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The effects of a mindfulness-based program on higher education students

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Background: Entering higher education is a process with multiple challenges that requires the mobilization of personal, social and instrumental resources. As a result, students tend to experience grater stress, anxiety, and depression. In this regard, mindfulness-based interventions (MBIs) can serve as a useful tool to help students deal with these demands.

Objective: This study aimed to evaluate the effect of a Mindfulness in Education program in reducing stress, anxiety, and depression symptoms among students.

Methods: Forty-four students of higher education from four degrees in the fields of Social and Cultural Sciences participated and finished surveys before and after the 12-weeks intervention, measuring stress, depression, anxiety, mindfulness, and self-compassion. Twenty-three students (82.61% female; Mage = 20.35 DPage = 3.24) participated in Mindfulness in Education. These participants were paired with 21 students (90.48% female; Mage = 18.67, DPage = 0.73), which constituted the control condition.

Results: The results showed a session × condition interaction that was statistically significant for depression ($p < 0.012$) and stress ($p < 0.026$). In the follow-up exploration, the experimental condition revealed a statistically significant and moderate change in the severity of the symptoms of depression [$t(14) = -2.315$, $p = 0.036$, $\xi = 0.304$, 95% CI (−0.023, −0.499)] but not at the stress level [$t(14) = -1.443$, $p = 0.171$, $\xi = 0.223$, 95% CI (−0.006, −0.364)].

Conclusion: Outcomes were promising, adding to evidence that MBIs can play an important role in helping students manage stress and depression. However, it is still necessary to investigate the mechanisms underlying this type of interventions.

KEYWORDS

higher education, mindfulness, stress, depression, anxiety

Introduction

The transition from high school to college or university can be a stressful event. In higher education, students are confronted with multiple academic, social and institutional challenges (e.g., Hindman et al., 2015; Bamber and Kraenzle Schneider, 2016), new lifestyle, friends, roommates, exposure to pedagogical challenges and alternative ways of thinking. Therefore, social, personal and emotional adaptation to this new context is a demanding process which requires students to mobilize a set of essential personal, social and instrumental resources. As a result, students tend to experience increased stress, anxiety (e.g., Bayram and Bilgel, 2008; DeRoma et al., 2009; Gallego et al., 2014; Goyal et al., 2014; Beiter et al., 2015; Habihirwe et al., 2018; Bamber and Morpeth, 2019), depression (e.g., Goyal et al., 2014; Beiter et al., 2015) and substance use (Ibrahim et al., 2013; Pedrelli et al., 2015) which may result in a significant deterioration of psychosocial functioning and maladaptive behaviors, such as excessive alcohol consumption and the use of substances (e.g., Mekonen et al., 2017), as well as an increased risk of drop-out (Eisenberg et al., 2009; Keyes et al., 2012). Thus, the mental health of higher education students has been a public health issue of growing concern (Baik et al., 2019).

In response to this scenario, Higher Education Institutions (HEIs) around the world have developed a set of actions. For example, providing psychological support services (e.g., Eells and Rando, 2010; Santos, 2011), tutoring and training programs, peer counseling, strong supportive therapeutic relationships (e.g., Monti et al., 2014; Dickson and Gullo, 2015), programs which facilitate transition and adaptation (Patton et al., 2006; Jdaitawi et al., 2011), and mindfulness-based programs (De Bruin et al., 2015; Lynch et al., 2018; Bamber and Morpeth, 2019; Mantzios and Egan, 2019; Serrão and Peixoto, 2020).

Mindfulness is characterized by attitudes of attention, conscientiousness, non-judgment in relation to the present experience and greater connectivity in relation to the context (Kabat-Zinn, 1994); it corresponds to a form of consciousness focused on the present, in which each thought, emotion or sensation is noticed and accepted as it is (Kabat-Zinn, 1990; Segal et al., 2002). Mindfulness-based interventions (MBIs) consist of formal and informal meditative practices which allow individuals to develop metacognitive skills which are activated when attention is anchored in the present moment. From a psychological perspective, these practices consist of a process of self-regulation of attention, focused on the perception of immediate experiences, and integrate attitudes of curiosity, openness, and acceptance of those same experiences (Bishop et al., 2004). In higher education, the development of MBIs has been gradual (Bamber and Morpeth, 2019) and some previous studies provide evidence that these programs may have beneficial psychological effects. For example, they could increase subjective wellbeing (e.g., Baer et al., 2006; Gawrysiak et al., 2017), decrease internal shame and increase optimism (e.g., Serrão and Peixoto, 2020), as well as decrease stress (e.g., Palmer and Rodger, 2009; Erogul et al., 2014; Gallego et al., 2014; Bamber and Kraenzle Schneider, 2016; Shearer et al., 2016). Consequently, MBIs may be an important addition to the already existing tools intended to promote students' adaptation to the demands of higher education (e.g., Hindman et al., 2015; Bamber and Kraenzle Schneider, 2016; Barnes et al., 2017).

