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Well-being among university students in the post-COVID-19 era: a cross-country survey

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University students have to handle crucial challenges for their future lives, such as succeeding in academic studies and finding attachment figures. These processes could potentially involve their well-being and mental health, with possible sociocultural differences based on the country of study. In order to explore such potential differences, a cross-sectional, multi-center survey was performed involving students from the University of Torino (Italy), Sevilla (Spain), and Lusòfona (Portugal). The survey, conducted from May to November 2023, investigated students' demographic and educational details, socioeconomic status, social support, mental health, academic environment, perceived COVID-19 pandemic impact, and future plans. Demographic profiles showed a predominance of female participants and straight sexual orientation, followed by bisexuality. Italian students showed the lowest levels of mental well-being and the highest rates of mental problems (anxiety and depression) and suicidal risk across the three countries despite the relatively similar profiles of social support. The prevalence of the students' confidence in their professional future is higher in Spain than in Italy and Portugal. This study provides a comprehensive examination of university students' mental health and well-being in three Southern European countries, addressing the major mental health challenges among university students and offering valuable insights for public health purposes.

Keywords Well-being, University students, Cross-country survey, Anxiety, Depression, Academic stress

The university years represent an intriguing life period with plenty of challenges, including academic issues, emotional delusions, and problems related to the transition between the end of adolescence and the beginning of adulthood[1]. The interplay of academic pressures, social dynamics, and developmental transitions provides a delicate balance in which mental vulnerabilities can easily thrive[2–4]. Furthermore, university experience can move the needle: indeed, college students are at higher risk of developing a mental condition compared to their non-college peers[5,6]. In particular, Beiter pinpointed three college-related individual concerns that may heighten mental risk: struggles with academic performance, intense pressure to succeed, and uncertainty about post-graduation life[7]. Furthermore, academic environments themselves, demanding high effort and commitment, could play a role in impairing the university experience[8–10]. All these elements could synergically stimulate the onset of both burnout and several mental conditions, such as anxiety, depression, and suicidality[8–11]. In this regard, a prevalence of about 30% % of depressive and anxiety symptoms among university students has been estimated[12]. In particular, the female gender, the pre-existing mental health conditions, and the lower socioeconomic status seem to be additional risk factors across multiple studies[13–15]. On the other hand, good social support can mitigate the above-mentioned risk factors for mental health, playing a crucial protective role as a source of motivation and promoting healthier lifestyles[16]. Further, the perceived social support could also represent a relevant individual background, capable of encouraging students' resilience and having beneficial effects on academic performance[16].

Beyond the well-known influential factors, the COVID-19 pandemic profoundly impacted students' mental health worldwide in both the short- and long term. In the immediate phase after the COVID-19 pandemic eruption, the impairment was observed mainly in terms of difficulties concentrating, disruptions of sleep patterns, concerns about academic performance, and increased anxiety and depression[17–20]. Furthermore, several researchers assessed the impact of prolonged exposure to the pandemic on cognitive and affective processing

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among students, observing an increase in the prevalence and severity of conditions such as anxiety, depression, suicidality, chronic sleeping difficulties, appetite changes, and health-related anxiety[21–23]. More specifically, the pandemic could have contributed to impaired mental health also among college students through the implementation of distancing measures leading to distance learning modalities, social isolation, lack of access to traditional support services, and family financial difficulties[24,25]. Additionally, research suggests that female students and those residing in lower-quality housing during lockdowns displayed exacerbated declines in mental health[25,26].

In May 2022, the WHO Director-General declared the global emergence related to the COVID-19 pandemic concluded[27]. However, the pandemic long-term consequences on youths' mental health are still a relevant public concern, and they still deserve careful surveillance over time to address targeted mitigation policies. The still scarce literature on the topic mainly relies on data from national-level surveys, hampering the adoption of a transcultural approach[28–32].

To our knowledge, literature still lacks studies assessing and comparing college students' mental health and well-being across different environments in the delicate post-pandemic phase. In order to address these research gaps, the present study describes the main findings of an international project that explored university students' mental health and well-being in three universities in Italy, Spain, and Portugal. These Mediterranean countries share cultural and environmental similarities (e.g. dietary habits, natural environment, social bounds)[33–35], despite the societal peculiarities (e.g. financial situation, physical activity habits) and the adoption of different pandemic-related measures potentially influencing mental health and well-being outcomes[36–39]. More specifically, the aim was to discern commonalities and differences in students' characteristics and experiences across these countries through a comparative approach, trying to offer a more detailed understanding of well-being patterns among college students in the post-COVID-19 era.

Methods

Survey design

A cross-sectional and multi-center survey was conducted between May and November 2023 in three European universities, the University of Torino (Italy), Sevilla (Spain), and Lusòfona (Portugal).

Participants

Students were eligible for enrollment in the study if they were (1) between 18 and 35 years old and (2) attending a bachelor's or master's degree program. Those who declined to provide informed consent were excluded from the study. All the eligible students (about 79,000 students in Italy, 60,000 in Spain, and 15,000 in Portugal) received an institutional email with a link to an anonymous online questionnaire. Students could agree to participate in the study by checking the box at the bottom of the personal data treatment information sheet on the first page of the online questionnaire. There was also a section explaining the study's goals, clarifying that there was no obligation to complete the questionnaire and assuring confidentiality and anonymity of the collected data. Finally, the research team did not offer any incentives to increase recruitment nor played an active role in selecting and/or targeting specific subpopulations of students. Participation was entirely voluntary, with students having the option to opt-out at any stage. Informed consent was obtained from all subjects.

