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Prevalence and Sociodemographic and Academic Factors Associated with Mental Health Problems in Spanish University Students

Anna Huguet[1,2,3,*], Josefa Canals-Sans[1,2], Sharlene Rozario[3], Sanjay Rao[4,5], Maria Victoria Arija-Val[2,6], and David Navarro-Gonzalez[7]

1 Department of Psicology, Research Center for Behavioral Assessment (CRAMC), Universitat Rovira i Virgili. Tarragona, Catalonia, Spain
2 Nutrition and Mental Health (NUTRISAM) Research Group, Universitat Rovira i Virgili. Tarragona, Spain
3 IWK Health. Halifax, Nova Scotia, Canada.
4 University of Ottawa. Faculty of Medicine, Psychiatry. Ottawa, Canada.
5 Centre for Mental and Psychological Health. Ottawa, Canada
6 Facultat de Medicina i Ciències de la Salut, Universitat Rovira i Virgili. Reus, Catalonia, Spain.
7 Facultat d'Educació, Psicologia i Treball Social, Universitat de Lleida. Lleida, Catalonia, Spain.

Título: Prevalencia y factores sociodemográficos y académicos asociados a problemas de salud mental en estudiantes universitarios españoles.
Resumen: Se ha evidenciado un incremento de problemas mentales en estudiantes universitarios a nivel mundial. Hemos investigado la prevalencia de problemas mentales comunes en estudiantes de una universidad pública española y su asociación con factores sociodemográficos y académicos. Se utilizó un diseño de estudio transversal. 2862 estudiantes completaron en línea el Cuestionario de Salud del Paciente (PHQ, PHQ-9), la Escala para el Trastorno de Ansiedad Generalizada (GAD-7) y preguntas sociodemográficas y académicas. Se utilizaron modelos de regresión logística multivariados. El 69,1% presentaron al menos uno de los problemas evaluados, siendo el trastorno de ansiedad generalizada (48,9%) y el trastorno depresivo mayor (47,4%) los más frecuentes. El 67,6% de las personas con riesgo de sufrir un problema, tenían riesgo de sufrir múltiples problemas. Ser mujer, minoría de género, vivir con compañeros, cursar primer año de grado y estar al final del semestre estaba asociado a mayor riesgo de sufrir al menos un problema. Algunos factores asociados con un problema individual variaron según el problema. Estudiar ciencias de la salud tenía un riesgo menor de depresión mayor y ser varón un mayor riesgo de consumo de alcohol. Dada la alta prevalencia de estudiantes con riesgo, medidas preventivas dirigidas especialmente a los grupos más vulnerables son necesarias.
Palabras clave: Universidad. Estudiantes. Prevalencia. Factores de riesgo. Trastornos mentales.

Abstract: There has been an increase in mental problems among university students worldwide. We investigated the prevalence of common mental problems in students at a public Spanish university and their associated sociodemographic and academic factors. A cross-sectional study design was used. 2,862 students completed the Patient Health Questionnaire (PHQ, PHQ-9), the Generalized Anxiety Disorder (GAD-7), and sociodemographic and academic questions. Multivariate logistic regression models were used. 69.1% screened positively for at least one evaluated problem, with generalized anxiety disorder (48.9%) and major depressive disorder (47.4%) being the most frequent. 67.6% of individuals screened for at least one problem were at risk for multiple problems. Being female, gender minority, living with housemates, and being in the first-year of undergraduate studies was associated with an increased risk of at least one mental problem. Factors associated with individual conditions varied across conditions. Studying health sciences was associated with a lower risk of major depression and being male was associated with a higher risk of alcohol abuse. Given the high prevalence of students at risk, preventative measures aimed especially at the most vulnerable groups are necessary.
Keywords: University. Students. Prevalence; Risk factors. Mental health disorders.

Introduction

The burden of mental health disorders has steadily increased worldwide over the years (GBD 2019 Mental Disorders Collaborators, 2022). In 2019 the global prevalence of mental health disorders and substance use disorders in the 5 to 24 age group was 11.63% and 1.22% respectively, with prevalence rates for mental health disorders being highest among the 15 to 19 years age group at 13.96%, and 13.63 % in the 20 to 24 age group (Kieling et al., 2024). In Catalonia, Spain the incidence rate of common mental health disorders (e.g., depression, anxiety, eating disorders) in adolescents and young adults has also seen a steady increase from 2008 to 2022 (Lozano-Sánchez et al., 2024). The period of emerging adulthood is when most individuals start or are in university and is generally an unstable developmental stage related to important decision-making. Recent meta-analyses showed that the global prevalence rates among college students almost rivaling global figures, with 33.6% experiencing depression symptoms, and 39.0% with anxiety (Li et al., 2022) and with it an increasing demand for mental health services (Lipson, Lattie, et al., 2019; Xiao et al., 2017). Research suggests that for many students' life can be stressful (McCloud & Bann, 2019) and associated with substantial impairment (e.g., poorer academic performance, higher class absenteeism, and dropouts poorer functioning) (Alonso et al., 2018; Auerbach et al., 2016; Ishii et al., 2018). More alarmingly, the age range for majority university students (i.e., 18-22 years) falls within the age group (i.e., 15-29 years) in which suicide is one of the leading causes of death (World Health Organization, 2021). Recent reports show high rates of self-harm, which is one of the strongest risk factors associated with suicide, among university students in Spain and internationally (Clements et al., 2023; Lázaro-Pérez et al., 2023) and mental health difficulties are an important risk factor for suicidal behaviors (Blasco et al., 2019; Seo et al., 2021).

These increasing numbers in mental health disorders, that in some cases lead to suicidality among university students, have garnered a lot of research attention (Hernández-Torrano et al., 2020). It is a growing public health concern

*** Correspondence address:**
Anna Huguet. E-mail: anna.huguet@urv.cat
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for the prevalence, incidence, and severity of mental health problems and their impact. As a result, there are calls for research aimed to better understand the current mental health of university students and the heterogeneity therein (Auerbach et al., 2018). The scope of the students' mental health problems must be well described to be able to develop strategies to address these issues on university campuses.

Prevalence in one location may vary from another (Ochnik et al., 2021). In Spain, the most recently published papers have been mainly restricted to subgroups of students (e.g., in initial stage of university studies (Ballester et al., 2020; Fernández-Rodríguez et al., 2019), students enrolled in certain programs (Ramón-Arbués et al., 2020), or specific mental health problem (Fernández-Rodríguez et al., 2019; Ruiz-Hernández et al., 2022)). Research also shows other basic socio-demographic and academic factors shaping students' mental health (e.g., age, ethnicity, sex, gender identity, finances, level of study, living situation, sexual orientation, academic pressures, foreign environment (Ahmed et al., 2023; Campbell et al., 2022; Limone & Toto, 2022; Sheldon et al., 2021)). Many of these studies have again looked at just a subgroup of students and one or two mental health outcomes. Despite the factors explored, research addressing the associations of these factors with poor mental health is limited (Campbell et al., 2022) or inconclusive (Ahmed et al., 2023; Ramón-Arbués et al., 2020; Sheldon et al., 2021). There is a need for up-to-date information of the prevalence of mental health problems in university students in Spain (Ramón-Arbués et al., 2020) and worldwide (Kang et al., 2021). It also seems necessary to continue investigating the contribution of sociodemographic and academic factors, even though most of them are non-modifiable (Kang et al., 2021); and investigate the effect on separate common mental health problems in a cohort of the student body, which will facilitate comparability. Findings will inform strategies to encourage help-seeking amongst those student groups at risk and tailor interventions for them, which may decrease related burden (e.g., overwhelming demand on under-resourced health services).

The aim of this cross-sectional study is twofold. First, to evaluate among students enrolled in a public university of Spain, in all levels and areas of study, the prevalence of students at risk of the following common mental health disorders: major depression disorder (MDD), panic disorder, generalized anxiety disorder (GAD), bulimia nervosa, binge eating disorder, alcohol abuse or dependence as selected by those students who meet DSM-IV diagnosis criteria (American Psychiatric Association, 1998) using self-rating instruments. Secondly, to identify sociodemographic (age, sex, gender, ethnicity, household composition) and academic factors (level of study, area of knowledge, and participation in an exchange program), associated with being at risk of mental health disorders among students, and explore whether these correlates are disorder-specific or transdiagnostic.

Method

Participants

Our target population included all students in a graduate or postgraduate program at one public university in Spain: Universitat Rovira i Virgili. We excluded students who did not provide informed consent for the study, and were not able to understand Catalan or Spanish.

The number of students in the Universitat Rovira i Virgili during the study period determined the sample size.

We obtained 4,315 participants who consented and immediately started the online survey, 1,453 of them (33.67%) dropped out prior to finishing. The results reported are based on 2,862 (66.33%) respondents who completed the online survey. Response rate was 18.45% of approximately 15,500 students enrolled at the university. Among those who completed, 25.26% (n = 723) had at least one missing value, there was some missing data among 96.04% of the variables, and there was 0.57% of missing data.

The mean age was 21.43 (SD = 4.72, range=17-80). Majority were female' sex (71.4%, n = 2,043) and cisgender (96.9%, n = 2,772). Most were white (86.9%, n = 2,487), and the most common minority ethnic groups were Latin Americans/Hispanics (n = 216, 7.5%) and Arabs/North-Africans/Western Asians (n = 86, 3%). Living at home with their parents was the most prevalent housing situation (50.8%, n = 1,453). Most students were undergraduates (87.4%, n = 2,500), and health science, and social and legal sciences where the areas of study most students were in (35.6%, n = 1018 and 32.5%, n = 929, respectively). See Table 1 for further details.

Instruments

The validated Spanish versions of the measures were administered. However, since Catalan is also an official language, the measures were translated to Catalan using a back-translation procedure. Students could choose their preferred language.

Sociodemographic and academic characteristics

Ad-hoc self-report questions were incorporated to evaluate the following variables: age, sex at birth (sex), gender identity (gender), ethnicity, household composition, level of study, study program, year of study, and if part of an exchange program.

Both sex at birth and gender identity items ("What was your assigned sex at birth?" with the response options: 'Male' and 'Female'. "What is your current gender identity? / How do you describe yourself?" with answer options: 'Male', 'Female' and 'Other') were used to evaluate gender categories as proposed by Tate et al. (2013). Gender minority category combined those respondents who endorsed 'others' as their gender identity, as well as those respondents who re-

ported discordant birth sex and gender identity, and cisgender category included those who reported that their gender identity was aligned with the sex assigned at birth.

Table 1
Demographic and academic characteristics of participants included in the analysis.

