BMJ Open

Mental health-promoting intervention models in university students: a systematic review and meta-analysis protocol

Pedro Amaro ,[1,2,3] César Fonseca,[1,4] Anabela Pereira,[5,6] Anabela Afonso,[7,8] Maria L Barros,[1,4] Isaura Serra,[4] Maria Fátima Marques,[4] Cansu Erfidan,[9] Sabina Valente,[2,3,5] Revés Silva,[1,4] Lara Guedes de Pinho [1,4]

To cite: Amaro P, Fonseca C, Pereira A, *et al*. Mental health-promoting intervention models in university students: a systematic review and meta-analysis protocol. *BMJ Open* 2025;**15**:e091297. doi:10.1136/bmjopen-2024-091297

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (https://doi.org/10.1136/bmjopen-2024-091297).

Received 17 July 2024
Accepted 24 January 2025

For numbered affiliations see end of article.

Correspondence to
Pedro Amaro;
pedro.amaro@ipportalegre.pt

ABSTRACT

Background The transition to higher education represents a demanding adaptation process with several socioeconomic factors involved. Mental health problems among university students have been worsening since the beginning of the COVID-19 pandemic. Our objective is to create scientific evidence about the models of mental health-promoting interventions among higher education students applied in academic environments, as well as their effectiveness. We aim to synthesise the scientific evidence on the models of an intervention promoting mental health among university students applied in academic environments as well as their results.

Methods and analysis A systematic review of the literature will be conducted. The research will be carried out using the EBSCO databases (CINAHL Complete, MEDLINE Complete, Psychology and Behavioral Sciences Collection), PubMed and Scopus. The research strategy includes the following MeSH or similar terms: Universities [Mesh], Students [Mesh], Education [Mesh], Undergraduate, "Higher Education", Universit*, College, Student*; "Psychosocial intervention" [Mesh], "Non-pharmacological", "Intervention model*", "Mental health promotion program*", Intervention*; "Randomized Controlled Trial", RCT; "Mental health" [Mesh], Depression [Mesh], Anxiety [Mesh], "Stress, psychological" [Mesh], "Quality of life" [Mesh], and "Psychological well-being" [Mesh]. All experimental studies with mental health-promoting interventions for university students that were published between January 2017 and November 2024 in English will be eligible. Two independent reviewers will apply the inclusion and exclusion criteria, analyse the quality of the data and extract it for synthesis. Disagreements will be resolved by a third reviewer. All randomised controlled trial studies with interventions in university students and their efficacy (with means and SD) will be included in the systematic review of the literature. The standardised mean difference will be used as the effect size to standardise individual results. Sensitivity analysis, subgroup analysis and meta-regression will be conducted to explore the causes of heterogeneity and the robustness of the results.

Ethics and dissemination Ethical approval is not required for this study as it is based on the review of previously published data. The results will be disseminated through publication in peer-reviewed journals and presentations at academic conferences, as well as in events organised by student associations.

PROSPERO registration number CRD42022359608.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The use of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 guidelines ensures the organisation and reproducibility of the results, as well as transparency.
⇒ The use of randomised controlled trials in this study allows a robust assessment of the efficacy of the intervention.
⇒ Data synthesis using subgroup analysis and meta-regression allows exploring potential sources of heterogeneity, due to the collection of different intervention methodologies.
⇒ Including only studies in the English language can lead to the exclusion of relevant studies in other languages.
⇒ The use of self-reported measures by participants in included studies can introduce bias, such as social desirability, subjectivity or lack of control of external variables.

INTRODUCTION

University students face several challenges in the transition to higher education, which requires a set of skills to deal positively with all the stressors they face.[1] During the developmental phase of university students, they may experience uncertainty regarding their career choice, seek greater autonomy, navigate new social circles, demand a higher level of knowledge and confront intricate responsibilities.[2] The mental well-being of college students can be affected by their worker-student status and extended work hours.[3]

Depression, anxiety, obsessive-compulsive disorder or post-traumatic stress disorder may arise as a response to stressors and

difficulties.[4] Students who experience psychological distress as a result of these individual and social changes are at higher risk of developing mental illness.[5] University students are often exposed to various stressors that can have detrimental effects on their academic pursuits. Such stressors may lead to changes in their mental health, poor academic performance, decreased quality of life and, ultimately, school dropout. It is critical to recognise and address these stressors to ensure that students can thrive academically and personally.[2 6 7]