Ethical considerations

Data was collected anonymously, no personal identifiers were collected, and the IP address was not registered. Approval for this study has been obtained from the institutional ethics boards of the participating universities (Prot. no. 0059546 of 30 January 2023, for the University of Torino; approval no. 20/23 of 16 May 2023 obtained by the Comité de Ética en la Investigación de Sevilla; approval no. 9 of 8 March 2023 received by the Ethics and Deontology Commission For Scientific Research (CEDIC) for the Lusofona University). The study was conducted in accordance with the international guidelines and regulations and the Declaration of Helsinki.

Questionnaire

A multi-language online survey (i.e., in English, Italian, Spanish, and Portuguese) was implemented on the REDCap platform of the University of Torino[40,41]. Overall, we adopted standardized scales validated in English. When available, we used the validated versions of the scales in Italian, Spanish, and Portuguese; otherwise, the English scales underwent the forward–backward translation process. The specific process for each scale, with the relevant validation work, can be found in the Supplementary file, Table S1. Respondents could choose the language in which they would fill out the questionnaire. The survey encompassed the following key components: demographic details (e.g., age, sex, sexual orientation), educational profile (course area, year of study, progress), socioeconomic status, social support, mental health and well-being, perceived COVID-19 impact, academic stress, and future perspectives information.

In particular, information related to sex at birth and sexual orientation was assessed following the GeniuSS Group guidelines[42]. Sexual orientation was asked as follows: 'How do you identify yourself?', adopting as possible answers: 'straight', 'lesbian', 'gay', 'bisexual', 'queer', 'pansexual', 'asexual', 'unlabelled', 'questioning', 'other'.

Socioeconomic status (SES)

The students' socioeconomic status was investigated using the *MacArthur Scale of Subjective Social Status*[43]. The scale visually represented a ladder in which steps were associated with numbers ranging from 1 (low perceived SES) to 10 (high perceived SES). Respondents were then asked to place themselves on the ladder compared to their peers. The personal financial situation was evaluated through one further question with four possible answers: 'dependent on family', 'work', 'scholarship', or 'other'.

Social support

Social support was assessed using a well-known validated psychometric tool, the *Multidimensional Scale of Perceived Social Support (MSPSS)*[44]. The scale consists of 12 items exploring an individual's perceived social support distributed across three subscales: Family, Friends, and Significant Other Support. Individuals rated their agreement with each item on a 7-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The scores for each subscale are added up and then divided by 4, while for the overall support, the sum score is divided by 12. Both the overall and subscales scores (ranging from 1 to 7) provide a measure of the individual's perceived social support. Low, medium, and high social support are defined based on the overall score (i.e. 1–2.9, 3–5, and 5.1–7, respectively). An excellent internal consistency was found for the overall scale ($\alpha > 0.92$), and the three subscales, consistently in the three countries.

Mental health

Mental health was evaluated using different validated tools based on the specific characteristics under investigation. Depression and anxiety were assessed through the *Patient Health Questionnaire-2 (PHQ-2)*[45] and the *Generalized Anxiety Disorder-2 (GAD-2)*[46], respectively. These two brief self-report instruments derived from the longer Patient Health Questionnaire-9 (PHQ-9)[47] and the Generalized Anxiety Disorder-7 (GAD-7)[48] questionnaire, both commonly used tools in mental health assessments. Participants were asked to indicate the frequency of presentation of each symptom using a 4-point scale ranging from 0, 'not at all', to 3, 'nearly every day'. A total score ≥ 3 on the PHQ-2 assessment suggests the presence of anxiety symptoms, while a score ≥ 3 on the GAD-2 evaluation indicates the occurrence of depressive traits. The PHQ-2 and the GAD-2 scales showed good internal consistency ($\alpha = 0.80$ and $\alpha = 0.85$, respectively), consistently in the three countries.

Suicidal behaviors and ideation were evaluated with the *Suicide Behaviors Questionnaire-Revised (SBQ-R)*[49]. This self-report validated questionnaire includes four items inquiring about different aspects related to suicidal risk (suicidal ideation, past suicide attempts, and the likelihood of engaging in future suicidal behavior). SBQ-R can help identify individuals who may be at risk for suicidal behavior or who have a history of suicidal thoughts or attempts. Total scores (ranging from 3 to 18) have been categorized identifying groups with low (total score less than 7) and high risk (total score equal to or higher than 7) of suicidal behavior[49]. A good internal consistency was found in our sample ($\alpha = 0.82$), independently by country. Before the SBQ-R questionnaire, participants were warned of questions about a particularly sensitive topic, and the section was optional.

Well-being

Well-being was investigated through the *Mental Health Continuum-Short Form* (MHC-SF)[50]. The self-report validated scale consists of 14 items measuring the degree of several aspects of well-being: (a) Overall well-being (items 1–14); (b) Emotional well-being (items 1–3), defined in terms of positive affect and satisfaction with life; (c) Social well-being (items 4–8), as described in Keyes' model of social well-being[51]; and (d) Psychological well-being (items 9–14). The MHC–SF asks individuals how frequently they felt in a specific aptitude, from 0 (none of the time) to 5 (all of the time): the higher the overall score, the higher the level of well-being. In our sample, an excellent internal consistency ($\alpha > 0.90$) was found referring to Overall and Emotional well-being, while a good internal consistency was shown for both Social, and Psychological well-being ($\alpha = 0.82$, and $\alpha = 0.87$, respectively), consistently in the three countries.