Variables	Total sample (n = 2,862) % (n)	95% IC
Birth sex[a]		
Female	71.8 (2,043)	70-73.4
Male	28.2 (804)	26.6-30
Gender identity[b]		
Female	70.6 (2,007)	68.8-72.1
Male	27.6 (786)	26.1-29.4
Others	1.8 (51)	1.3-2.3
Gender identity[c]		
Cisgender	97.7 (2,772)	97.1-98.2
Gender minority	2.3 (66)	1.8-2.9
Ethnicity[d]		
White/Euro-Caucasian	87.1 (2,487)	85.9-88.4
Non-White/Non-Euro-Caucasian	12.9 (367)	11.6-14.1
Level of study[e] ; year of study		
Bachelor[f]	87.7 (2,500)	86.6-89.1
1st year	34.9 (866)	33.1-36.8
2nd year	26.2 (650)	24.5-27.9
3rd year	20.8 (516)	19.2-22.4
4th year	14.6 (362)	13.3-16.1
5th year	3.4 (84)	2.7-4.2
Master	8.1 (231)	7.1-9.1
PhD	4.2 (119)	3.4-4.9
Area of knowledge[g]		
Arts and Humanities	8.5 (240)	7.6-9.6
Architecture and Engineering	16.5 (464)	15.1-17.8
Social and Legal Sciences	33 (929)	31.3-34.7
Sciences	5.8 (162)	4.9-6.6
Health Sciences	36.2 (1,018)	34.4-37.8
Participating in an exchange program[h]	1.1 (32)	0.7-1.5
Current living situation[i]		
With parents	50.9 (1,453)	49-52.7
With partner	10.3 (293)	9.1-11.5
With housemates	28 (801)	26.5-29.9
Alone	5.9 (167)	5-6.7
Others	4.9 (139)	4-5.6
Recruitment period		
Beginning and middle of semester (September – December)	61.2 (1,751)	59.4-63
End of semester (April – June)	38.8 (1,111)	37-40.6

Note. Participants with missing values: [a]15, [b]18, [c]24, [d]8, [e]12, [f]22, [g]49, [h]31, [i]9

Mental health disorders: Patient Health Questionnaire (PHQ)

The PHQ (Spitzer et al., 1999) is one of the most comprehensive screening instruments for mental disorders. It is a self-administered questionnaire designed to evaluate the presence of common mental health disorders based on the DSM-IV including: major depression, other depressive disorders, panic disorder, other anxiety disorders, binge eating, bulimia nervosa, somatoform disorder, and alcohol abuse or dependence, using an algorithm scoring method. All the modules were administered except the one evaluating other anxiety disorders, which was covered by the GAD-7. Moreover, since the diagnosis of somatoform disorder requires clinical judgement to rule out a biological explanation for the physical symptoms that participant reports, and our survey did not ask about biological explanations, the prevalence of somatoform disorder is not reported.

The original PHQ has shown to have adequate psychometric properties (Spitzer et al., 1999, 2000). When used in primary care evaluation of mental disorders, it has been found to have a good concordance between diagnoses according to the PHQ and diagnoses according to the original clinician-administered PRIME-MD (kappa=0.65; overall accuracy=85%, sensitivity=75%, specificity=90%) and it was also found that a PHQ diagnosis was related with functional impairment, disability days, and health care use (Spitzer et al., 1999). A Spanish version has been developed and well-validated. The Spanish version, when used in general hospital with inpatients, also showed to have good diagnostic validity (Kappa = 74; overall accuracy = 88%; sensitivity = 87%; specificity = 88%) and good predictive validity: inpatients with a PHQ diagnosis had more functional impairment, disability days and health care use (Diez-Quevedo et al., 2001).

Major depression: Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 (Kroenke et al., 2001) is used to identify possible MDD. It follows nine criteria of the DSM-IV for the diagnosis of MDD. Each item is answered on a 4-point Likert scale (0 (not at all) - 3 (nearly every day)). The total score is the sum of the item scores, and ranges from 0 to 27. Scores of 5, 10, 15 and 20 represent cut points for mild, moderate, moderately severe, and severe depression, respectively, with a standard cut-off for suspected MDD being a 10 or above (Kroenke et al., 2010).

Internal consistency of the original PHQ-9 has shown to be high (i.e., Cronbach's α= 0.86 and 0.89 in a study involving primary care centers and obstetrical clinics, respectively) (Kroenke et al., 2001). The cut-off of ≥10 on the original PHQ-9 yielded a sensitivity of 88% and a specificity of 88% for major depression (Kroenke et al., 2001). The PHQ-9 has also shown to be sensitive to changes of condition severity over time (Kroenke et al., 2010; Löwe et al., 2004) and to be related to functional status, disability days, and symptom-related difficulty (Kroenke et al., 2001).The psychometric properties of the Spanish version for Spain has also been studied (Muñoz-Navarro et al., 2017) and it showed to perform reasonably well as screening tool for MDD in adult patients in Spanish primary care centers when the most common cut-off point of ≥10 was used (sensitivity=0.95 and specificity=0.67) (Muñoz-Navarro et al., 2017). In our study sample, the Spanish version and our Catalan version were also found to be reliable (Cronbach's α=0.89 and 0.88, respectively).

Generalized anxiety disorder: Generalized Anxiety Disorder-7 (GAD-7)

The GAD-7 (Spitzer et al., 2006) was derived from the PHQ. Each of the seven items is answered on a 4-point Likert scale (0 (not at all) - 3 (nearly every day)). The total score is the sum of the items, and the total ranges from 0 to 21. Scores of 5, 10, and 15 represent cut points for mild, moderate, and severe anxiety, respectively, with a standard cut-off for suspected GAD being a 10 or above (Kroenke et al., 2010).

The original version of the GAD-7 showed to have excellent reliability (Cronbach's α =0.92), a sensitivity of 89 and specificity of 82 for diagnosis of GAD when using a cut-off of 10 in primary care clinicals in the United States, and the GAD scores were also found to be strongly associated with multiple domains of functional impairment (Spitzer et al., 2006). The adapted Spanish version for Spain that we used also demonstrated robust psychometric properties when the version was evaluated in primary care settings (Cronbach's α =0.83) and GAD-7 scores highly correlated with other scales (i.e., HADS-Anxiety, HADS-Depression, and HAM) (García-Campayo et al., 2012). In our study sample, the Spanish version and our Catalan version were also found to be reliable (Cronbach's α =0.91 and 0.91, respectively).

Procedure

In this cross-sectional study, students at the participating university were recruited from April 25th to June 19th, 2022, which coincides with end of a semester (i.e., February – June), and from September 5th to December 15th, 2022, which coincides with beginning and middle of a semester (September –January). Two different time periods were opened to facilitate recruitment. At both times, we used several recruitment methods, all students at the participating university (n= 15,418 in 2021/22 academic year and n=15,652 in 2022/23) were invited to participate as long as they have not answered the survey previously. Information regarding the study was passed through e-mail-invitations, in-person presentations in classrooms, and posting through the University's official social media (i.e., Facebook, Instagram) or the University's website or online learning platform.

Interested students were referred to a study website, where they could provide their online informed consent, and once consent was provided, they were automatically redirected to an online survey to be completed. The survey contained several sections: sociodemographic and academic characteristics, normative mental health needs, expressed mental health needs, and their view of mental health services, but only the first two, sociodemographic (age, sex, gender identity, ethnicity, household composition) and academic characteristics (level of study, area of knowledge, and participation in an exchange program), are relevant for the purpose of this study. The last two sections (i.e., expressed mental health needs, and students view of mental health services) fall outside of the scope of this study. Data taken at different recruitment periods (i.e., April- June, 2022 and September-December, 2022) was pooled and analyzed together.

The study was approved by the University Ethics committee (CEIPSA-2020-PR-0005). This study also followed the STROBE guidelines for reporting cross-sectional study data (Vandenbroucke et al., 2007). See appendix 1.

Data Analysis

Missing values: A high percentage of participants dropped out, so the dataset contains data not missing at random. Analyses were made only with the subset of participants who completed the survey. Among those who completed the survey, we encountered Missing At Random (MAR) data, representing less than 5% of the total data. To deal with MAR data, a modified Hot-Deck Multiple Imputation (HD-MI) was implemented (Lorenzo-Seva & Ginkel, 2016), which generated 5 complete data sets, and each missing value was replaced by the most repeated value of the 5 sets. After this, total scale scores were computed, and analyses performed.

Prevalence and severity: Proportions and 95% confidence interval [CI] were calculated.

Sociodemographic and academic factors associated with screening positively for mental health disorder: Various multivariate logistic regressions were performed to determine the association between sociodemographic and academic characteristics (independent variables) and screening positively for mental health disorders (dependent variables). This was done first for participants who screened positively for at least one mental disorder and then, 6 regressions, one for screening positively for each of the explored mental disorders: MDD, panic disorder, GAD, bulimia nervosa, binge eating disorder, and alcohol abuse. The following sociodemographic and academic variables were considered as independent variables: age, sex (male, female), gender (cisgender, minority), ethnicity (white/Euro Caucasian-, non-white/non-Euro Caucasian), household composition (with parents, with partner, with housemates, alone, others), level of study (first-year undergraduates, second to fifth-year undergraduates, masters, PhD), area of knowledge (health sciences, architecture and engineering, arts and humanities, sciences, and social and legal sciences), participation in an exchange program (yes, no), and recruitment period (end of semester, beginning and middle of the semester). Recruitment period was considered a posteriori a potential confounding factor and consequently, entered into the models as an independent variable because during data analysis, this variable was found to be associated with prevalence of being at risk for mental health disorders. The rest of sociodemographic and academic variables were established a priori as potential risk factors. Although gender identity defined as male, female, and other was also gathered, it was decided a posteriori not to be entered into the multivariate analyses because sex at birth and gender identity were

highly correlated. For the multivariate analyses, all variables with p-value<0.05 when performing chi-square and independent t-test were entered into the analyses. Automatic selection using both forward likelihood ratio selection and backward likelihood ratio elimination was first used. After, we manually removed from the model the independent variables with a p-value of the Wald statistic larger than 0.05. Forward selection and backward elimination led to the same results. OR and corresponding 95% confidence intervals (CI) were calculated. Multicollinearity was checked by tolerance and variance inflation factor (VIF) and two- way interaction between independent variables retained in the model was also checked individually.

All analyses were performed with SPSS (version 29, IBM Corp) and MATLAB (The MathWorks, Inc.).

Results

Prevalence of being at risk of mental health disorders

69.1% (95% CI 67.4-70.8%) screened positive for at least one disorder. The most common disorders that students screened positively for were GAD (48.9%, 95% CI 47-50.8%) followed by MDD (47.4%, 95% CI 45.6-49.2%) (see Table 2). Among those who screened positive for probable GAD or MDD, the severity of their symptoms was most frequently categorized as moderate (see Table 2).