The prevalence of psychological distress among higher education students is on the rise, making this population increasingly vulnerable. This vulnerability is also related to the developmental stage of higher education students. In particular, in the transition to higher education, there is a shift to adult life. This is a phase where decisions are made about the future accompanied by significant changes in both the personal and educational spheres. It is related to a sense of competence, exploration of choices or even the crystallisation of goals,[8] while dealing with social expectations regarding their future.[9] The social role and responsibility of higher education institutions, with teachers, managers and students as agents, are components of sustainability that influence the quality of life of communities.[10] Therefore, higher education institutions should consider the preparation of professionals who play an active role in solving social problems and needs, contributing to their development in the face of increasing global challenges.[11] Investing in the mental health of higher education students not only benefits them individually but also has a larger impact on society.

Depressive and anxious symptoms contribute to this vulnerability and can lead to the development of psychiatric problems. Studies suggest that approximately 20% of university students have been diagnosed with a mental disorder, with anxiety and mood swings being the most common.[12 13]

We live in a time of rapid social, economic and cultural change. The speed and intensity of global transformations affect both ecological systems and social and cultural dynamics, redefining meanings, emotional connections to environments and behaviours. The concept of a 'sense of place' may emerge as a foundation for understanding and responding to the challenges posed by these changes, helping to promote resilience and adaptation.[14] The current socioeconomic context has been and continues to be affected by the COVID-19 pandemic, which has also changed the way of teaching, learning and the environment in which university students live.[15] The changes brought about by the 'three waves' of the COVID-19 pandemic had a negative impact on the mental health of higher education students, with higher levels of depressive symptoms, anxiety and stress in various countries. This negative impact is related to social isolation, financial uncertainties, decreased social support and online learning.[16] The prevalence of depressive symptoms, anxiety and stress varied according to geographic location and was similar between subgroups based on gender, educational level and field of study.[17]

The measures adopted due to the COVID-19 pandemic focused on the prevention of physical illness and negatively affected university students in social, physical and mental aspects.[18–20] A study conducted in Portugal with a sample of 7873 people aged 16 and older states that the group that experienced the greatest difficulty with the pandemic was the youngest because they were vulnerable to financial, domestic and mental health effects, as well as prospects.[21] The ElHawary *et al*'s[22] study in a sample of 248 university students concluded that since the COVID-19 outbreak, 48% of university students felt more depressed, 52% felt more solitary and general health habits worsened; those with a history of depression or anxiety showed an increase in depressive symptoms (66% vs 42%) and an increase in anxiety (69% vs 41%). Jojoa *et al*[23] concluded that there was an increase in anxiety and self-reported depression from 38.5% to 49% (n=1084) affecting the learning experience. Therefore, the Baloch *et al*'s[24] study concluded that 41.3% (n=494) of university students experienced minimum levels of anxiety. Using the Depression, Anxiety and Stress Scale-21 in a population of 485 university students, Almhdawi *et al*'s[25] study showed that there was a moderate level of depression, a moderate level of anxiety and a mild level of stress. After the COVID-19 pandemic, there was a decline in the mental health of university students when compared with the prepandemic phase, with an increase in anxiety and depressive symptoms.[1] All university institutions should address the issues that affect the health and well-being of their students.[26]

In the past 8 years, several non-pharmacological interventions have been developed, such as mindfulness-based therapies, acceptance and commitment therapy (which have been used to train students to provide peer support), therapies using body movement and art-based therapies. It is therefore necessary to evaluate these mental health-promoting models and their effects on university students. A systematic review of the literature,[15] which included 40 studies from various countries, identified four domains of intervention in promoting the mental health of higher education students: mindfulness movement-based interventions, interventions based on psychoeducation or meaning attribution and interventions using support elements such as animal therapy or online resources. The authors emphasise the need to evaluate the effectiveness of these interventions in promoting the mental health of higher education students.

Several systematic reviews[15 27–34] and meta-analyses[35–40] on mental health-promoting interventions have been developed. The main gap is the fact that systematic reviews of the literature are not based on randomised controlled studies, so they do not allow an objective evaluation of the measure of effect. In meta-analysis reviews, the main gap is that they are based on a small number of studies or studies before 2017 or even an in-depth analysis of the moderators that justify the heterogeneity of the results obtained.