Perceived COVID-19 impact

A 10 items scale from the 2021/2022 Health Behavior in School-Aged Children was used to evaluate the subjective impact of COVID-19-related measures on various aspects of individuals' lives: life in general, overall and mental health, relationships with family and friends, school performance, physical activity, eating behaviors, future expectations, financial situation[52]. Respondents were asked to assess the extent of the impact by selecting one of the following options on a five-point Likert scale: 1 = ''very negative', 2 = 'somewhat negative', 3 = 'neither positive nor negative', 4 = somewhat positive', or 5 = 'very positive'. Collapsing some response options, a three-level variable was obtained for each item, identifying negative (options 1 and 2), neutral (option 3), and positive (options 4 and 5) COVID-19 impact groups[53].

Academic stress

The Academic stress was evaluated using the *Effort-Reward Imbalance—Student Questionnaire (ERI-SQ)*[54], a self-reported validated questionnaire based on the Effort-Reward Imbalance (ERI) theoretical framework[55]. The tool includes three subscales: the Effort (from items 1 to 3), the Reward (from items 4 to 9), and the Overcommitment dimensions (from items 10 to 14). The Effort score identifies the intensity and amount of effort an individual perceives in academic activities. It is calculated based on participants' responses to items regarding the study load, time pressure, and interruptions in doing the academic tasks. The Reward score reflects the perceived level of rewards gained in exchange for the efforts made. Rewards encompass social recognition, career advancement, job security, or other positive outcomes associated with academic accomplishments. In addition, the ERI-SQ incorporates a measure of Overcommitment, which denotes a personality trait characterized by an excessive dedication to work or academic tasks, regardless of the balance between effort and reward. From the previous measures, the Effort-Reward Imbalance (ERI) ratio is computed by dividing the Effort score by the Reward score multiplied by a correction factor[54,56]. The ERI ratio suggests a possible imbalance between the effort and the reward. For ERI ratio equal to 1, the student reports equal levels of effort and reward, an ERI ratio < 1 indicates less effort than rewards, while an ERI ratio > 1 indicates that the perceived effort is greater than the rewards, suggesting a greater likelihood of negative health outcomes due to stressors in the academic environment. Similarly, a high overcommitment score implies a propensity to invest excessive effort, even when

the corresponding rewards are perceived as inadequate. The 14-item scale showed good internal consistency (overall α = 0.83), in contrast, independently by country, lower internal consistency levels were registered for Effort, Reward, and Overcommitment scales (α = 0.66, α = 0.69, and α = 0.80, respectively).

Future perspectives

Some further questions were asked about students' future professional perspectives: (1) Plans for the future after completing higher education (the possible answers were pursuing further studies (post-graduate, master's, or Ph.D.), getting a job, working in another country, starting a business, or not having a specific plan); (2) Professional future: two questions with response options ranging from 1 ('strongly disagree') to 5 ('strongly agree') were provided to explore the readiness to manage and build the professional future after completing higher education and confidence in professional future. Dichotomized variables were then created based on high (options 4 or 5) or medium/low (equal or lower than 3) agreement. Furthermore, one further question exploring overall future expectations was provided. In this regard, subjects were asked to rate their expectations for the future on a scale from 0 to 10, where 0 represents poor expectations and 10 excellent ones. This assessment reflects general optimism or pessimism about prospects.

Data analysis

Demographic information and psychometric measures were described with absolute frequencies and percentages for categorical variables and medians and interquartile ranges (IQRs) for continuous ones. Data was stratified by country, and the rate of missing values for each aforementioned variable was reported. Afterward, further stratification by sex was performed within each country, and d fferences by sex were tested with a chi-square test for categorical variables and a Wilcoxon test for continuous ones. All statistical tests were two-sided, and the level of statistical significance was set at 0.05. Data were analyzed using the R software version 4.3.0[57]. Radar plots were generated to visually represent specific results by country, using Flourish[58], a data visualization platform, and InkScape[59], a vector graphics editor, to enhance their quality and clarity.

Results

Demographic and Educational profile of participants

Our sample comprised 8773 students in Italy, 612 in Spain, and 396 in Portugal. The response rates in the three universities were 11.1% (Italy), 2.6% (Portugal), and 1.0% (Spain). We then excluded all participants who waived informed consent (n = 90), those older than 35 (n = 1308) or younger than 18 (n = 3), and those with missing information about sex (n = 72) obtaining a final overall sample of 8380 students (7559 students in Italy, 469 in Spain, and 352 in Portugal).

Table 1 shows the demographic and educational characteristics of the sample. The median age of respondents was homogeneous in the three countries. The majority of the sample was composed of females (more than 65% in the three countries) and declared a straight sexual orientation (> 70%). The main reported non-straight sexual orientation was bisexual, declared by 8–20% of the participants across countries (Most respondents attended a program concerning "Humanities and Philosophy" and "Social and Economic Sciences" areas, although over 12% of participants did not provide such information. Most students were in the first three years of college in the three countries (71% in Italy, 62% in Spain, and 88% in Portugal). Less than 50% of students in Italy and Spain declared themselves on track (44% and 46%, respectively), compared to 73% of Portuguese students.