Table 2
Prevalence of students screening positive for common mental health disorders and severity of their symptomatology

	n	%	95% IC
Major depressive disorder	1356	47.4	45.6-49.2
Moderate	697	24.4	22.9-25.9
Moderately severe	466	16.3	14.9-17.6
Severe	193	6.7	5.8-7.7
Panic disorder	441	15.4	14-16.7
Generalized anxiety disorder	1399	48.9	47-50.8
Moderate	799	27.9	26.2-29.6
Severe	600	21	19.5-22.5
Bulimia nervosa	98	3.4	2.8-4.2
Binge eating disorder	222	7.8	6.8-8.7
Alcohol abuse	694	24.2	22.5-25.9
Meeting criteria for one or more mental health problems	1977	69.1	67.4-70.8

Among those who screened positive for at least one disorder (n = 1,977), 32.4% (n = 641) screened positively for only one and 67.6% (n = 1,336) screened positively for more than one. About 23.4% met criteria for two disorders and 23.3% met for three or more. The estimates for the pair-wise cross-sectional co-occurrence between explored mental disorders are presented in Table 3. Students at risk for eating disorders were often at risk for co-occurring MDD and GAD (i.e., of those at risk for bulimia nervosa, 88.8% were at risk for MDD and 83.7% for GAD; and of those at risk for binge eating, 77.9% were at risk for MDD and 68.9% for GAD). Co-occurrence between depression and anxiety was also often observed (i.e., 80.2% at risk for MDD were also at risk for GAD; 80% and 88% of individuals at risk for a panic disorder were also at risk for MDD and GAD, respectively; and 77.7% of students at risk for GAD were also at risk for MDD).

Table 3
Prevalence (and counts) of participants at risk of scoring positively for at least two mental health disorders.

	% (*n*), IC 95%					
	Major depressive disorder (n = 1356)	Panic disorder (n = 441)	Generalized anxiety disorder (n = 1399)	Bulimia nervosa (n = 98)	Binge eating disorder (n = 222)	Alcohol abuse (n = 694)
Co-occurring major depressive disorder	-	80 (353), 76.2-83.8	77.7 (1,087), 75.4-79.9	88.8 (87), 82.4-94.8	77.9 (173), 72-83	53.6 (372), 49.9-57.4
Co-occurring panic disorder	26 (353), 23.8-28.4	-	27.7 (388), 25.4-30.2	43.9 (43), 34.3-53.4	24.3 (54), 18.9-30	18.6 (129), 15.7-21.6
Co-occurring generalized anxiety disorder	80.2 (1,087), 78.2-82.2	88 (388), 85-91.2	-	83.7 (82), 76.5-90.4	68.9 (153), 62.2-75.1	52.3 (363), 48.6-55.8
Co-occurring bulimia nervosa	6.4 (87), 5-7.7	9.8(43), 7.3-12.8	5.9 (82), 4.6-7.1	-	0	5.3 (37), 3.7-7.1
Co-occurring binge eating disorder	12.8 (173), 10.9-14.6	12.2 (54), 9.3-15.5	10.9 (153), 9.3-12.6	0	-	9.7 (67), 7.5-12.1
Co-occurring alcohol abuse	27.3 (372), 25.1-30	29.3 (129), 25.2-33.8	25.9 (363), 23.7-28.2	37.8 (37), 28.6-47.8	30.2 (67), 23.7-36.4	-

Factors associated with screening positively for at least one mental health disorders

Age, sex, gender, living situation, level of study, area of knowledge, and recruitment period were found to be related with being at risk for at least one mental health disorder at univariate analysis (see appendix 2). Table 4 shows results from the multivariate logistic regression. Students recruited in the beginning and middle of semester had lower odds of being at risk than students recruited at the end (OR=0.49 [0.40, 0.59]). Females and gender minority students had higher odds of being at risk than males and cisgender stu-

dents (OR=1.65 [1.37, 1.99], 2.72 [1.33, 5.58], respectively). Students living with housemates had higher odds of being at risk than students living with parents (OR=1.42 [1.17, 1.72]). Compared to first-year undergraduates, both masters and PhD students had lower odds of being at risk (OR=0.60 [0.45, 0.80], 0.45 [0.30, 0.67], respectively). When architecture and engineering students (OR=1.38 [1.08, 1.76]) and arts and humanities students (OR=1.97 [141, 2.74]) were compared to health science students, they were at greater odds of being at risk. Social and legal sciences students also had greater odds of being at risk but only among students recruited in the beginning and middle of semester but not among students recruited at the end of semester.

Table 4
Multiple logistic regression of correlates of screening positively for at least one mental health disorder

Variables	Adjusted OR (95% CI)	*p*-value
Recruitment period		
End of semester	Ref.	
Beginning and middle of the semester	.490 (.401-.589)	< .001
Sex		
Male	Ref.	
Female	1.654 (1.371-1.994)	< .001
Gender		
Cisgender	Ref.	
Non-cisgender	2.721 (1.326-5.584)	.006
Current living situation		
With parents	Ref.	
With housemates	1.42 (1.17-1.72)	< .001
Level of study		
1st year bachelor	Ref.	
Master	.60 (.45-.80)	< .001
PhD	.45 (.30-.67)	.002
Area of knowledge		
Health Science	Ref.	
Architecture and Engineering	1.38 (1.08-1.76)	.009
Arts and Humanities	1.97 (1.41-2.74)	< .001
Recruitment phase by 'Health Science vs Social and Legal Sciences'	1.87 (1.31-2.68)	< .001

Note. R^2= 0.048 (Cox & Snell), 0.068 (Nagelkerke). Omnibus $X^2_{(9)}$=137.098, $p < .001$
Classification table 69.2% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 63.4% of the cases

Factors associated with screening positively for being at risk for an emotional disorder

The factors associated with being at risk for an emotional disorder, which emerged as significant on univariate analyses, were the same for all the explored emotional disorders and included: recruitment period, sex, gender, age, level of study and area of knowledge (see appendix 2).

The results of multivariate logistic regression model for being at risk for MDD (Table 5) show that students in the beginning and middle of semester had lower odds of being at risk than students at the end (OR=0.51 [0.42, 0.61]). Females at birth had double the odds of being at risk than males (OR=2.03 [1.68, 2.46]), and gender minority students had eleven times greater odds than cisgender students (OR=11.28 [3.29, 38.66]). Older age was associated with lower odds (OR=0.98 [0.97, 0.99]). Compared to health science students, architecture and engineering students, arts and humanities students, and sciences students had greater odds of being at risk (OR=1.72 [1.36, 2.18], OR=5.63 [2.22, 14.27], and OR=1.63 [1.15, 2.30], respectively). Furthermore, three significant interaction effects were found. Older students in arts and humanities reported higher odds of being at risk than older students in health sciences. Health science students recruited in the beginning and middle of semester reported lower odds of being at risk than social and legal science students. Finally, males at birth who did not identify as males reported greater odds of being at risk than cisgender males.

The multivariate logistic regression model for being at risk for a panic disorder (Table 5) shows that students recruited in the beginning and middle of semester also had lower odds of being at risk (OR=0.79 [0.63, 0.98]). Females at birth and gender minority students had around three times greater odds of being at risk than males at birth (OR=3.33 [2.46, 4.52]) and cisgender students (OR=2.88 [1.62, 5.11]), respectively. Compared to first-year undergraduates, master students reported a lower odd of being at risk (OR=0.56 [0.34, 0.89]). Also, one interaction effect was found. Cisgender students enrolled in a master's program had greater odds to be at risk than cisgender first year undergraduates.

Finally, the results of our multivariate analysis for being at risk for GAD (Table 5) showed that odds differed based on recruitment period, sex, and gender (OR=0.64 [0.55, 0.75], OR=1.99 [1.67, 2.38], and OR=8.72 [2.92-26], respectively), similar to findings for MDD and panic disorder. Analysis shows older students had lower odds of being at risk (OR=0.98 [0.97, 0.99] compared to younger students. Furthermore, there was sex and gender interactions. Males at birth that do not identify as male had higher odds of being at risk than cisgender males.

Table 5
Multiple logistic regression of correlates of screening positively for an emotional disorder

Variables	Major depression disorder		Panic disorder		Generalized anxiety disorder	
	Adjusted OR (95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Recruitment period						
End of semester	Ref.		Ref.		Ref.	
Beginning and middle of semester	0.51 (0.42-0.61)	< .001	0.79 (0.63-0.98)	.032	0.64 (0.55-0.75)	< .001
Sex						
Male	Ref.		Ref.		Ref.	
Female	2.03 (1.68-2.46)	< .001	3.33 (2.46-4.52)	< .001	1.99 (1.67-2.38)	< .001
Gender						
Cisgender	Ref.		Ref.		Ref.	
Non-cisgender	11.28 (3.29-38.66)	< .001	2.88 (1.62-5.11)		8.72 (2.92-26)	< .001
Age	0.98 (0.97-0.99)	.03			.98 (.97-.99)	.020
Level of study						
First-year undergrad			Ref.			
Master			0.56 (0.34-0.89)	.016		
Area of knowledge						
Health Science	Ref.					
Architecture and Engineering	1.72 (1.36-2.18)	< .001				
Arts and Humanities	5.63 (2.22-14.27)	< .001				
Sciences	1.63 (1.15-2.30)	.005				
Age by 'Health Sciences vs Arts & Humanities'	0.95 (0.92-0.99)	.014				
Recruitment period by 'Health Sciences vs Social and Legal Sciences'	2.06 (1.46-2.91)	< .001				
Sex by gender	0.17 (0.04-0.72)	.015			0.18 (0.05.0.66)	.009
Gender by 'First year undergra vs master'			8.37 (1.11-62.77)	.039		

Note. Major depression disorder: $R^2 = 0.062$ (Cox & Snell), 0.082 (Nagelkerke). Omnibus $X^2_{(10)} = 169.574$, $p < .001$. Classification table 60.1% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 63.6% of the cases.
Panic disorder: $R^2 = 0.037$ (Cox & Snell), 0.064 (Nagelkerke). Omnibus $X^2_{(5)}=105.73$, $p < .001$. Classification table 84.7% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 63.7% of the cases.
Generalized anxiety disorder: $R^2 = 0.042$ (Cox & Snell), 0.056 (Nagelkerke). Omnibus $X^2_{(5)}=117.35$, $p < .001$. Classification table 58.9% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 61% of the cases.

Factors associated with screening positively for an eating disorder

Univariate analyses show that being at risk for bulimia nervosa was associated with sex, gender, ethnicity, and area of knowledge (see appendix 2). The results of the logistic regression showed that compared to males assigned at birth and cisgender students, females assigned at birth and non-cisgender students were at higher odds of being at risk, respectively (OR=1.79 [1.07, 3.02] and OR=3.71 [1.64-9.38]) (see Table 6).