In the present study, a comprehensive set of analyses will be developed, including meta-analysis, subgroup analyses and meta-regression, to identify patterns, explore effect moderators and understand sources of heterogeneity in the results, resulting in a robust synthesis considering the breadth of the variables under study.

It is expected that this study will identify models for promoting the mental health of higher education students that show significant effects in reducing depressive symptoms, anxiety and stress, considering the context experienced in recent years. These evidence-based models can be used to implement, create or restructure inclusive, personalised or broader mental health programmes tailored to the needs of students. The expected results may support decision-making by higher education authorities, impacting the promotion of higher education students' well-being. The expected results, in addition to reinforcing the practical applicability and effectiveness of coproduced models promoting the mental health of higher education students, also promote their scalability and applicability in different populations and scenarios, aligning with the needs of higher education students.

Therefore, it is essential to conduct a systematic review to gain a deeper understanding of the results obtained by the mental health intervention models applied to university students.

Objective

This article describes a protocol for a systematic review with meta-analysis whose main objective is to synthesise the scientific evidence on the intervention models that promote mental health among higher education students applied in academic environments, as well as their effectiveness.

Review questions

A systematic review of the literature will be carried out to answer the following questions:

What are the intervention models that promote the mental health of university students?

What is the efficacy of applying non-pharmacological intervention models to reduce symptoms of depression, anxiety and stress among higher education students?

MATERIALS AND METHODS

This systematic review with meta-analysis will use the Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 guidelines.[41]

Eligibility criteria

To guarantee the rigour and systematisation of the study of the topic under analysis, the following eligibility criteria were defined.

Population

Inclusion criteria are studies conducted with university students, with clear results of the effects the interventions have had on the mental health of university students, at the various stages of their academic careers.

Intervention

The review will include randomised controlled trial (RCT) studies that refer to mental health interventions and the efficacy/outcomes of the interventions from 2017 to 2024. The analysis of RCTs published between 2017 and 2024, which evaluates the effects of intervention models to reduce symptoms of depression, anxiety and stress, allows us to understand the relevance of the most recent interventions in light of the social and educational changes that have occurred since 2017, such as the period of the COVID-19 pandemic. The analysis period will allow for subgroup analysis, for example, on the effect of mental health promotion models before, during and after the pandemic. It also allows updating the results of previous meta-analytical studies before 2017, such as those developed by Davies *et al*[42] or Conley *et al*.[43]

Comparison

Studies will be included in which there is a comparative group to evaluate the efficacy of the intervention between the experimental group and the control group. The control and experimental groups must be randomly randomised, according to the guidelines for RCTs.

Primary outcome

Due to the evidence of higher incidence and prevalence rates, the effectiveness of mental health promotion models will be evaluated based on outcomes such as depressive symptoms, anxiety and stress. The data will be of a quantitative nature, such as averages, measures of prevalence or incidence, frequencies, means, SD or sample size data in RCT studies, thus showing the impact and effects of interventions. The efficacy of the interventions will be assessed based on measures of effect, such as the difference in means, considering their level of significance. The effect measures of the interventions will be obtained from the assessments conducted in the selected studies at various assessment times (eg, baseline, intervention and follow-up).

Study design

This Systematic review and meta-analysis will include primary quantitative experimental studies (RCTs). The use of RCTs provides a methodological standard that allows comparisons of the effectiveness of mental health promotion models for higher education students, standardising the results obtained for symptoms of depression, anxiety and stress.

Context

The studies to be included in this review shall be those carried out in a university environment in any country or culture.

Table 1 Search terms

Population	Intervention	Comparison	Outcome
► Universities [Mesh] ► Students [Mesh] ► Education [Mesh] ► Undergraduate ► "Higher Education" ► Universit* ► College* ► Student*	► "Psychosocial intervention"[Mesh] ► "Non-pharmacological" ► "Intervention model*" ► "Mental health promotion program*" ► Intervention*	► "Randomized Controlled Trial" ► RCT	► "Mental health" [Mesh] ► Depression [Mesh] ► Anxiety [Mesh] ► "Stress, psychological"[Mesh] ► "Quality of life"[Mesh] ► "Psychological well-being"[Mesh] ► "Depressive symptom*" ► "Anxiety symptom*" ► "Stress symptom*"

Search strategy

Data sources

The studies will be carried out using the EBSCO databases (CINAHL Complete, MEDLINE Complete, Psychology and Behavioral Sciences Collection), PubMed and Scopus.