Socioeconomic status and social support

The MacArthur Scale registered slightly higher levels of Subjective Social Status in Italy (median score: 7.0; IQR: 5.0–7.0) than in Spain and Portugal (median score: 6.0; IQR: 5.0–7.0 in both countries). Participants declared that they mainly depend on their families for financial support (> 75%), with variations in rates of work and scholarships across the countries. Notably, fewer respondents in Italy and Portugal (11% and 16%, respectively) relied on scholarships compared to the Spanish sample (29%), while an inverse trend was found regarding rates of work (i.e., lower in Spain than in Italy and Portugal) (Fig. 1, Table 2, and Table S2, Supplementary file).

The social support profiles emerging from the MSPSS showed similar perceived support levels on the three subscales among the three countries. Significant other subscales represented the primary source of support (median scores of at least 6.0 across the three countries). Overall, most respondents reported high social support (> 60%), mainly from Significant other and Friends, without relevant cross-country differences. Some sex differences were found within countries concerning social support (Table S3, Supplementary file). More specifically, females declared higher Friends and Significant others support scores in Italy and Spain than their male peers ($p < 0.001$). In Portugal, males declared higher scores of Family support than females ($p = 0.007$). Patterns are globally confirmed adopting the categorized variables.

Mental health and well-being

In Italy and Spain, about two out of three respondents showed a high GAD-2 score (67% and 64%, respectively), while in Portugal, this anxious trait was presented by 50% of the sample (Table 3, Fig. 2). However, the percentages of high depressive scores on the PHQ-2 were below 50% in all countries (44% in Italy, 44% in Spain, and 34% in Portugal). While students in Italy and Spain exhibited a higher frequency of both anxious and depressive symptoms compared to the Portuguese sample, a quite homogeneous picture emerged exploring SBQ-R scores. More specifically, 30%, 26%, and 29% of respondents were classified in the high suicidal risk group in Italy, Spain, and Portugal, respectively. Concerning the MHC-SF questionnaire, Italian respondents exhibited lower overall scores (median score: 30.0; IQR: 21.0–40.0) than Spanish and Portuguese ones (median scores: 41.0 (IQR:

	Italy (N = 7559)	Spain (N = 469)	Portugal (N = 352)	Missing (N = 8380)
Age	22.0 [21.0, 24.0]	21.0 [20.0, 23.0]	21.0 [19.0, 23.0]	5 (0.1%)
Sex assigned at birth				72 (1%)
Male	1,773 (23%)	153 (33%)	67 (19%)	
Female	5,717 (76%)	313 (67%)	285 (81%)	
Sexual orientation				71 (0.9%)
Straight	5555 (73%)	332 (71%)	261 (74%)	
Lesbian	109 (1%)	9 (2%)	5 (1%)	
Gay	142 (2%)	14 (3%)	8 (2%)	
Bisexual	615 (8%)	92 (20%)	35 (10%)	
Queer	98 (1%)	0 (0%)	2 (1%)	
Pansexual	145 (2%)	0 (0%)	10 (3%)	
Asexual	67 (1%)	2 (0%)	1 (0%)	
Unlabelled	359 (5%)	9 (2%)	23 (7%)	
Questioning	387 (5%)	10 (2%)	6 (2%)	
Other	12 (1%)	0 (0%)	1 (0%)	
Course area				967 (12%)
Agricultural and Forest Sciences	159 (2%)	7 (1%)	2 (1%)	
Humanities and Philosophy	1926 (25%)	30 (6%)	60 (17%)	
Law	435 (6%)	7 (1%)	15 (4%)	
Medical Sciences	1459 (19%)	51 (11%)	52 (15%)	
Natural Sciences	1198 (16%)	12 (3%)	19 (5%)	
Social and Economic Sciences	1572 (21%)	83 (18%)	163 (46%)	
Veterinary Sciences	160 (2%)	0 (0%)	3 (1%)	
Academic year				10 (0.1%)
First	1884 (25%)	88 (19%)	142 (40%)	
Second	1976 (26%)	116 (25%)	87 (25%)	
Third	1502 (20%)	83 (18%)	83 (23%)	
Fourth	500 (6%)	108 (23%)	20 (6%)	
Fifth	500 (6%)	38 (8%)	15 (4%)	
Sixth	139 (2%)	15 (3%)	2 (1%)	
Taking longer	1050 (14%)	19 (4%)	3 (1%)	
Progress				124 (2%)
Perfectly on track	3337 (44%)	215 (46%)	256 (73%)	
Slightly late	2555 (34%)	161 (34%)	82 (23%)	
Delayed	1550 (21%)	86 (18%)	14 (4%)	

Table 1. Demographic and educational characteristics among university students in Italy, Spain, and Portugal. Data are reported using absolute frequencies and percentages for categorical variables and using medians and interquartile ranges (IQRs) for continuous ones.