Sex and level of study were associated with being at risk for a binge eating disorder (see appendix), and both factors remained in the logistic regression analyses (see Table 5). Females at birth had higher odds of being at risk (OR=1.62 [1.15, 2.28]) when compared to males at birth. Those students in a master's program had lower odds of being at risk (OR=0.36 [0.17, 0.77]) than first-year undergraduates.

Table 6
Multiple logistic regression of correlates of screening positively for bulimia nervosa

Variables	Bulimia nervosa		Binge eating disorder	
	Adjusted OR (95% CI)	*p*-value	Adjusted OR (95% CI)	*p*-value
Sex				
Male	Ref.		Ref.	
Female	1.79 (1.07-3.02)	.027	1.62 (1.15-2.28)	.006
Gender				
Cisgender	Ref.			
Minority group	3.71 (1.64-9.38)	.002		
Level of study				
First-year undergraduate			Ref.	
Masters			0.36 (0.17-0.77)	.008

Note. Bulimia nervosa: $R^2 = 0.004$ (Cox & Snell), 0.017 (Nagelkerke). Omnibus $X^2_{(2)}=12.40$, $p = .002$. Classification table 96.6% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 62.2% of the cases.
Binge eating disorder: $R^2 = 0.006$ (Cox & Snell), 0.015 (Nagelkerke). Omnibus $X^2_{(2)}=17.97$, $p < .001$. Classification table 92.3% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 56.5% of the cases.

Factors associated with screening positively for alcohol abuse

Sex, age, living situation, level of study, and recruitment period were related with being at risk for alcohol abuse at univariate analysis (see appendix 2). When performing multivariate logistic regressions, females at birth had lower odds of being at risk than males (OR=0.66 [0.55-0.80]). Students recruited in the beginning and middle of the semester were also at lower odds of being at risk (OR=0.74 [0.61-0.89]). Compared to students living with parents, students living with partner had 0.42 times [0.29-0.63] lower odds of being at risk, and students living with housemates had nearly double the odds of being at risk (OR=1.88 [1.56-2.27]) (see Table 7).

Table 7
Multiple logistic regression of correlates of screening positively for alcohol abuse

Variables	Adjusted OR (95% CI)	*p*-value
Recruitment		
End of semester	Ref.	
Beginning and middle of the semester	0.74 (0.61-0.89)	.001
Sex		
Male	Ref.	
Female	0.66 (0.55-0.80)	< .001
Current living situation		
With parents	Ref.	
With partner	0.42 (0.29-0.63)	< .001
With housemates	1.88 (1.56-2.27)	< .001

Note. R^2=0.035 (Cox & Snell), 0.052 (Nagelkerke). Model $X^2_{(4)}$=99.86, p < .001. Classification table 75.9% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 62% of the case

Discussion

There is a scarcity of studies globally, and especially in Spain, that; 1) invite all students enrolled in a university to participate 2) and provide recent epidemiological data on a broad range of mental health problems. The purpose of this study was to, evaluate the prevalence, and sociodemographic and academic factors associated with being at risk for common types of mental health problems reported among students enrolled in any program of one public university in Spain. Our results show that almost 7 out of 10 students screened positively for at least one examined mental health disorder. Consistent with previous studies (Auerbach et al., 2018; Lipson et al., 2022; Wang et al., 2020), the risk for anxiety (49%) and depression (47%) were the most prevalent. Our findings are similar to recent nationwide analyses which used similar methods (Capdevila-Gaudens et al., 2021; Gobierno de España, 2023). However, our rates, at times, are higher or equal than other recent European studies (Bootsma et al., 2023; Kavvadas et al., 2023), studies performed earlier in Spain (Auerbach et al., 2018), and recent systematic reviews (Ahmed et al., 2023; Li et al., 2022). It is not possible to know the extent to which these differences reflect a real increase in rates over time (Duffy et al., 2019) and the extent to which they reflect heterogeneity between studies or study samples (Li et al., 2022).

Co-occurrence between depression and anxiety, and co-occurrence of eating disorders with depression or anxiety were substantial and have been identified in previous studies (Hudson et al., 2007; ter Meulen et al., 2021).

When investigating the range of sociodemographic and academic potential predictive factors few of them were found to be common across several disorders. These transdiagnostic factors include sex, gender identity (cisgender and gender minority), and period in which students were recruited (end of semester vs beginning and middle of a semester). Sex is a factor that is reported consistently in the literature to be associated with certain mental health or behavioral problems. Being female at birth was associated with risk for internalizing psychopathology (i.e., anxiety, depression, and panic disorder) (Lynch et al., 2021) and eating disorders (i.e., binge eating and anorexia nervosa) (Alhaj et al., 2022), while being male was associated with risk for alcohol abuse (Lynch et al., 2021; McHugh et al., 2018). This linkage has been explained by a number of biological and psychosocial hypotheses (Bangasser & Cuarenta, 2021; Kang et al., 2020; McHugh et al., 2018)

Gender identity has also been studied. However, the majority of studies conducted with university students that have explored the association between gender and mental health conditions have not looked beyond the gender binary (i.e., male/female) or they have gathered information on gender minority (i.e., non-cisgender) but not taken it into account in the analysis (Auerbach et al., 2018; Duffy et al., 2019; Liu et al., 2022; Wang et al., 2020). There is small but growing literature that examine the potential effect of gender minorities on mental health. Our findings are consistent with initial findings reported in this literature, which show that gender-minority students have an elevated risk for poorer mental outcomes compared to cisgender students (Alibudbud, 2023; Lipson, Raifman, et al., 2019; Liu et al., 2019; Seehuus et al., 2021). For instance, a nationally representative survey of 65,213 college students randomly selected across the U.S. that used validated screenings tools to evaluate symptoms of anxiety, depression, eating disorders, self-injury and suicidality found that gender minority students were more likely to be at risk for one or more of the mental health problems than cisgender students (Lipson, Raifman, et al., 2019). Psychosocial stressors, including lack of social support, discrimination, violence, and victimization to which they are exposed to (McCann & Brown, 2017; Newcomb et al., 2020) likely can explain this increased risk. Further research to replicate and support findings are needed.

The recruitment period was also found to be related to being more at risk of any of the explored emotional disorders as well as alcohol abuse. Participants recruited at the end of a semester were at higher risk. The end of a semester is likely to be a stressful time due to the high workload associated with exams. This academic pressure may explain why these students are more vulnerable. Previous studies have

found linkages between exam periods, mental health conditions, and suicidality (Gunnell et al., 2020; Steare et al., 2023). Due to such associations, caution should be taken to the timing within the academic year when epidemiological data is collected.

Age was another relevant factor, but only with emotional problems. Much like other studies conducted in the general population we found that younger age was associated with a higher likelihood of depression and anxiety (Basta et al., 2022), which may be related to greater social role instability (e.g., more frequent romantic transitions) (Patrick et al., 2020), but there are inconsistent study findings regarding age in the student populations (Ahmed et al., 2023; Campbell et al., 2022) .

Two additional and understudied potential risk factors include level of study and area of knowledge. Studies have mainly focused on undergraduates, especially first-year students (Ruiz-Hernández et al., 2022) or those in health sciences (Lipson et al., 2016), because of repeat findings that they are vulnerable groups. Our results align with those studies that warn first-year undergraduates are at risk for psychopathology (Bassols et al., 2014). First-years are vulnerable, probably due to the many challenges they face when transitioning between high school and university (e.g., homesickness, time management, creating a new social network) (Bassols et al., 2014). However, our study, much like others (McLafferty et al., 2022; Ramón-Arbués et al., 2020; Ruiz-Hernández et al., 2022), paradoxically found that health science students are less likely to report psychopathology or depression. Health science students are more conscientious about their health, which could lead to higher likelihood of seeking professional help, and have more knowledge about care; which could act as protective factors (Ruiz-Hernández et al., 2022). Further studies are needed to confirm these linkages.

Alcohol consumption has varied in the past decades in Spain due to alcohol control policy changes (e.g., increasing age requirements for purchasing alcohol, increasing taxes) (Llamosas-Falcón et al., 2022). Even though there has been a slight decrease in alcohol consumption amongst university students in Spain, it continues to be a public health concern (Romero-Rodríguez et al., 2022). One quarter of participants in our study sample reported to be at risk of alcohol abuse. Risk factors for alcohol abuse is still sparse (Solmi et al., 2021), but our findings are in line with other studies that suggest that parent control could exert a protective factor (Krieger et al., 2018) since those students that reported to live with parents were at lower risk when compared with those living with housemates. Living with a partner was also found to be associated with less risk than living with parents, so this appears as per our knowledge to be a unique finding thus far. The multivariate regression models derived from these factors despite showing acceptable model fit, have poor predictive accuracy. It is not possible to predict risk for psychopathology based on a few factors. We need to continue exploring the potential role of other factors involved at both individual and contextual levels.

The strength of this study lies in the investigation of a range of highly prevalent mental health problems in a sample of students in a university from different areas of knowledge, level of study, using screening tools validated against clinical diagnoses, which produces a wide scope of knowledge about the current mental health needs of university students and allows direct comparability.

The study also presents some limitations. First, our study sample was recruited from only one university, limiting the generalizability of results. However, this study was conducted in a public Spanish university with a demographic profile similar to the national population. Apart from this, performing this study in a single institution facilitated the use of refusal conversion strategies and, therefore, increased our response rate, which in turn helps reduce non-response bias. Second, the self-selection of participants could have introduced selection bias. Those more vulnerable could have been more attracted to participate (Kaźmierczak et al., 2023) and as a result influence the validity of results. Third, the need to understand Spanish or Catalan as inclusion criterion could have also been source of bias because it would have reduced the participation of foreigners. However, students unable to understand Spanish or Catalan tend to be newcomers and a minority at the University. Fourth, we chose to use universal community screening scales that assess key symptoms of the DSM-IV diagnoses (American Psychiatric Association, 1998). Although these scales were not written to align with the most updated diagnoses criteria, they were selected because they still capture the DSM-5-TR criteria (e.g., the DSM-5-TR still recommends the use of PHQ-9 to evaluate depression severity, American Psychiatric Association, 2022), and they are one of the most commonly used worldwide for screening due to their convenient use and sound psychometric properties and, consequently, they facilitate comparability across cultures and contexts. Fifth, our cross-sectional study does not capture causality nor the full complexity of the inter-relationship of potential predictive variables. Finally, we need to be cautious when interpreting our estimated prevalence rates since we used screening tools that have been validated against clinical diagnosis, but do not have diagnostic accuracy. Participants who screened positive for any of the evaluated disorders may not be diagnosed with the disorder if interviewed because of the potential limited positive predictive values of the screening tools. Levis et al., (2019)

Considering that use of screening self-administered tools can overestimate prevalence of disorders (Levis et al., 2020), to estimate the prevalence of common mental health disorders in university students and factors impacting that prevalence, it would be useful to perform epidemiological studies which included a two-stage diagnostic procedure. The first phase should include the use of self-administered screening questionnaires using a cutoff that prioritize the scale's sensitivity so that diagnoses are not missed, followed by a second

stage which should include the use of a diagnostic interview for those who screen positive on the screening questionnaires (Zimmerman, 2024). Moreover, in an attempt to generalize findings nationwide studies should be performed inviting the whole community of students to participate and using more response-inducing strategies (e.g., providing a conditional lottery ticket) to reduce potential bias due to selective participation (Spoor et al., 2024).