Search terms

Research terms or similar were outlined considering the objective and research questions of the present study. The population, intervention, comparison and outcome model was followed to systematically and clearly structure the definition of research terms. The research terms were designed to cover both undergraduate and postgraduate student populations for a broader view of the effectiveness of mental health promotion models in reducing depressive, anxious and stress symptoms in higher education institutions (table 1).

A detailed description of the terms as well as limiters, expanders and results (research conducted on 1 December 2024) is available in the online supplemental material—databases, with the adaptation to each database.

The research conducted at this stage revealed 6008 studies in the selected databases. After automatic duplicate verification using Mendeley, 744 duplicate articles were identified, requiring the title and abstract of 5264 studies to be screened in the next phase.

Articles (RCTs) published from January 2017 to November 2024 in English will be eligible.

Data collection and analysis

Selection of studies

Mendeley software will be used to archive the articles, and duplicate articles will be removed. The JBI Sumari platform will be used to manage the selection process and assess the methodological quality of the studies collected.

Two independent researchers will review the title and abstract of each article to minimise bias. Those that do not meet the defined inclusion criteria will be excluded. Disagreements during the extraction process will be resolved between the two main reviewers through discussions to reach a consensus. In case of disagreement, a third reviewer will be consulted. The third reviewer (an expert in the field) will have the role of objectively analysing the data and criteria in question and then making a final decision that ensures consistency and accuracy in data extraction according to the defined methodology. The search results and data analysis will be presented in a flowchart according to Page *et al*.[41]

Data extraction

The synthesis and analysis of the systematic literature review results will be narrative and structured to answer the research questions. A summary table will be constructed for the synthesis of the included studies. The data will be grouped into the following variables: studies characteristics (author, year of publication, country, objectives of the study, sample), participants' characteristics (age, gender, degree programme, academic degree), instruments for measuring outcomes and characteristics of the intervention (type, year, description, duration, delivery method, intervention format, intervention duration).

Quality appraisal

The study's quality evaluation will be made using the Joanna Briggs Institute checklist for RCTs[44] by the two independent reviewers using a third reviewer in case of disagreement.

The quality assessment using the JBI critical appraisal tool for the assessment of risk of bias for RCTs includes structured questions that allow for the internal and statistical conclusion validity. Questions 1–3, such as 'Was true randomisation used?', assess selection and allocation bias. The administration of the intervention is evaluated by questions 4–6, for example, 'Were the groups treated identically, except for the intervention?' ensuring that the observed differences are due to the intervention under study. Bias related to the assessment, detection and measurement of the outcome is evaluated by questions 7–9, for example, 'Were outcome assessors blind to treatment assignment?'. Question 10 assesses bias related to participant retention, 'Was follow-up complete

and, if not, were differences between groups in terms of their follow-up adequately described and analysed?'. Statistical conclusion validity is evaluated in questions 11–13, such as 'Was appropriate statistical analysis used?'.

The results of the quality assessment of each study will be presented in this review in a table format.

Strategy for data synthesis

By the aim and questions of this systematic literature review, data will be synthesised and analysed in a narrative, quantitative and structured way, using measures of effect such as standardised mean difference, to understand the impact of interventions promoting the mental health of university students. The mental health promotion programmes of university students will be presented considering their efficacy/results, showing their evidence in promoting the mental health of the study population.

A table will be presented with the following data: study characteristics, participants characteristics, instruments for measuring outcomes and characteristics of the intervention to facilitate the visualisation and discussion of the results.

The meta-analysis to assess the effect of mental health-promoting interventions among university students will be carried out using the random effects model with a 95% CI. The random effects model is used considering the predictability of heterogeneity, assuming that the difference between the observed results is not only due to chance but also to characteristics of the studies. This model is useful when there are various intervention methodologies, supporting a more conservative interpretation.[45] The analysis will be conducted using SPSS V.28 software.

The data from the various studies will be standardised using the standard mean difference, due to the predictability of the use of different measurement instruments for the evaluation of outcomes[45]:

$$SMD = \frac{M_1 - M_2}{SD_{\text{pooled}}}$$

where M_1 and M_2 are the means of the groups or conditions being compared: experimental and control groups, and SD_{pooled} is the pooled SD of the groups (control and experimental).

$$SD_{\text{pooled}} = \sqrt{\frac{(n_1-1)\,SD_1^2 + (n_2-1)\,SD_2^2}{n_1+n_2-2}}$$

where n_1 and n_2 are the sample sizes of the two groups (control and experimental) and SD_1 and SD_2 are the SD of the two groups (control and experimental).