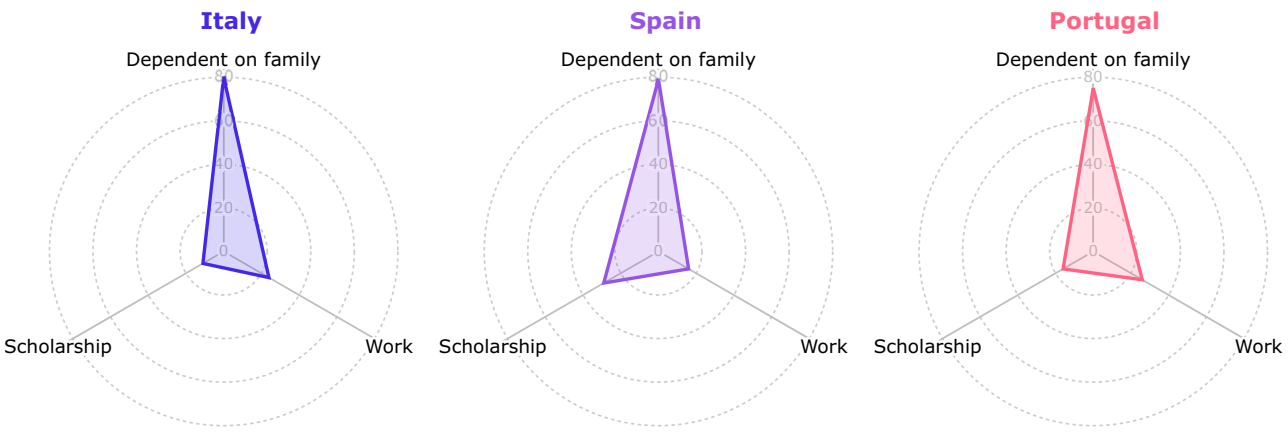

Figure 1. Financial situation among university students in Italy, Spain, and Portugal. Radar plots with percentages of financial situation are presented across the three countries.

	Italy (N = 7559)	Spain (N = 469)	Portugal (N = 352)	Missing (N = 8380)
Socioeconomic status (MacArthur scale)	7.0 [5.0, 7.0]	6.0 [5.0, 7.0]	6.0 [5.0, 7.0]	307 (4%)
Family support (MSPSS)	5.8 [4.3, 6.5]	5.8 [4.8, 6.6]	5.5 [4.5, 6.5]	695 (8%)
Family support (MSPSS)				695 (8%)
Low	852 (11%)	36 (8%)	20 (6%)	
Medium	1,822 (24%)	92 (20%)	108 (31%)	
High	4,283 (57%)	275 (59%)	197 (56%)	
Friends support (MSPSS)	5.8 [4.8, 6.3]	6.0 [5.0, 7.0]	5.8 [5.0, 6.5]	678 (8%)
Friends support (MSPSS)				678 (8%)
Low	654 (9%)	24 (5%)	12 (3%)	
Medium	1669 (22%)	91 (19%)	103 (29%)	
High	4647 (62%)	292 (62%)	210 (60%)	
Significant other support (MSPSS)	6.0 [5.0, 7.0]	6.3 [5.0, 7.0]	6.3 [5.3, 7.0]	698 (8%)
Significant other support (MSPSS)				698 (8%)
Low	584 (8%)	45 (10%)	14 (4%)	
Medium	1189 (16%)	65 (14%)	63 (18%)	
High	5178 (69%)	296 (63%)	248 (71%)	
Overall social support (MSPSS)	5.7 [4.8–6.3]	5.8 [4.9–6.5]	5.8 [5.0–6.3]	761 (9%)
Overall social support (MSPSS)				761 (9%)
High	4755 (63%)	291 (62%)	235 (67%)	
Medium	1762 (23%)	95 (20%)	82 (23%)	
Low	375 (5%)	16 (3%)	8 (2%)	

Table 2. Socioeconomic status and perceived social support among university students in Italy, Spain, and Portugal. MSPSS, Multidimensional Scale of Perceived Social Support. Data are reported using absolute frequencies and percentages for categorical variables and using medians and interquartile ranges (IQRs) for continuous ones.

	Italy (N = 7559)	Spain (N = 469)	Portugal (N = 352)	Missing (N = 8380)
Anxiety (GAD-2)				830 (10%)
High	5031 (67%)	300 (64%)	175 (50%)	
Low	1809 (24%)	97 (21%)	138 (39%)	
Depression (PHQ-2)				844 (10%)
High	3327 (44%)	204 (43%)	121 (34%)	
Low	3501 (46%)	191 (41%)	192 (55%)	
Suicidal risk (SBQ-R)				1134 (14%)
High	2,288 (30%)	120 (26%)	102 (29%)	
Low	4,249 (56%)	276 (59%)	211 (60%)	
Overall well-being ((MHC-SF)	30.0 [21.0, 40.0]	41.0 [29.0, 51.0]	39.0 [29.0, 48.0]	1233 (15%)
Emotional well-being (MHC-SF)	8.0 [5.0, 10.0]	9.0 [7.0, 12.0]	10.0 [8.0, 12.0]	1080 (13%)
Social well-being (MHC-SF)	6.0 [3.0, 10.0]	11.0 [6.0, 16.0]	10.0 [6.0, 14.0]	1137 (14%)
Psychological well-being (MHC-SF)	16.0 [11.0, 22.0]	20.0 [15.0, 24.0]	19.0 [14.0, 24.0]	1142 (14%)

Table 3. Mental Health and Well-Being among university students in Italy, Spain, and Portugal. GAD-2, Generalized Anxiety Disorder; PHQ-2, Patient Health Questionnaire; SBQ-R, Suicide Behaviour Questionnaire Revised; MHC-SF, Mental Health Continuum–Short Form. Data are reported using absolute frequencies and percentages for categorical variables and using medians and interquartile ranges (IQRs) for continuous ones.