Clinical implications

Considering the large proportion of students at risk for mental health disorder and that mental health problems in young adulthood are a significant risk factor for poor mental health later in life (Solmi et al., 2022), more support in educational institutions are needed to reduce the incidence of mental health disorders and reduce the burden on health care systems. Selective prevention programs for mental health targeting those students that have self-identified to be at increased risk for a given disorder, and more support provided at the end of semesters could be undertaken on university campuses. A number of selective interventions have shown to be effective in preventing common mental health disorders (Salazar de Pablo et al., 2021).

Conclusions

This study highlights the need to take action towards the prevention and treatment of mental health problems among university students since close to 50% were considered at risk for at least one common mental health problem. This study also shows that sociodemographic and academic factors are associated with mental health problems, being female, non-cisgender, and at the end of semester are associated with being at risk for most of the evaluated mental health disorders. However, there are factors that their association differ depending on the mental health disorder. Therefore, when planning preventive and treatment actions, it is important to tailor those actions towards the groups of students identified as at-risk.

Complementary information

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References

Ahmed, I., Hazell, C. M., Edwards, B., Glazebrook, C., & Davies, E. B. (2023). A systematic review and meta-analysis of studies exploring prevalence of non-specific anxiety in undergraduate university students. *BMC Psychiatry*, *23*(1), 240. https://doi.org/10.1186/s12888-023-04645-8

Alhaj, O. A., Fekih-Romdhane, F., Sweidan, D. H., Saif, Z., Khudhair, M. F., Ghazzawi, H., Nadar, M. S., Alhajeri, S. S., Levine, M. P., & Jahrami, H. (2022). The prevalence and risk factors of screen-based disordered eating among university students: A global systematic review, meta-analysis, and meta-regression. *Eating and Weight Disorders: EWD*, *27*(8), 3215–3243. https://doi.org/10.1007/s40519-022-01452-0

Alibudbud, R. (2023). Gender in mental health: Comparison of the rate and social factors of depression, anxiety, and stress among young adult Filipino heterosexual cisgender men and women and LGBT+ individuals. *The International Journal of Social Psychiatry*, *69*(2), 430–437. https://doi.org/10.1177/00207640221106874

Alonso, J., Mortier, P., Auerbach, R. P., Bruffaerts, R., Vilagut, G., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Ennis, E., Gutiérrez-García, R. A., Green, J. G., Hasking, P., Lochner, C., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Zaslavsky, A. M., Kessler, R. C., & WHO WMH-ICS Collaborators. (2018). Severe role impairment associated with mental disorders: Results of the WHO World Mental Health Surveys International College Student Project. *Depression and Anxiety*, *35*(9), 802–814. https://doi.org/10.1002/da.22778

American Psychiatric Association (Ed.). (1998). *Diagnostic and statistical manual of mental disorders: DSM-IV ; includes ICD-9-CM codes effective 1. Oct. 96* (4. ed., 7. print).

American Psychiatric Association (Ed.). (2022). *Diagnostic and statistical manual of mental disorders: DSM-5-TR* (Fifth edition, text revision). American Psychiatric Association Publishing.

Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G., Hwang, I., Kessler, R. C., Liu, H., Mortier, P., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Aguilar-Gaxiola, S., Al-Hamzawi, A., Andrade, L. H., Benjet, C., Caldas-de-Almeida, J. M., Demyttenaere, K., … Bruffaerts, R. (2016). Mental disorders among college students in the World Health Organization World Mental Health Surveys. *Psychological Medicine*, *46*(14), 2955–2970. https://doi.org/10.1017/S0033291716001665

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., & WHO WMH-ICS Collaborators. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*(7), 623–638. https://doi.org/10.1037/abn0000362

Ballester, L., Alayo, I., Vilagut, G., Almenara, J., Cebrià, A. I., Echeburúa, E., Gabilondo, A., Gili, M., Lagares, C., Piqueras, J. A., Roca, M., Soto-Sanz, V., Blasco, M. J., Castellví, P., Mortier, P., Bruffaerts, R., Auerbach, R. P., Nock, M. K., Kessler, R. C., … UNIVERSAL study group. (2020). Mental disorders in Spanish university students: Prevalence, age-of-onset, severe role impairment and mental health treatment. *Journal of Affective Disorders*, *273*, 604–613. https://doi.org/10.1016/j.jad.2020.04.050

Bangasser, D. A., & Cuarenta, A. (2021). Sex differences in anxiety and depression: Circuits and mechanisms. *Nature Reviews Neuroscience*, *22*(11), Article 11. https://doi.org/10.1038/s41583-021-00513-0

Bassols, A. M., Okabayashi, L. S., Silva, A. B. da, Carneiro, B. B., Feijó, F., Guimarães, G. C., Cortes, G. N., Rohde, L. A., & Eizirik, C. L. (2014). First- and last-year medical students: Is there a difference in the prevalence and intensity of anxiety and depressive symptoms? *Revista Brasileira De Psiquiatria (Sao Paulo, Brazil: 1999)*, *36*(3), 233–240. https://doi.org/10.1590/1516-4446-2013-1183

Basta, M., Micheli, K., Koutra, K., Fountoulaki, M., Dafermos, V., Drakaki, M., Faloutsos, K., Soumaki, E., Anagnostopoulos, D., Papadakis, N., & Vgontzas, A. N. (2022). Depression and anxiety symptoms in adolescents and young adults in Greece: Prevalence and associated factors. *Journal of Affective Disorders Reports*, *8*, 100334. https://doi.org/10.1016/j.jadr.2022.100334

Blasco, M. J., Vilagut, G., Almenara, J., Roca, M., Piqueras, J. A., Gabilondo, A., Lagares, C., Soto-Sanz, V., Alayo, I., Forero, C. G., Echeburúa, E., Gili, M., Cebrià, A. I., Bruffaerts, R., Auerbach, R. P., Nock, M. K., Kessler, R. C., Alonso, J., & UNIVERSAL study group. (2019). Suicidal Thoughts and Behaviors: Prevalence and Association with Distal and Proximal Factors in Spanish University Students. *Suicide & Life-Threatening Behavior*, *49*(3), 881–898. https://doi.org/10.1111/sltb.12491

Bootsma, E., Jansen, L., Kiekens, G., Voorpoels, W., Mortier, P., Proost, S., Vande Poel, I., Jacobs, K., Demyttenaere, K., Alonso, J., Kessler, R. C., Cuijpers, P., Auerbach, R. P., & Bruffaerts, R. (2023). Mood disorders in higher education in Flanders during the 2nd and 3rd COVID-19 wave: Prevalence and help-seeking: Findings from the Flemish College Surveys (FLeCS). *Journal of Psychiatric Research*, *159*, 33–41. https://doi.org/10.1016/j.jpsychires.2023.01.017

Campbell, F., Blank, L., Cantrell, A., Baxter, S., Blackmore, C., Dixon, J., & Goyder, E. (2022). Factors that influence mental health of university and college students in the UK: A systematic review. *BMC Public Health*, *22*(1), 1778. https://doi.org/10.1186/s12889-022-13943-x

Capdevila-Gaudens, P., García-Abajo, J. M., Flores-Funes, D., García-Barbero, M., & García-Estañ, J. (2021). Depression, anxiety, burnout and empathy among Spanish medical students. *PloS One*, *16*(12), e0260359. https://doi.org/10.1371/journal.pone.0260359

Clements, C., Farooq, B., Hawton, K., Geulayov, G., Casey, D., Waters, K., Ness, J., Kelly, S., Townsend, E., Appleby, L., & Kapur, N. (2023). Self-harm in university students: A comparative analysis of data from the Multicentre Study of Self-harm in England. *Journal of Affective Disorders*, *335*, 67–74. https://doi.org/10.1016/j.jad.2023.04.112

Diez-Quevedo, C., Rangil, T., Sanchez-Planell, L., Kroenke, K., & Spitzer, R. L. (2001). Validation and utility of the patient health questionnaire in diagnosing mental disorders in 1003 general hospital Spanish inpatients. *Psychosomatic Medicine*, *63*(4), 679–686. https://doi.org/10.1097/00006842-200107000-00021

Duffy, M. E., Twenge, J. M., & Joiner, T. E. (2019). Trends in Mood and Anxiety Symptoms and Suicide-Related Outcomes Among U.S. Undergraduates, 2007-2018: Evidence From Two National Surveys. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, *65*(5), 590–598. https://doi.org/10.1016/j.jadohealth.2019.04.033

Fernández-Rodríguez, C., Soto-López, T., & Cuesta, M. (2019). Needs and demands for psychological care in university students. *Psicothema*, *31*(4), 414–421. https://doi.org/10.7334/psicothema2019.78

García-Campayo, J., Zamorano, E., Ruiz, M. A., Pérez-Páramo, M., López-Gómez, V., & Rejas, J. (2012). The assessment of generalized anxiety disorder: Psychometric validation of the Spanish version of the self-administered GAD-2 scale in daily medical practice. *Health and Quality of Life Outcomes*, *10*(1), 114. https://doi.org/10.1186/1477-7525-10-114

GBD 2019 Mental Disorders Collaborators. (2022). Global, regional, and national burden of 12 mental disorders in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019. *The Lancet Psychiatry*, *9*(2), 137–150. https://doi.org/10.1016/S2215-0366(21)00395-3

Gobierno de España. (2023). *Estudio sobre "la salud mental en el estudiantado de las universidades españolas"* -. https://www.universidades.gob.es/estudio-sobre-la-salud-mental-en-el-estudiantado-de-las-universidades-espanolas/

Gunnell, D., Caul, S., Appleby, L., John, A., & Hawton, K. (2020). The incidence of suicide in University students in England and Wales 2000/2001-2016/2017: Record linkage study. *Journal of Affective Disorders*, *261*, 113–120. https://doi.org/10.1016/j.jad.2019.09.079