The MBIs used on college or university students differ in their type of intervention, design and length. However, Mindfulness-Based Stress Reduction (MBSR; Erogul et al., 2014) and Mindfulness-Based Cognitive Therapy (MBCT; Gallego et al., 2014) are the most used and are generally extracurricular courses.

In this study, the mindfulness program (Mindfulness in Education; MiE) was introduced as part of the core curriculum in first-year courses to teach students self-care skills during this important developmental period. No particular program, such as MBCT or MBSR, was used. Instead, a program was created with a predominant focus on the psycho-educational dimension of depression, stress, anxiety, mindfulness and compassion. A longer-than-normal course was also designed, consisting of a total of 12 weeks rather than the standard 8 weeks. Therefore, the current study aims to evaluate the effects of the MiE program on helping Social and Cultural Sciences students to cope with stress, anxiety and depression, since these are the most frequent problems which these students experience. We hypothesize that students in the intervention group will report decreased levels of stress, generalized anxiety and depression from the pre- to post-intervention when compared to the control group; and students in the intervention group will report higher mindfulness and self-compassion from the pre-intervention to the post-intervention.

Materials and methods

Participants

Forty-four first-year students from four higher education degrees in the fields of Social and Cultural Sciences took part in this study. As part of their curriculum, 23 students (82.61% female; Mage = 20.35, SDage = 3.24) attended a MiE program. Of these, five (21.74%) reported familiarity with mindfulness practices (e.g., meditation, yoga) prior to the program, and thirteen (56.52%) reported having had psychological or psychiatric treatment in the past. These participants were paired with 21 students (90.48% female; Mage = 18.67, SDage = 0.73), who attended a different course on Philosophy for Children. The participants' flow diagram is presented in **Figure 1**. **Table 1** presents participants' demographic characteristics (e.g., familiarity with mindfulness practices, and previous psychological or psychiatry treatment). These two groups did not differ in their demographic characteristics.

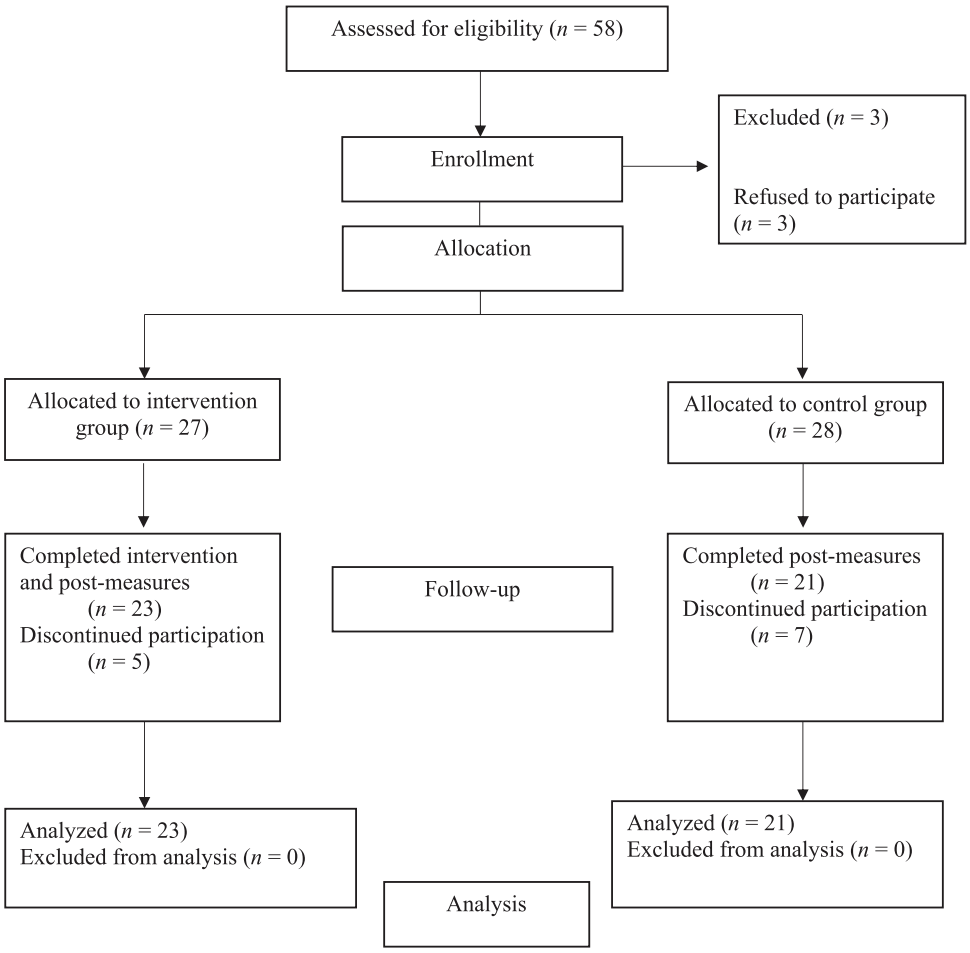

FIGURE 1
Flowchart of participants through each stage of the study.

