	-0.15	-0.26	-0.12	-0.17	-0.15
Perceived competence (1-5)	0.52	[0.35; 0.70]	<.001	0.13	0.12	0.18	0.08	0.09	0.16	0.17
Responsibility (1-5)	0.41	[0.27; 0.55]	<.001	0.12	0.11	0.17	0.14	0.12	0.11	0.03
Loneliness (0-3)	-0.39	[-0.52; -0.27]	<.001	-0.12	-0.07	-0.17	-0.01	-0.14	-0.16	-0.07
Neuroticism (1-5)	-0.24	[-0.36; -0.13]	<.001	-0.08	-0.06	-0.07	-0.16	-0.09	0.03	0.04
Leaving home ≥2 times/month	0.30	[0.05; 0.56]	.019	0.04	0.03	0.03	-0.01	0.11	0.05	0.10
Illness recovery capacity (0-3)	-0.02	[-0.25; 0.21]	.866	-0.003	0.01	0.04	0.02	0.06	-0.01	-0.10

Note. B = standardized regression coefficient; Adjusted for age and income level.

contributed to this vulnerability (Adamson et al., 2020; Brailovskaia & Margraf, 2020; Nochaiwong et al., 2021; Wang et al., 2020). Across the countries evaluated, the overall prevalence of distress (46.15%) exceeded estimates from other European cross-cultural studies, which reported a prevalence of around 25% (Ochnik et al., 2021). Consequently, it is confirmed that university students constitute a demographic that is susceptible to experiencing a higher mental health impact during pandemic-related restrictions.

Concerning transculturality, the observed differences between countries were not statistically significant, suggesting an absence of cultural variations in the psychological impact of the pandemic, at least in the higher education environments of the countries analyzed here, that is, those within the Ibero-American region (Marques et al., 2021). This finding can be interpreted in light of the parallel measures adopted by the participating countries to prevent the spread of infection (OECD, 2020; University of Oxford, 2022), including the closure of the education sector in March 2020 and the gradual resumption of activities according to the behavior of the virus. Notably, face-to-face attendance was partially resumed at universities in mid-2021, accompanied by containment measures such as limited seating, mask usage, and hand sanitization (Pérez-Anaya et al., 2021). This convergence of findings in culturally diverse contexts implies the existence of common factors that affect university students equally (Al-Tammemi et al., 2020; Eskin et al., 2016). This homogeneity could be explained by the shared educational context: the university and its surrounding environment show similarities in Ibero-American countries. Therefore, subsequent developments could have a similar influence, potentially homogenizing cultural differences across countries. Such uniformity is advantageous from an academic standpoint, as it suggests that, for students to achieve their learning potential, the same set of resources or tools (teachers, peers, technology, etc.) is used in all countries (Diaz et al., 2022). This emphasizes the importance of environmental similarities across universities over the potential cultural and health disparities between countries (CRUE, 2020; Kleiman et al., 2020).

Finally, it was proposed that individual differences would be significantly related to distress, somatization, and post-traumatic growth and moderated by the country of origin. Regarding gender, previous results are confirmed, indicating that women suffer a greater psychological impact. This impact could be explained by psychosocial variables such as traditional roles in sharing household and parenting tasks, which were intensified among women during confinement (Otten et al., 2021). Additionally, differences in levels of trait neuroticism, consistently observed to be higher in women than in men, could contribute to this impact. Regression analyses further indicated that higher levels of neuroticism and loneliness, coupled with lower levels of resilience, were predictors of greater distress and somatization. Notably, these factors were also inversely associated with post-traumatic growth.

The elevated levels of distress observed among university students, along with symptoms of anxiety and depression, may

be attributed to both the prolonged duration of restrictions for this group compared to the rest of the population and the altered developmental needs that likely influenced their behavioral and emotional responses to the pandemic containment measures. This differential impact is notably associated with higher levels of loneliness, neuroticism, and lower levels of resilience (adaptability to changes). Neuroticism emerges as a particularly significant predictor of distress, consistent with findings from previous studies conducted both during the pandemic and in pre-pandemic contexts, where its inverse relationship with physical and mental health is well established (Friedman, 2019; Mattson et al., 2018). Higher neuroticism predisposes individuals to experience heightened physiological and sympathetic nervous system activation, more negative feelings and thoughts, increased emotional instability and isolation, a reduced capacity to face crises and life events, and lower adaptiveness to new situations.