Hernández-Torrano, D., Ibrayeva, L., Sparks, J., Lim, N., Clementi, A., Almukhambetova, A., Nurtayev, Y., & Muratkyzy, A. (2020). Mental Health and Well-Being of University Students: A Bibliometric Mapping of the Literature. *Frontiers in Psychology*, *11*, 1226. https://doi.org/10.3389/fpsyg.2020.01226

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, *61*(3), 348–358. https://doi.org/10.1016/j.biopsych.2006.03.040

Ishii, T., Tachikawa, H., Shiratori, Y., Hori, T., Aiba, M., Kuga, K., & Arai, T. (2018). What kinds of factors affect the academic outcomes of university students with mental disorders? A retrospective study based on medical records. *Asian Journal of Psychiatry*, *32*, 67–72. https://doi.org/10.1016/j.ajp.2017.11.017

Kang, H. K., Rhodes, C., Rivers, E., Thornton, C. P., & Rodney, T. (2021). Prevalence of Mental Health Disorders Among Undergraduate University Students in the United States: A Review. *Journal of Psychosocial Nursing and Mental Health Services*, *59*(2), 17–24. https://doi.org/10.3928/02793695-20201104-03

Kang, H.-J., Park, Y., Yoo, K.-H., Kim, K.-T., Kim, E.-S., Kim, J.-W., Kim, S.-W., Shin, I.-S., Yoon, J.-S., Kim, J. H., & Kim, J.-M. (2020). Sex differences in the genetic architecture of depression. *Scientific Reports*, *10*(1), Article 1. https://doi.org/10.1038/s41598-020-66672-9

Kavvadas, D., Kavvada, A., Karachrysafi, S., Papaliagkas, V., Chatzidimitriou, M., & Papamitsou, T. (2023). Stress, Anxiety, and Depression Levels among University Students: Three Years from the Beginning of the Pandemic. *Clinics and Practice*, *13*(3), 596–609. https://doi.org/10.3390/clinpract13030054

Kaźmierczak, I., Zajenkowska, A., Rogoza, R., Jonason, P. K., & Ścigała, D. (2023). Self-selection biases in psychological studies: Personality and affective disorders are prevalent among participants. *PLOS ONE*, *18*(3), e0281046. https://doi.org/10.1371/journal.pone.0281046

Kieling, C., Buchweitz, C., Caye, A., Silvani, J., Ameis, S. H., Brunoni, A. R., Cost, K. T., Courtney, D. B., Georgiades, K., Merikangas, K. R., Henderson, J. L., Polanczyk, G. V., Rohde, L. A., Salum, G. A., & Szatmari, P. (2024). Worldwide Prevalence and Disability From Mental Disorders Across Childhood and Adolescence: Evidence From the Global Burden of Disease Study. *JAMA Psychiatry*, *81*(4), 347–356. https://doi.org/10.1001/jamapsychiatry.2023.5051

Krieger, H., Young, C. M., Anthenien, A. M., & Neighbors, C. (2018). The Epidemiology of Binge Drinking Among College-Age Individuals in the United States. *Alcohol Research : Current Reviews*, *39*(1), 23–30.

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Löwe, B. (2010). The Patient Health Questionnaire Somatic, Anxiety, and Depressive Symptom Scales: A systematic review. *General Hospital Psychiatry*, *32*(4), 345–359. https://doi.org/10.1016/j.genhosppsych.2010.03.006

Lázaro-Pérez, C., Munuera Gómez, P., Martínez-López, J. Á., & Gómez-Galán, J. (2023). Predictive Factors of Suicidal Ideation in Spanish University Students: A Health, Preventive, Social, and Cultural Approach. *Journal of Clinical Medicine*, *12*(3), 1207. https://doi.org/10.3390/jcm12031207

Levis, B., Benedetti, A., Ioannidis, J. P. A., Sun, Y., Negeri, Z., He, C., Wu, Y., Krishnan, A., Bhandari, P. M., Neupane, D., Imran, M., Rice, D. B., Riehm, K. E., Saadat, N., Azar, M., Boruff, J., Cuijpers, P., Gilbody, S., Kloda, L. A., … Thombs, B. D. (2020). Patient Health Questionnaire-9 scores do not accurately estimate depression prevalence: Individual participant data meta-

analysis. *Journal of Clinical Epidemiology*, *122*, 115-128.e1. https://doi.org/10.1016/j.jclinepi.2020.02.002

Levis, B., Benedetti, A., & Thombs, B. D. (2019). Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: Individual participant data meta-analysis. *The BMJ*, *365*, l1476. https://doi.org/10.1136/bmj.l1476

Li, W., Zhao, Z., Chen, D., Peng, Y., & Lu, Z. (2022). Prevalence and associated factors of depression and anxiety symptoms among college students: A systematic review and meta-analysis. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *63*(11), 1222–1230. https://doi.org/10.1111/jcpp.13606

Limone, P., & Toto, G. A. (2022). Factors That Predispose Undergraduates to Mental Issues: A Cumulative Literature Review for Future Research Perspectives. *Frontiers in Public Health*, *10*, 831349. https://doi.org/10.3389/fpubh.2022.831349

Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased Rates of Mental Health Service Utilization by U.S. College Students: 10-Year Population-Level Trends (2007–2017). *Psychiatric Services*, *70*(1), 60–63. https://doi.org/10.1176/appi.ps.201800332

Lipson, S. K., Raifman, J., Abelson, S., & Reisner, S. L. (2019). Gender Minority Mental Health in the U.S.: Results of a National Survey on College Campuses. *American Journal of Preventive Medicine*, *57*(3), 293–301. https://doi.org/10.1016/j.amepre.2019.04.025

Lipson, S. K., Zhou, S., Abelson, S., Heinze, J., Jirsa, M., Morigney, J., Patterson, A., Singh, M., & Eisenberg, D. (2022). Trends in college student mental health and help-seeking by race/ethnicity: Findings from the national healthy minds study, 2013-2021. *Journal of Affective Disorders*, *306*, 138–147. https://doi.org/10.1016/j.jad.2022.03.038

Lipson, S. K., Zhou, S., Wagner, B., Beck, K., & Eisenberg, D. (2016). Major Differences: Variations in Undergraduate and Graduate Student Mental Health and Treatment Utilization Across Academic Disciplines. *Journal of College Student Psychotherapy*, *30*(1), 23–41. https://doi.org/10.1080/87568225.2016.1105657

Liu, C. H., Stevens, C., Wong, S. H. M., Yasui, M., & Chen, J. A. (2019). The prevalence and predictors of mental health diagnoses and suicide among U.S. college students: Implications for addressing disparities in service use. *Depression and Anxiety*, *36*(1), 8–17. https://doi.org/10.1002/da.22830

Liu, Y., Frazier, P. A., Porta, C. M., & Lust, K. (2022). Mental health of US undergraduate and graduate students before and during the COVID-19 pandemic: Differences across sociodemographic groups. *Psychiatry Research*, *309*, 114428. https://doi.org/10.1016/j.psychres.2022.114428

Llamosas-Falcón, L., Manthey, J., & Rehm, J. (2022). Changes in alcohol consumption in Spain between 1990 and 2019. *Adicciones*, *34*(1), 61–72. https://doi.org/10.20882/adicciones.1400

Lorenzo-Seva, U., & Ginkel, J. R. V. (2016). Multiple Imputation of missing values in exploratory factor analysis of multidimensional scales: Estimating latent trait scores. *Anales de Psicología / Annals of Psychology*, *32*(2), Article 2. https://doi.org/10.6018/analesps.32.2.215161

Löwe, B., Kroenke, K., Herzog, W., & Gräfe, K. (2004). Measuring depression outcome with a brief self-report instrument: Sensitivity to change of the Patient Health Questionnaire (PHQ-9). *Journal of Affective Disorders*, *81*(1), 61–66. https://doi.org/10.1016/S0165-0327(03)00198-8

Lozano-Sánchez, A., Aragonès, E., López-Jiménez, T., Bennett, M., Evangelidou, S., Francisco, E., García, M., Malgosa, E., Codern-Bové, N., Guzmán-Molina, C., & Jacques-Aviñó, C. (2024). Temporal trends and social inequities in adolescent and young adult mental health disorders in Catalonia, Spain: A 2008–2022 primary care cohort study. *Child and Adolescent Psychiatry and Mental Health*, *18*, 159. https://doi.org/10.1186/s13034-024-00849-2

Lynch, S. J., Sunderland, M., Newton, N. C., & Chapman, C. (2021). A systematic review of transdiagnostic risk and protective factors for general and specific psychopathology in young people. *Clinical Psychology Review*, *87*, 102036. https://doi.org/10.1016/j.cpr.2021.102036

McCann, E., & Brown, M. (2017). Discrimination and resilience and the needs of people who identify as Transgender: A narrative review of quantitative research studies. *Journal of Clinical Nursing*, *26*(23–24), 4080–4093. https://doi.org/10.1111/jocn.13913

McCloud, T., & Bann, D. (2019). Financial stress and mental health among higher education students in the UK up to 2018: Rapid review of evidence. *Journal of Epidemiology and Community Health*, *73*(10), 977–984. https://doi.org/10.1136/jech-2019-212154

McGrath, J. J., Lim, C. C. W., Plana-Ripoll, O., Holtz, Y., Agerbo, E., Momen, N. C., Mortensen, P. B., Pedersen, C. B., Abdulmalik, J., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Bromet, E. J., Bruffaerts, R., Bunting, B., de Almeida, J. M. C., de Girolamo, G., De Vries, Y. A., Florescu, S., … de Jonge, P. (2020). Comorbidity within mental disorders: A comprehensive analysis based on 145 990 survey respondents from 27 countries. *Epidemiology and Psychiatric Sciences*, *29*, e153. https://doi.org/10.1017/S2045796020000633

McHugh, R. K., Votaw, V. R., Sugarman, D. E., & Greenfield, S. F. (2018). Sex and Gender Differences in Substance Use Disorders. *Clinical Psychology Review*, *66*, 12–23. https://doi.org/10.1016/j.cpr.2017.10.012

McLafferty, M., Brown, N., Brady, J., McLaughlin, J., McHugh, R., Ward, C., McBride, L., Bjourson, A. J., O'Neill, S. M., Walsh, C. P., & Murray, E. K. (2022). Variations in psychological disorders, suicidality, and help-seeking behaviour among college students from different academic disciplines. *PloS One*, *17*(12), e0279618. https://doi.org/10.1371/journal.pone.0279618