The effect size will be interpreted according to the classification suggested by Cohen which is as follows:

d=0.2, small effect; d=0.5, medium effect; and d=0.8, large effect.[46]

The exploration of data consistency will be assessed using the heterogeneity measure (I^2). The Egger test and Kendall's Tau will be used to assess the presence of publication bias.

The impact of missing data will be assessed using sensitivity analyses (methodological risk of bias). Subgroup analyses (eg, participant characteristics and intervention characteristics) will be conducted to explore potential heterogeneity in the results: studies area, academic degree, pre-COVID-19 versus post-COVID-19, delivery method (face to face/digital), intervention format (individual/group) and intervention intensity (intervention intensity=-session duration (minutes)×number of sessions per week×total number of weeks). Meta-regression will be performed to measure the impact of moderators such as mean age, gender, academic degree and study area.

Tables, graphs (forest plot, funnel plot) and/or figures with the extracted results will be elaborated to facilitate the visualisation of the data or the representation of the quality of the studies.

If a quantitative analysis is not possible (eg, due to high heterogeneity), we will adopt a qualitative synthesis approach, without losing sight of the proposed objectives. A qualitative synthesis will be carried out by areas of intervention in the promotion of the mental health of university students. The data will then be grouped by domains and the description and analysis of how the interventions were implemented and their results.

Assessment of the quality of the evidence produced by the review

The Grading of Recommendations Assessment, Development and Evaluation will be used to assess the quality of the studies and tests, providing information on the presence of biases, inaccuracies or inconsistencies of results. Thus, it will allow us to classify and quantify the quality of the recommendations in our review.[47]

Author affiliations
[1]Universidade de Évora, Comprehensive Health Research Centre (CHRC), LA_REAL, Évora, Portugal
[2]Research Center on Health and Social Sciences (CARE), Polytechnic University of Portalegre, Portalegre, Portugal
[3]Polytechnic University of Portalegre, Portalegre, Portugal
[4]Universidade de Évora, Escola Superior de Enfermagem São João de Deus, Évora, Portugal
[5]Universidade de Évora, Centro de Investigação em Educação e Psicologia (CIEP), Évora, Portugal
[6]Universidade de Évora, Escola de Ciências Sociais, Évora, Portugal
[7]Universidade de Évora, Centro de Investigação em Matemática e Aplicações (CIMA), Évora, Portugal
[8]Universidade de Évora, Escola de Ciências e Tecnologia, Évora, Portugal
[9]Istanbul Bilgi University, İstanbul, Turkey

X Lara Guedes de Pinho @guedes_pinho

Contributors All authors contributed to the development of this study as follows: PA, LGP and CF initiated the study design. Writing—original draft preparation: PA and CE. Writing—review and editing: CF, AP, MLB, IS, MFM, SV, RS, AA and LGP. Supervision: CF, AP and LGP. Project administration: LGP. Funding acquisition: LGP and CF. PA is the guarantor of the study and responsible for the integrity of the data.

Funding This work is funded by national funds through the Foundation for Science and Technology, under the project UIDP/04923

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

ORCID iDs
Pedro Amaro http://orcid.org/0000-0002-0342-8892
Lara Guedes de Pinho http://orcid.org/0000-0003-1174-0744