Consistent with previous studies conducted on the general population (Adamson et al., 2020; Brailovskaia & Margraf, 2020; Nochaiwong et al., 2021; Wang et al., 2020), our results highlight how loneliness predicts greater distress and somatization symptoms. The absence of physical companionship during confinements, isolation, and distancing measures triggered both psychological and physical symptoms, such as headache, dizziness, back pain, or shortness of breath. This, coupled with the overwhelming information about the symptoms of the virus, might have led many students to mistakenly believe that they had been infected (Sun et al., 2021), contributing to greater emotional instability and fear of getting sick or dying (Egoavil et al., 2021; Kecojevic et al., 2020; Morales et al., 2020; Sánchez et al., 2021).

As anticipated, higher resilience levels considered a protective individual factor against crises and psychosocial stressors (Labrague, 2021; Vázquez et al., 2021), have proven to be a fundamental variable for better psychological adaptation during the pandemic, safeguarding the mental health of students. Resilience enables the more effective management of academic demands and facilitates the development of coping strategies in the face of environmental pressures. This suggests that the absence of resilience exacerbates distress, hinders performance, and impedes optimal environmental adaptation (Pidgeon et al., 2014). In a similar vein, it has been confirmed that PTG (posttraumatic growth), perceived competence, and responsibility contribute to better coping with the challenges associated with the restrictions (Nowicki et al., 2020).

Limitations and future research

While this study presents an important strength regarding the sample size, it is not without limitations. First, its cross-sectional nature precludes the establishment of temporal or causal relationships between the analyzed variables. Additionally, the non-probabilistic sampling method could compromise both the external and internal validity of the results, limiting the generalization of the findings. However, it is important to emphasize that the survey was constructed using previously validated instruments, and highly rigorous analyses were employed to ensure adequate internal validity. Nevertheless, using short instruments designed ad-hoc for the study could introduce false positives and negatives. Therefore, it is recommended to verify the identified cases using more comprehensive and specialized questionnaires or individual clinical interviews. Future studies should adopt longitudinal designs that allow for identifying causal relationships between variables and their covariation over time (Lisnyj et al., 2022), given the dynamic nature of pandemics and

health restrictions in terms of duration and intensity. Additionally, future research should analyze diverse countries with varying contextual, health, economic, and social characteristics to better understand the role of cultural differences, as the countries in the present study shared a common language (Spanish) and similar lockdown policies.

Conclusions

The findings of this study could significantly enhance our ability to predict the psychological impact of future health crises or catastrophes, particularly among the youngest and most vulnerable groups, such as students. In summary, cultural heterogeneity or variations in the severity of pandemic restriction measures do not appear to account for individual variability in psychological impact among higher education students. Conversely, the differential impact of the pandemic on mental health, especially in female students compared to the general population of their respective countries, suggests that this could result from an aggregate effect of shared characteristics among students, such as the educational-university environment and age. These findings also emphasize the importance of considering individual student differences when implementing university prevention programs to complement the overwhelmed public health systems during the pandemic. Such programs should particularly target women and the most vulnerable students with higher levels of neuroticism and loneliness (e.g., international Students) and those with lower levels of resilience, responsibility, and perceived competence. Recognizing the higher prevalence of mental health problems among university students and their unique characteristics compared to the general population, higher education institutions are increasingly focusing on developing prevention programs. These initiatives aim not only to improve the well-being of students but also to reduce health costs derived from complications during pandemics (United Nations, 2021). Examples include Social Responsibility programs that promote healthy campuses and initiatives such as the third half (Muro et al., 2022), designed to optimize the well-being of researchers in alignment with the Sustainable Development Goals and healthy environments proposed by the WHO.

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