Muñoz-Navarro, R., Cano-Vindel, A., Medrano, L. A., Schmitz, F., Ruiz-Rodríguez, P., Abellán-Maeso, C., Font-Payeras, M. A., & Hermosilla-Pasamar, A. M. (2017). Utility of the PHQ-9 to identify major depressive disorder in adult patients in Spanish primary care centres. *BMC Psychiatry*, *17*(1), 291. https://doi.org/10.1186/s12888-017-1450-8

Newcomb, M. E., Hill, R., Buehler, K., Ryan, D. T., Whitton, S. W., & Mustanski, B. (2020). High Burden of Mental Health Problems, Substance Use, Violence, and Related Psychosocial Factors in Transgender, Non-Binary, and Gender Diverse Youth and Young Adults. *Archives of Sexual Behavior*, *49*(2), 645–659. https://doi.org/10.1007/s10508-019-01533-9

Ochnik, D., Rogowska, A. M., Kuśnierz, C., Jakubiak, M., Schütz, A., Held, M. J., Arzenšek, A., Benatov, J., Berger, R., Korchagina, E. V., Pavlova, I., Blažková, I., Aslan, I., Çınar, O., & Cuero-Acosta, Y. A. (2021). Mental health prevalence and predictors among university students in nine countries during the COVID-19 pandemic: A cross-national study. *Scientific Reports*, *11*(1), 18644. https://doi.org/10.1038/s41598-021-97697-3

Patrick, M. E., Rhew, I. C., Duckworth, J. C., Lewis, M. A., Abdallah, D. A., & Lee, C. M. (2020). Patterns of Young Adult Social Roles Transitions Across 24 Months and Subsequent Substance Use and Mental Health. *Journal of Youth and Adolescence*, *49*(4), 869–880. https://doi.org/10.1007/s10964-019-01134-8

Ramón-Arbués, E., Gea-Caballero, V., Granada-López, J. M., Juárez-Vela, R., Pellicer-García, B., & Antón-Solanas, I. (2020). The Prevalence of Depression, Anxiety and Stress and Their Associated Factors in College Students. *International Journal of Environmental Research and Public Health*, *17*(19), 7001. https://doi.org/10.3390/ijerph17197001

Romero-Rodríguez, E., Amezcua-Prieto, C., Morales Suárez-Varela, M., Ayán-Pérez, C., Mateos-Campos, R., Martín-Sánchez, V., Ortíz-Moncada, R., Redondo-Martín, S., Alguacil Ojeda, J., Delgado-Rodríguez, M., Blázquez Abellán, G., Alonso-Molero, J., Cancela-Carral, J. M., Valero Juan, L. F., & Fernández-Villa, T. (2022). Patterns of Alcohol Consumption and Use of Health Services in Spanish University Students: UniHcos Project. *International Journal of Environmental Research and Public Health*, *19*(10), Article 10. https://doi.org/10.3390/ijerph19106158

Ruiz-Hernández, J. A., Guillén, Á., Pina, D., & Puente-López, E. (2022). Mental Health and Healthy Habits in University Students: A Comparative Associative Study. *European Journal of Investigation in Health, Psychology and Education*, *12*(2), 114–126. https://doi.org/10.3390/ejihpe12020010

Salazar de Pablo, G., De Micheli, A., Solmi, M., Oliver, D., Catalan, A., Verdino, V., Di Maggio, L., Bonoldi, I., Radua, J., Baccaredda Boy, O., Provenzani, U., Ruzzi, F., Calorio, F., Nosari, G., Di Marco, B., Famularo, I., Montealegre, I., Signorini, L., Molteni, S., … Fusar-Poli, P. (2021). Universal and Selective Interventions to Prevent Poor Mental Health Outcomes in Young People: Systematic Review and Meta-analysis. *Harvard Review of Psychiatry*, *29*(3), 196–215. https://doi.org/10.1097/HRP.0000000000000294

Seehuus, M., Moeller, R. W., & Peisch, V. (2021). Gender effects on mental health symptoms and treatment in college students. *Journal of American College Health: J of ACH*, *69*(1), 95–102. https://doi.org/10.1080/07448481.2019.1656217

Seo, C., Di Carlo, C., Dong, S. X., Fournier, K., & Haykal, K.-A. (2021). Risk factors for suicidal ideation and suicide attempt among medical students: A meta-analysis. *PloS One*, *16*(12), e0261785. https://doi.org/10.1371/journal.pone.0261785

Sheldon, E., Simmonds-Buckley, M., Bone, C., Mascarenhas, T., Chan, N., Wincott, M., Gleeson, H., Sow, K., Hind, D., & Barkham, M. (2021). Prevalence and risk factors for mental health problems in university undergraduate students: A systematic review with meta-analysis. *Journal of Affective Disorders*, *287*, 282–292. https://doi.org/10.1016/j.jad.2021.03.054

Solmi, M., Civardi, S., Corti, R., Anil, J., Demurtas, J., Lange, S., Radua, J., Dragioti, E., Fusar-Poli, P., & Carvalho, A. F. (2021). Risk and protective factors for alcohol and tobacco related disorders: An umbrella review of observational studies. *Neuroscience and Biobehavioral Reviews*, *121*, 20–28. https://doi.org/10.1016/j.neubiorev.2020.11.010

Solmi, M., Radua, J., Olivola, M., Croce, E., Soardo, L., Salazar de Pablo, G., Il Shin, J., Kirkbride, J. B., Jones, P., Kim, J. H., Kim, J. Y., Carvalho, A. F., Seeman, M. V., Correll, C. U., & Fusar-Poli, P. (2022). Age at onset of mental disorders worldwide: Large-scale meta-analysis of 192 epidemiological studies. *Molecular Psychiatry*, *27*(1), 281–295. https://doi.org/10.1038/s41380-021-01161-7

Spitzer, R. L., Kroenke, K., & Williams, J. B. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. *JAMA*, *282*(18), 1737–1744. https://doi.org/10.1001/jama.282.18.1737

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092. https://doi.org/10.1001/archinte.166.10.1092

Spitzer, R. L., Williams, J. B., Kroenke, K., Hornyak, R., & McMurray, J. (2000). Validity and utility of the PRIME-MD patient health questionnaire in assessment of 3000 obstetric-gynecologic patients: The PRIME-MD Patient Health Questionnaire Obstetrics-Gynecology Study. *American Journal of Obstetrics and Gynecology*, *183*(3), 759–769. https://doi.org/10.1067/mob.2000.106580

Spoor, J., Vrancken Peeters, M.-J. T. F. D., Oldenburg, H. S. A., Bleiker, E. M. A., & van Leeuwen, F. E. (2024). Strategies to increase survey participation: A randomized controlled study in a population of breast cancer survivors. *Annals of Epidemiology*, *94*, 1–8. https://doi.org/10.1016/j.annepidem.2024.04.002

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, *45*(4), 249–257. https://doi.org/10.1080/00050067.2010.482109

Steare, T., Gutiérrez Muñoz, C., Sullivan, A., & Lewis, G. (2023). The association between academic pressure and adolescent mental health problems: A systematic review. *Journal of Affective Disorders*, *339*, 302–317. https://doi.org/10.1016/j.jad.2023.07.028

Storrie, K., Ahern, K., & Tuckett, A. (2010). A systematic review: Students with mental health problems--a growing problem. *International Journal of Nursing Practice*, *16*(1), 1–6. https://doi.org/10.1111/j.1440-172X.2009.01813.x

Tate, C. C., Ledbetter, J. N., & Youssef, C. P. (2013). A two-question method for assessing gender categories in the social and medical sciences. *Journal of Sex Research*, *50*(8), 767–776. https://doi.org/10.1080/00224499.2012.690110

ter Meulen, W. G., Draisma, S., van Hemert, A. M., Schoevers, R. A., Kupka, R. W., Beekman, A. T. F., & Penninx, B. W. J. H. (2021). Depressive and anxiety disorders in concert–A synthesis of findings on comorbidity in the NESDA study. *Journal of Affective Disorders*, *284*, 85–97. https://doi.org/10.1016/j.jad.2021.02.004

Vandenbroucke, J. P., Elm, E. von, Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., Egger, M., & Initiative, for the S. (2007). Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and Elaboration. *PLOS Medicine*, *4*(10), e297. https://doi.org/10.1371/journal.pmed.0040297

Wang, X., Hegde, S., Son, C., Keller, B., Smith, A., & Sasangohar, F. (2020). Investigating Mental Health of US College Students During the COVID-19 Pandemic: Cross-Sectional Survey Study. *Journal of Medical Internet Research*, *22*(9), e22817. https://doi.org/10.2196/22817

World Health Organization. (2021). *Suicide worldwide in 2019: Global health estimates*. World Health Organization. https://www.who.int/publications-detail-redirect/9789240026643

Xiao, H., Carney, D. M., Youn, S. J., Janis, R. A., Castonguay, L. G., Hayes, J. A., & Locke, B. D. (2017). Are we in crisis? National mental health and treatment trends in college counseling centers. *Psychological Services*, *14*(4), 407–415. https://doi.org/10.1037/ser0000130

Zimmerman, M. (2024). The value and limitations of self-administered questionnaires in clinical practice and epidemiological studies. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)*, *23*(2), 210–212. https://doi.org/10.1002/wps.21191

Appendix 1

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation	Page No.	Relevant text from the manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1	Abstract: [A cross-sectional study design was used.]
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	1	[69.1% screened positively for at least one evaluated problem, with generalized anxiety disorder (48.9%) and major depressive disorder (47.4%) being the most frequent… Being female, gender minority, living with housemates, and being in the first-year of undergraduate studies was associated with an increased risk of at least one mental problem.]
Introduction				
Background /rationale	2	Explain the scientific background and rationale for the investigation being reported	3	[…research addressing the associations of these factors with poor mental health is limited or inconclusive. There is a need for up-to-date information of the prevalence of mental health problems in university students in Spain and worldwide]
Objectives	3	State specific objectives, including any prespecified hypotheses	3	[…to evaluate among students enrolled in a public university of Spain, in all levels and areas of study, the prevalence of students at risk of the following common mental health disorders] and [to identify sociodemographic (age, sex, gender, ethnicity, household composition) and academic factors (level of study, area of knowledge, and participation in an exchange program), associated with being at risk of mental health disorders among students, and explore whether these correlates are disorder-specific or transdiagnostic.]
Methods				
Study design	4	Present key elements of study design early in the paper	7	[In this cross-sectional study…]
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7	[…students at the participating university were recruited from April 25th to June 19th, 2022, … and from September 5th to December 15th, 2022]
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	4	[Our target population included all students in a graduate or postgraduate program at one public university in Spain: Universitat Rovira i Virgili. We excluded students who did not provide informed consent for the study, and were not able to understand Catalan or Spanish.].
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8	[Various multivariate logistic regressions were performed to determine the association between sociodemographic and academic characteristics (independent variables) and screening positively for mental health disorders (dependent variables). This was done first for participants who screened positively for at least one mental disorder and then, 6 regressions, one for screening positively for each of the explored mental disorders: MDD, panic disorder, GAD, bulimia nervosa, binge eating disorder, and alcohol abuse. The following sociodemographic and academic variables were considered as independent variables: age, sex (male, female), gender (cisgender, minority), ethnicity (white/Euro Caucasian-, non-white/non-Euro Caucasian), household composition (with parents, with partner, with housemates, alone, others), level of study (first-year undergraduates, second to fifth-year undergraduates, masters, PhD), area of knowledge (health sciences, architecture and engineering, arts and humanities, sciences, and social and legal sciences), participation in an exchange program (yes, no), and recruitment period (end of semester, beginning and middle of the semester). Recruitment period was considered a posteriori a potential confounding factor]
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there	5-6	[Sociodemographic and academic characteristics: Ad-hoc self-report questions were incorporated to evaluate the following variables: age, sex at birth (sex), gender identity (gender), ethnicity, household composition, level of study, study program, year of study, and if part of an exchange program. Both sex at birth and gender identity items (…) were used to evaluate