REFERENCES

1 Amaro P, Fonseca C, Afonso A, *et al*. Depression and Anxiety of Portuguese University Students: A Cross-Sectional Study about Prevalence and Associated Factors. *Depress Anxiety* 2024;2024:1–14.
2 Lantyer A da S, Varanda CC, Souza FG de, *et al*. Ansiedade e Qualidade de Vida entre Estudantes Universitários Ingressantes: Avaliação e Intervenção. *Rev Bras Ter Comp Cogn* 2016;18:4–19.
3 Oviatt DP, Baumann MR, Bennett JM, *et al*. Undesirable Effects of Working While in College: Work-School Conflict, Substance Use, and Health. *J Psychol* 2017;151:433–52.
4 Nigatu YT, Liu Y, Uppal M, *et al*. Interventions for enhancing return to work in individuals with a common mental illness: systematic review and meta-analysis of randomized controlled trials. *Psychol Med* 2016;46:3263–74.
5 Cuijpers P, Cristea IA, Ebert DD, *et al*. PSYCHOLOGICAL TREATMENT OF DEPRESSION IN COLLEGE STUDENTS: A METAANALYSIS. *Depress Anxiety* 2016;33:400–14.
6 Wiljer D, Shi J, Lo B, *et al*. Effects of a Mobile and Web App (Thought Spot) on Mental Health Help-Seeking Among College and University Students: Randomized Controlled Trial. *J Med Internet Res* 2020;22:e20790.
7 Zapata-Ospina JP, Patiño-Lugo DF, Marcela Vélez C, *et al*. Mental health interventions for college and university students during the COVID-19 pandemic: A critical synthesis of the literature. *Rev Colomb Psiquiatr (Engl Ed)* 2021;50:199–213.
8 Marttinen E, Dietrich J, Salmela-Aro K. Intentional Engagement in the Transition to Adulthood. *Eur Psychol* 2018;23:311–23.
9 Yau PS, Shane J, Heckhausen J. Developmental goals during the transition to young adulthood. *Int J Behav Dev* 2021;45:475–83.
10 Fonseca I, Bernate J, Betancourt M, *et al*. Developing social responsibility in university students. ICETC 2019; Amsterdam Netherlands, 2019:215–8. 10.1145/3369255.3369275 Available: https://dl.acm.org/doi/proceedings/10.1145/3369255
11 Coelho M, Menezes I. University Social Responsibility, Service Learning, and Students' Personal, Professional, and Civic Education. *Front Psychol* 2021;12:617300.
12 Auerbach RP, Alonso J, Axinn WG, *et al*. Mental disorders among college students in the World Health Organization World Mental Health Surveys. *Psychol Med* 2016;46:2955–70.
13 Knapstad M, Sivertsen B, Knudsen AK, *et al*. Trends in self-reported psychological distress among college and university students from 2010 to 2018. *Psychol Med* 2021;51:470–8.
14 Masterson VA, Enqvist JP, Stedman RC, *et al*. Sense of place in social–ecological systems: from theory to empirics. *Sustain Sci* 2019;14:555–64.
15 Nair B, Otaki F. Promoting University Students' Mental Health: A Systematic Literature Review Introducing the 4M-Model of Individual-Level Interventions. *Front Public Health* 2021;9:699030.
16 Panneer S, Dutta S, Palaniswamy U, *et al*. Impact of Three Waves of the COVID-19 on Students of Higher Education Institutions—Challenges and Way Forward. *Soc Dev Issues* 2023;45.
17 Li Y, Wang A, Wu Y, *et al*. Impact of the COVID-19 Pandemic on the Mental Health of College Students: A Systematic Review and Meta-Analysis. *Front Psychol* 2021;12:669119.
18 Dafogianni C, Pappa D, Mangoulia P, *et al*. Anxiety, Stress and the Resilience of University Students during the First Wave of the COVID-19 Pandemic. *Healthcare (Basel)* 2022;10:2573.
19 Low EZ, O'Sullivan NJ, Sharma V, *et al*. Assessing medical students' perception and educational experience during COVID-19 pandemic. *Ir J Med Sci* 2023;192:1015–20.
20 Maia BR, Dias PC. Ansiedade, depressão e estresse em estudantes universitários: o impacto da COVID-19. *Estud Psicol* 2020. Available: http://www.scielo.br/j/estpsi/a/k9KTBz398jqfvDLby3QjTHJ/?format=html
21 Gouveia R, Serra-Silva S, de AA, *et al*. Os impactos sociais da pandemia: o segundo confinamento. 2021. Available: https://repositorio.ul.pt/handle/10451/49662
22 ElHawary H, Salimi A, Barone N, *et al*. The effect of COVID-19 on medical students' education and wellbeing: a cross-sectional survey. *Can Med Educ J* 2021;12:92–9.
23 Jojoa M, Lazaro E, Garcia-Zapirain B, *et al*. The Impact of COVID 19 on University Staff and Students from Iberoamerica: Online Learning and Teaching Experience. *Int J Environ Res Public Health* 2021;18:5820.
24 Baloch GM, Sundarasen S, Chinna K, *et al*. COVID-19: exploring impacts of the pandemic and lockdown on mental health of Pakistani students. *PeerJ* 2021;9:e10612.
25 Almhdawi KA, Alazrai A, Obeidat D, *et al*. Healthcare students' mental and physical well-being during the COVID-19 lockdown and distance learning. *Work* 2021;70:3–10.
26 Schlesselman LS, Cain J, DiVall M. Improving and Restoring the Well-being and Resilience of Pharmacy Students during a Pandemic. *Am J Pharm Educ* 2020;84:ajpe8144.
27 Dick S, Whelan E, Davoren MP, *et al*. A systematic review of the effectiveness of digital interventions for illicit substance misuse harm reduction in third-level students. *BMC Public Health* 2019;19:1244.
28 Friedrich A, Schlarb AA. Let's talk about sleep: a systematic review of psychological interventions to improve sleep in college students. *J Sleep Res* 2018;27:4–22.
29 Hobbs C, Armitage J, Hood B, *et al*. A systematic review of the effect of university positive psychology courses on student psychological wellbeing. *Front Psychol* 2022;13:1023140.
30 Lattie EG, Adkins EC, Winquist N, *et al*. Digital Mental Health Interventions for Depression, Anxiety, and Enhancement of Psychological Well-Being Among College Students: Systematic Review. *J Med Internet Res* 2019;21:e12869.
31 Oliveira C, Pereira A, Vagos P, *et al*. Effectiveness of Mobile App-Based Psychological Interventions for College Students: A Systematic Review of the Literature. *Front Psychol* 2021;12:647606.
32 Parbery-Clark C, Lubamba M, Tanner L, *et al*. Animal-Assisted Interventions for the Improvement of Mental Health Outcomes in Higher Education Students: A Systematic Review of Randomised Controlled Trials. *Int J Environ Res Public Health* 2021;18:10768.
33 Suyo-Vega JA, Meneses-La-Riva ME, Fernández-Bedoya VH, *et al*. Mental Health Projects for University Students: A Systematic Review of the Scientific Literature Available in Portuguese, English, and Spanish. *Front Sociol* 2022;7:922017.
34 Ungar P, Schindler A-K, Polujanski S, *et al*. Online programs to strengthen the mental health of medical students: A systematic review of the literature. *Med Educ Online* 2022;27:2082909.
35 González-Valero G, Zurita-Ortega F, Ubago-Jiménez JL, *et al*. Use of Meditation and Cognitive Behavioral Therapies for the Treatment of Stress, Depression and Anxiety in Students. A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health* 2019;16:4394.
36 Chandler L, Patel C, Lovecka L, *et al*. Improving university students' mental health using multi-component and single-component sleep interventions: A systematic review and meta-analysis. *Sleep Med* 2022;100:354–63.
37 Harrer M, Adam SH, Baumeister H, *et al*. Internet interventions for mental health in university students: A systematic review and meta-analysis. *Int J Methods Psych Res* 2019;28.
38 Kunzler AM, Helmreich I, König J, *et al*. Psychological interventions to foster resilience in healthcare students. *Cochrane Database of Systematic Reviews* 2020;2020.