29.0–51.0) and 39.0 (IQR: 29.0–48.0), respectively) indicating lower mental well-being among Italian participants compared to the others. This pattern is consistent across the three domains of the MHC-SF questionnaire.

In terms of sex differences across the mental domains, Italian and Portuguese females presented higher scores in both the GAD-2 ($p < 0.001$ in both countries) and the PHQ-2 scales ($p = 0.011$ and $p = 0.023$, respectively), while no substantial patterns were found regarding SBQ-R. In the three countries, lower levels of well–being could be observed in girls than in boys in all domains of the MHC-SF questionnaire, with significant differences

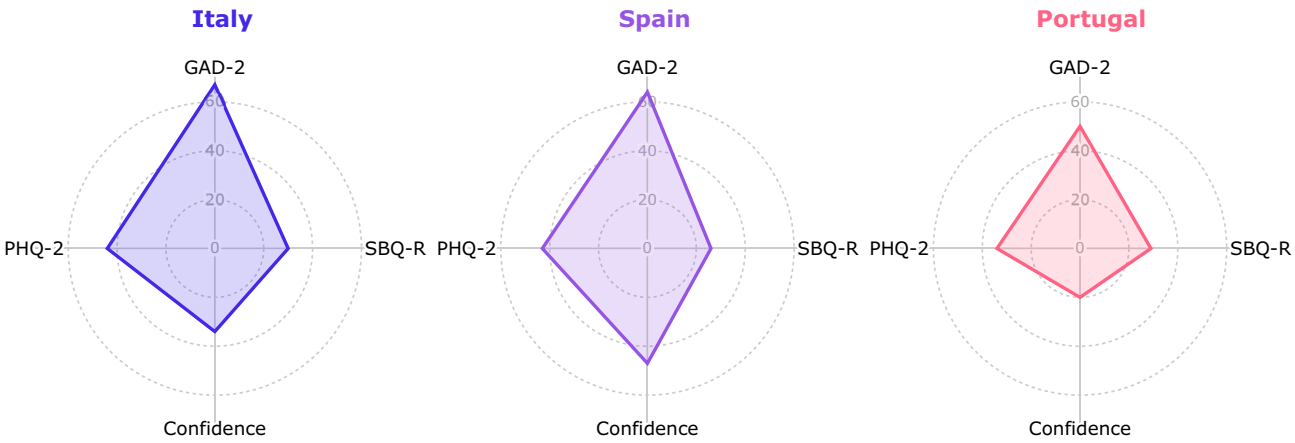

Figure 2. Radar plots showing rates of mental problems and confidence levels in the professional future among university students in Italy, Spain, and Portugal. Radar plots with percentages of anxiety symptoms (GAD-2), depressive symptoms (PHQ-2), suicidal risk (SBQ-R), and confidence in professional future are presented across the three countries.

between the two sexes in Italy and Portugal for the overall score and social and psychological domains (Table S3, Supplementary file).

Perceived impact of the COVID-19 pandemic

Results about the perceived impact of the COVID-19 pandemic are shown in Fig. 3 and Table S4 (Supplementary file). University students were more likely to report a negative than a positive pandemic impact on several life domains (i.e., life as a whole, overall and mental health, physical activity, eating behaviors, family financial situation, and future expectations), especially in Italy. In particular, half of Italian students (50.2%) reported a negative impact of the pandemic on their mental health compared to 40.3% and 37.8% of Spanish and Portuguese ones. Conversely, the COVID-19 pandemic's influence on relationships with family and friends and school performance seemed to have been perceived more positively than negatively. A missing rate of 16% was observed consistently throughout the items.

Academic stress and future perspectives

The ERI-SQ scoring revealed a homogeneous pattern in perceived overcommitment levels and the ERI ratio across countries (Table 4). In all countries, the median ERI ratio was slightly greater than 1, indicating that 6–13% of the effort was not met by the received rewards. In all countries, females seemed to have a significantly higher ERI ratio than males (Table S3, Supplementary file).