	Item No	Recommendation	Page No.	Relevant text from the manuscript
		is more than one group		gender categories as proposed by Tate et al. (2013). Gender minority category combined those respondents who endorsed 'others' as their gender identity, as well as those respondents who reported discordant birth sex and gender identity, and cisgender category included those who reported that their gender identity was aligned with the sex assigned at birth.] PHQ: [It is a self-administered questionnaire designed to evaluate the presence of common mental health disorders based on the DSM-IV including: major depression, other depressive disorders, panic disorder, other anxiety disorders, binge eating, bulimia nervosa, somatoform disorder, and alcohol abuse or dependence, using an algorithm scoring method.] PHQ-9: [with a standard cut-off for suspected MDD being a 10 or above.] GAD: [with a standard cut-off for suspected GAD being a 10 or above.]
Bias	9	Describe any efforts to address potential sources of bias	7	[Two different time periods were opened to facilitate recruitment. At both times, we used several recruitment methods, all students at the participating university...]
Study size	10	Explain how the study size was arrived at	4	[The number of students in the Universitat Rovira i Virgili during the study period determined the sample size.]
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why		
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8	[Various multivariate logistic regressions were performed to determine the association between sociodemographic and academic characteristics (independent variables) and screening positively for mental health disorders (dependent variables).]
		(*b*) Describe any methods used to examine subgroups and interactions	N/A	
		(*c*) Explain how missing data were addressed	8	[To deal with MAR data, a modified Hot-Deck Multiple Imputation (HD-MI) was implemented.]
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	N/A	
		(*e*) Describe any sensitivity analyses	N/A	
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	4	[We obtained 4,315 participants who consented and immediately started the online survey, 1,453 of them (33.67%) dropped out prior to finishing. The results reported are based on 2,862 (66.33%) respondents who completed the online survey. Response rate was 18.45% of approximately 15,500 students enrolled at the university.]
		(b) Give reasons for non-participation at each stage	N/A	
		(c) Consider use of a flow diagram	N/A	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	4	[The mean age was 21.43 (SD=4.72, range=17-80). Majority were female' sex (71.4%, *n* = 2,043) and cisgender (96.9%, *n* = 2,772). Most were white (86.9%, *n* = 2,487), and the most common minority ethnic groups were Latin Americans/Hispanics (*n* = 216, 7.5%) and Arabs/North-Africans/Western Asians (*n* = 86, 3%). Living at home with their parents was the most prevalent housing situation (50.8%, *n* = 1,453). Most students were undergraduates (87.4%, *n* = 2,500), and health science, and social and legal sciences where the areas of study most students were in (35.6%, *n* = 1018 and 32.5%, *n* = 929, respectively). See Table 1 for further details.] Table 1.

	Item No	Recommendation	Page No.	Relevant text from the manuscript
		(b) Indicate number of participants with missing data for each variable of interest		Table 1
Outcome data	15*	Report numbers of outcome events or summary measures		Table 2 and 3
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included		Table 4, 5, 6 and 7
		(*b*) Report category boundaries when continuous variables were categorized		Table 2
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	10-12	At least one mental health disorder: [Social and legal sciences students also had greater odds of being at risk but only among students recruited in the beginning and middle of semester but not among students recruited at the end of semester.] Table 4. MDD: [Three significant interaction effects were found. Older students in arts and humanities reported higher odds of being at risk than older students in health sciences. Health science students recruited in the beginning and middle of semester reported lower odds of being at risk than social and legal science students. Finally, males at birth who did not identify as males reported greater odds of being at risk than cisgender males.] Panic disorder: [one interaction effect was found. Cisgender students enrolled in a master's program had greater odds to be at risk than cisgender first year undergraduates.] GAD: [there was sex and gender interactions. Males at birth that do not identify as male had higher odds of being at risk than cisgender males.] Table 5
Discussion				
Key results	18	Summarise key results with reference to study objectives	13	[Our results show that almost 7 out of 10 students screened positively for at least one examined mental health disorder.] [Co-occurrence between depression and anxiety, and co-occurrence of eating disorders with depression or anxiety were substantial.] [When investigating the range of sociodemographic and academic potential predictive factors few of them were found to be common across several disorders. These transdiagnostic factors include sex, gender identity (cisgender and gender minority), and period in which students were recruited (end of semester vs beginning and middle of a semester).]
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias		[The study also presents some limitations. First, our study sample was recruited from only one university, limiting the generalizability of results. („„) Second, the self-selection of participants could have introduced selection bias. (…) Third, the need to understand Spanish or Catalan as inclusion criterion could have also been source of bias because it would have reduced the participation of foreigners. (---) Fourth, we chose to use universal community screening scales that assess key symptoms of the DSM-IV diagnoses (…) Fifth, our cross-sectional study does not capture causality nor the full complexity of the inter-relationship of potential predictive variables. Finally, we need to be cautious when interpreting our estimated prevalence rates since we used screening tools that have been validated against clinical diagnosis, but do not have diagnostic accuracy.]

	Item No	Recommendation	Page No.	Relevant text from the manuscript
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	16	[We need to be cautious when interpreting our estimated prevalence rates (…).] [Our cross-sectional study does not capture causality nor the full complexity of the inter-relationship of potential predictive variables.]
Generalisability	21	Discuss the generalisability (external validity) of the study results	15-16	[Our study sample was recruited from only one university, limiting the generalizability of results (…). Second, the self-selection of participants could have introduced selection bias. Those more vulnerable could have been more attracted to participate and as a result influence the validity of results. Third, the need to understand Spanish or Catalan as inclusion criterion could have also been source of bias because it would have reduced the participation of foreigners.]
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17	[This work was not supported by any funding.]

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Appendix 2

Descriptive statistics (i.e., mean and SD, and percentage) for potential correlates and bivariate analysis (t-test and chi-square) to explore association between potential correlates and being at risk of mental health problems

	At least one mental health disorder (n=1,977)	Emotional disorder			Eating disorder		Alcohol abuse (n=694)
		Major depression disorder (n=1,344)	Panic disorder (n=435)	Generalized anxiety disorder (n=1,385)	Bulimia nervosa (n=98)	Binge eating disorder (n=222)	
Categorical correlates, %							
Recruitment phase							
End of semester (*n* = 1,751)	73.5	52.14	16.9	53.57	3.54	7.99	25.75
Beginning and middle of semester (*n* = 1,111)	62.1***	39.87***	13.05**	41.49***	3.24	7.38	21.87*
Sex							
Male (*n* = 804)	60.32	36.32	6.59	36.69	2.23	5.47	28.61
Female (*n* = 2,043)	72.39***	51.64***	18.75***	53.55***	3.87*	8.61**	22.32***
Gender							
Cisgender (*n* = 2,772)	68.57	46.67	14.9	48.26	3.24	7.76	24.20
Non-cisgender (*n* = 66)	86.36**	75.75***	33.33***	71.21***	10.6**	7.57	19.7
Ethnicity							
White/Euro-Caucasian (*n* = 2,487)	69.08	46.72	15.52	48.73	3.18	7.8	24.69
Non-White/Non-Euro-Caucasian (*n* = 367)	68.66	51.50	14.41	49.05	5.17*	7.63	20.44
Current living situation							
With parents (*n* = 1,453)	68.89	48.24	14.18	49.35	3.3	7.91	21.95
With partner (*n* = 293)	59.04	40.95	13.65	44.71	2.73	6.48	10.92
With housemates (*n* = 801)	73.28	47.07	16.73	49.56	3.49	8.11	33.58
Alone (*n* = 167)	67.66	51.5	22.15	47.3	5.39	3.59	26.35
Others (*n* = 139)	68.34***	7.48	16.55	49.64	3.60	11.51	19.42***
Level of studies							
First-year undergraduate program (*n* = 866)	69.40	48.61	17.09	49.19	4.04	9	22.63
Second to fifth-year undergraduate program (*n* = 1,612)	71.15	48.13	15.82	50.19	3.41	8.13	26.67
Master (*n* = 231)	58.87	38.09	9.96	41.99	1.3	3.03	18.61
PhD (*n* = 119)	55.46**	39.49**	8.4**	41.18*	4.2	3.36**	14.28***
Area of knowledge							
Health Sciences (*n* = 1,018)	64.34	40.37	14.93	44.69	2.65	7.76	21.71
Architecture and Engineering (*n* = 464)	66.81	47.83	8.62	44.40	1.94	7.33	25.43
Arts and Humanities (*n* = 240)	74.58	55.42	18.75	51.67	15.42	7.08	22.5
Sciences (*n* = 162)	75.92	58.64	15.43	54.94	3.7	6.17	29.63
Social and Legal Sci (*n* = 929)	72.22***	50.27***	17.87***	53.28***	4.52*	8.40	25.73
Taking part in an exchange program							
Taking part (*n* = 32)	68.75	43.75	15.62	50	9.37	2.5	34.37
Not taking part (*n* = 2,799)	69.13	47.44	15.40	48.80	3.39	7.75	24.11
Continuous correlates, mean (*SD*)							
Age							
Disorder	22.31 (5.63)	22.21 (5.39)	22.19 (5.72)	22.32 (5.49)	22.74 (8.6)	22.34 (5.59)	21.98 (5.74)
Non-disorder	23.38 (7.40)***	23.03 (6.91)***	22.73 (6.34)*	22.95 (6.89)**	22.64 (6.16)	22.67 (6.31)	22.86 (6.40)***

*$p < .05$, **$p < .01$, ***$p < .001$.