39 Lin J, Gao YF, Guo Y, *et al*. Effects of qigong exercise on the physical and mental health of college students: a systematic review and Meta-analysis. *BMC Complement Med Ther* 2022;22:287.
40 Winzer R, Lindberg L, Guldbrandsson K, *et al*. Effects of mental health interventions for students in higher education are sustainable over time: a systematic review and meta-analysis of randomized controlled trials. *PeerJ* 2018;6:e4598.
41 Page MJ, McKenzie JE, Bossuyt PM, *et al*. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Int J Surg* 2021;88:105906.
42 Davies EB, Morriss R, Glazebrook C. Computer-delivered and web-based interventions to improve depression, anxiety, and psychological well-being of university students: a systematic review and meta-analysis. *J Med Internet Res* 2014;16:e130.
43 Conley CS, Shapiro JB, Kirsch AC, *et al*. A meta-analysis of indicated mental health prevention programs for at-risk higher education students. *J Couns Psychol* 2017;64:121–40.
44 Barker TH, Stone J, Sears K, *et al*. The revised JBI critical appraisal tool for the assessment o: JBI Evidence Synthesis. *JBI Evidence Synthesis* 2023.
45 Borenstein M, Hedges LV, Higgins JP, *et al*. Introduction to Meta-Analysis. John Wiley & Sons, 2021.
46 Gignac GE, Szodorai ET. Effect size guidelines for individual differences researchers. *Pers Individ Dif* 2016;102:74–8.
47 Guyatt G, Oxman AD, Akl EA, *et al*. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables. *J Clin Epidemiol* 2011;64:383–94.