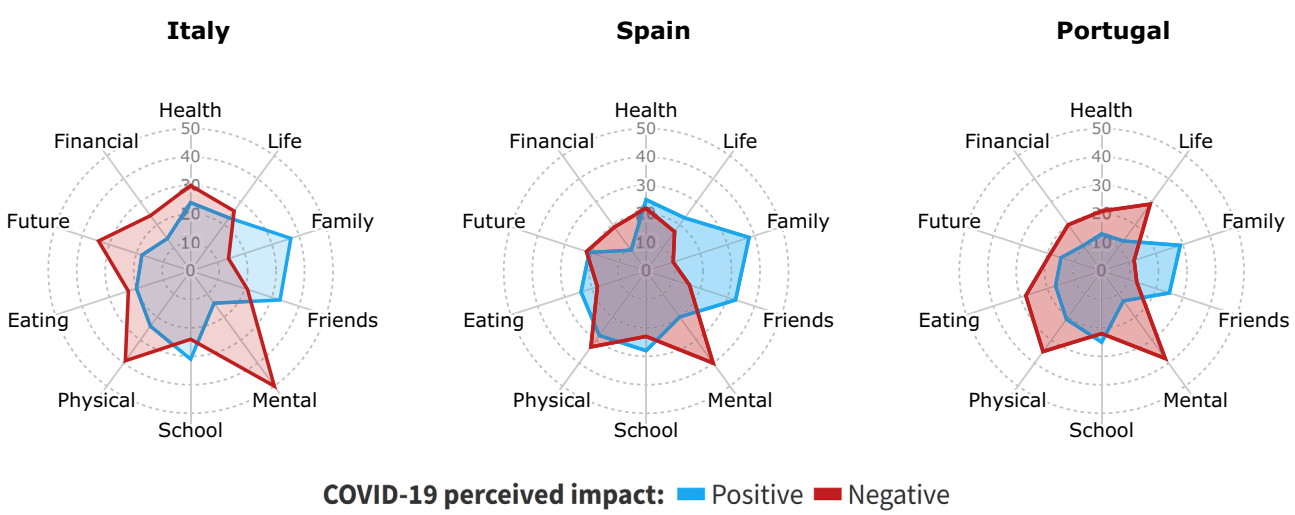

Figure 3. Prevalence of positive (in blue) and negative (in red) perceived COVID-19 impact on several life domains among university students in Italy, Spain, and Portugal. Radar plots with percentages of perceived COVID-19 pandemic impact on students' overall health, life in general, family relationships, friends' relationships, mental health, school performance, physical activity, eating behaviors, future perspectives, and financial situation are presented across the three countries.

	Italy (N = 7559)	Spain (N = 469)	Portugal (N = 352)	Missing (N = 8380)
ERI ratio	1.06 [0.84, 1.33]	1.13 [0.88, 1.43]	1.06 [0.89, 1.33]	1476 (18%)
Overcommitment	13.0 [11.0, 15.0]	14.0 [12.0, 16.0]	13.0 [11.0, 14.5]	1313 (16%)
Future plans				1364 (16%)
Continue your studies	2421 (32%)	214 (46%)	139 (40%)	
Get a job	2665 (35%)	107 (23%)	80 (23%)	
Go and work in another country	728 (10%)	37 (8%)	23 (6%)	
Start my own business	146 (2%)	3 (0%)	10 (3%)	
I don't plan to finish higher education	90 (1%)	2 (0%)	3 (1%)	
Other	324 (4%)	9 (2%)	15 (4%)	
Confidence in professional future	2599 (34%)	218 (47%)	71 (20%)	1407 (17%)
Be prepared to work	2614 (35%)	134 (29%)	67 (19%)	1401 (17%)
Expectation for future	7.0 [5.0, 8.0]	7.0 [5.0, 8.0]	7.0 [5.0, 8.0]	1943 (23%)

Table 4. Academic environment and future plans among university students in Italy, Spain, and Portugal. ERI, effort reward imbalance. Data are reported using absolute frequencies and percentages for categorical variables and using medians and interquartile ranges (IQRs) for continuous ones.

The expectations for the future were similar in the analyzed universities (median score: 7.0; IQR: 5.0–8.0), while perspectives after graduation showed a higher variability across countries (Table 4). More specifically, in Italy, most students declared their intention to find a job after graduation (35%), while in Spain and Portugal, most planned to continue their studies (46% and 40%, respectively). Overall, a decreasing prevalence of participant students declaring confidence in their own professional future was found in Spain, Italy, and Portugal (47%. 34%, and 20%, respectively). Furthermore, Italian and Spanish students felt more prepared for work than Portuguese ones (35% and 29% vs. 19%, respectively).

Discussion

The present cross-country project primarily aimed to identify common and specific mental health and well-being traits among university students in Italy, Spain, and Portugal.

Respondents were primarily females with a median age of 21, currently attending the first three academic years. About three out of four students declared a straight sexual orientation, while bisexuality represented the second most common sexual orientation, ranging from 8% in Italy to 20% in Spain. The high levels of bisexuality compared to the previous studies (up to 10%) could be the result of undergoing changes in sexual norms and behaviors, leading to even more youths identifying as bisexual[60,61]. Italian students presented higher median socioeconomic status than Portuguese and Spanish ones, reflecting the different economic wealth situations observed by the World Bank in such countries[38,39]. Conversely, quite similar patterns in social support were registered across universities, confirming the expected cultural similarities in social bonds in these three Mediterranean countries[35,62,63]. Overall, students declared a relatively higher support from Friends and Significant other than Family, underlying their developmental transition from adolescent to young adult supportive networks[64–66].

The PHQ-2 and GAD-2 assessments showed high levels of anxiety (> 50%) and depressive symptoms (> 30%) among students in the three countries, being exacerbated among females than males. Furthermore, these first insights suggest higher levels of such mental problems among Italian and Spanish students than Portuguese ones. The disparities in emotional, social, and psychological well-being captured by MHC-SF are also noteworthy, with Italian students reporting lower scores than their counterparts in Spain and Portugal.

These results suggested different cross-country trends based on the indicators explored, enforcing the validity of conceptualizing mental health as a multidimensional construct in which the various dimensions can have different correlated patterns[51,67–70]. More specifically, the present study found that Italian students showed the lowest levels of well-being and the highest rates of mental problems across the three countries. These findings align with those reported by recent works on nationally representative samples of adolescents in the same countries, suggesting shared underlying causes at a macro-level, even among contiguous age groups (adolescents and young adults)[36,71]. Several factors could be involved in the observed pattern, including pandemic-related measures duration and strictness, as confirmed by the higher levels of negative perceived impact of COVID-19 on mental health in Italy, observed in the present and other studies[36,71]. Moreover, cross-country differences in physical activity could have had a contributing role[37]. In particular, the high negative impact of pandemic-related measures on students' physical activity in Italy could have exacerbated the pre-pandemic cross-cultural exercise differences[37].

Furthermore, the observed cross-country pattern of mental problems in the university environment may also be attributed to the significant social and academic pressures that Italian university students experience[10,72]. Our analysis revealed a lower percentage of scholarship recipients and higher rates of working students in Italy than in the other explored countries. These elements suggest differences in university study support policies across countries, reflecting the different financial frameworks, which also have consequences for the well-being of university students[73].

Among the mental health issues explored in this survey, results about suicidality deserve to be discussed separately, in light of the latest evidence on this sensitive topic.

Approximately one-third of students within the three countries exhibited characteristics placing them in the "high risk" category in the SBQ-R assessment, with substantially geographically homogeneous patterns across countries. Such prevalence is higher than that emerged from other surveys conducted before the COVID-19 pandemic[74–76], in line with data collected during 2020[77], and slightly lower than levels registered in 2021[77]. In particular, literature exploring long-term temporal trends of suicidality suggested an increase in the phenomenon since 2021, which was attributed to the impact of COVID-19 on students' lives[21,78–80]. Furthermore, in our sample, high rates of negative perceived impact of the COVID-19 pandemic on mental health were observed across the three countries, enforcing such possible association. From this perspective, the long-term consequences of COVID-19 pandemic-related measures on youths' mental health could have left prolonged traces, still detectable in 2023, during the so-called post-COVID-19 era. In this regard, literature is still lacking, and further exploration of the topic is needed to increase the knowledge of the phenomenon and to guide the policy agenda promoting youths' mental health[81,82].

COVID-19 perceived impact assessment showed a relatively homogeneous picture among students across countries. Specifically, pandemic-related measures seemed to have negatively impacted several domains (i.e., mental health, physical activity, future perspectives, and financial situation). Still, a prevailing positive impact was perceived regarding relationships with family, friends, and school performance. Overall, our findings are consistent with other studies adopting the same measurement tool on nationally representative samples of adolescents in the three countries, enlightening shared environmental exposures across age groups[53,83]. More specifically, results referring to the pandemic impact on family relationships are consistent with the findings by other authors, who observed tighter family bonds after the lockdown establishment[17,25,84–88].

The academic stress assessment pointed out similar trends among countries: the median ERI ratio was higher than one among students regardless of the country, indicating perceived rewards lower than expected, especially among girls. These findings align with results from previous works that showed unbalanced ERI ratios toward effort among university students[10,54].

Finally, a quite heterogeneous geographical pattern was found regarding future professional perspectives: 20–30% of students in our sample felt prepared for work, and confidence in the professional future showed a decreasing pattern from Spain to Italy and Portugal. This presumably reflects the cross-country economic wealth differences and the widespread uncertainty about the future among youths[38,39,89,90].

Limitations and strengths

The observed findings should be interpreted cautiously due to several limitations of the study. While our sample included over 8000 students, it only represented a small percentage of the target population (approximately 150,000 students in the academic year 2022–2023). This issue could potentially hinder the generalizability of our findings. Additionally, most students responded in Italy, resulting in an unbalanced sample and few participants in Spain and Portugal. These methodological issues could lead to analytical constraints regarding statistical comparisons between countries, making it possible to analyze differences only within each country. The unbalanced sample and the low sample size in 2 out of 3 countries also limited the exploration of the factors associated with well-being in a cross-country framework. Furthermore, the self-reported nature of the data and the cross-sectional design of the study also represented additional weaknesses.

Despite these limitations, the present work is one of the first cross-country surveys exploring academic stress, mental health, and well-being among university students in the post-COVID-19 era. This international research stands out for its rigorous methodology, using validated tools and a consistent protocol to assess the well-being of university students in Italy, Spain, and Portugal. The comparative approach adopted across countries allowed us to explore the complexities of three Southern European countries sharing cultural similarities and to study their influence on university students' well-being. In particular, we found cross-university patterns consistent with the existing studies on the topic despite a high level of heterogeneity recognized in the literature in psychometric instruments and target student populations. Finally, using validated tools like PHQ-2, GAD-2, SBQ-R, and MHC-SF allowed us to simultaneously capture different mental health and well-being dimensions among university students, providing a more comprehensive and holistic framework.

Conclusions

This cross-sectional survey explores the well-being levels and mental health patterns in three Southern European countries in the post-COVID-19 phase in light of their cultural similarities and peculiarities.

Overall, Italian students showed the lowest levels of mental well-being and the highest rates of mental problems (i.e., anxiety and depression) and suicidal risk across the three countries despite the relatively similar profiles of social support. The prevalence of the students' confidence in their professional future is higher in Spain than in Italy and Portugal. The emerging picture offers valuable insights into this public health topic and paves the way for further exploration of the relationships between students' environmental factors (e.g., social support and academic stress) and various aspects of their well-being.

Data availability

Data is available from the corresponding author upon reasonable request.

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Author contributions

PD and RIC designed the research. MB, RIC, TG, CMM, EK conducted the research. MB, GZ and RIC analyzed data. MB, LC, TG, CMM, PG, EK, RIC interpreted the results. MB, GZ, PG mainly wrote the manuscript. PD and RIC supervised the research team. All of the authors read and approved the final manuscript.

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Competing interests

The authors declare no competing interests.

Additional information

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