Measures and instruments

The *Perceived Stress Scale* (PSS-10; Cohen et al., 1983; Portuguese version by Trigo et al., 2010), assesses the extent to which life events are perceived as stressors. The scale comprised ten items, where the subject is invited to indicate how often he/she felt or thought in a certain way during the last month, according to a five-point Likert scale (0 = "Never" to 4 = "Very Often"). Total scores correspond to the sum of the 10 items; higher scores indicate higher levels of stress (cut-off point = 25). In the present study, PSS-10 reliability was also adequate [α = 0.914, 95% CI (0.872, 0.943)].

The *Patient Health Questionnaire* (PHQ-9; Kroenke et al., 2001; Portuguese version by Ferreira et al., 2018) is a simple questionnaire which assesses the health and mood of the participants in a quick way, checking if they have any of the main signs and symptoms of depression. It is a scale designed to assess depression and is composed of nine items, evaluated on a four-point Likert scale: 0 ("Never") to 3 ("Almost Every Day"), with a score ranging between zero and 27 points. Total scores are obtained through the sum of all items. It should also be noted that a score equal to or higher than nine points is estimated as a positive indicator of depression. Both the original version (α = 0.86 to 0.89; Kroenke et al., 2001) and the Portuguese version (α = 0.869; Ferreira et al., 2018) revealed adequate reliability. In this study, the reliability of the PHQ-9 was also adequate [α = 0.839, 95% CI (0.766, 0.900)]. This scale objectively determines the severity of the initial symptoms and monitors the changes in symptoms and the effects of treatment over time, for this reason we chose to include it in the present study.

The *Generalized Anxiety Disorder* (GAD-7; Spitzer et al., 2006; Portuguese version of Sousa et al., 2015) is a self-report scale which consists of seven items, assessed on a Likert scale from zero ("Never") to three ("Almost Every Day"), designed to measure the severity of the various symptoms of Generalized Anxiety Disorder. The total score can range from zero to 21 points and is obtained through the sum of the scores of all

items; the higher the score, the higher the severity of anxiety symptoms. A score equal to or higher than nine points is estimated as a positive indicator of anxiety. In the present study, GAD-7 reliability was also adequate [α = 0.899, 95% CI (0.840, 0.938)].

The *Five Facets Mindfulness Questionnaire* (FFMQ; Baer et al., 2006, Portuguese version by Gregório and Pinto-Gouveia, 2011) is a self-report instrument to assess the general tendency of being mindful in daily life. It is composed of thirty-nine items, evaluated on a Likert scale from one ("Never or Very Rarely True") to five ("Often or Always True"). The present scale measures five subdimensions of mindfulness: (a) observing (eight items); (b) describing (eight items); (c) acting with awareness (eight items); (d) non-judging (eight items) and (e) non-reacting (seven items). The scores of the subscales range between eight and forty points, except for the non-reactive subscale which varies between 7 and 35 points; the higher the score, the higher the levels of mindfulness. In the present study, good reliability was also obtained [α = 0.908, 95% CI (0.865, 0.939)].

The *Self-Compassion Scale* (SCS; Neff, 2003; Portuguese version of Castilho and Gouveia, 2011) is a self-report measure consisting of a total of 26 items divided into six subscales: Self-Kindness (five items); Self-Criticism (five items); Human Condition (four items); Isolation (four items); Mindfulness (four items) and Over-Identification (four items). Each item is rated on a five-point Likert scale (1 = "Almost Never" and 5 = "Almost Always"). The total score is obtained through the sum of the scores of all items, and it is also possible to obtain the average score for each subscale (partial results). Higher scores indicate higher levels of self-pity/self-compassion. In the present study, SCS reliability was also adequate [α = 0.944, 95% CI (0.917, 0.965)].

TABLE 1 Demographic characteristics.

Variables	MiE (n = 23)	Control (n = 21)	
Age in years, M (*SD*)	20.35 (3.24)	18.67 (0.73)	$t(24.43) = -2.42$, $p = 0.023$, $d = 0.71$
Gender			
Male, *n* (%)	4 (17.39%)	2 (9.52%)	$\chi^2(1, 44) = 0.59$, $p = 0.44$
Female, *n*(%)	19 (82.61%)	19 (90.48%)	
Marital status			
Single, *n*(%)	22 (95.65%)	21 (100%)	$\chi^2(1, 44) = 1.32$, $p = 0.25$
Married, *n*(%)	1 (4.35%)	0	
Psychological or psychiatric treatment			
Past, *n*(%)	13 (56.52%)	7 (33.33%)	$\chi^2(1, 44) = 2.33$, $p = 0.13$
Present, *n*(%)	3 (13.04%)	1 (4.76%)	$\chi^2(1, 44) = 0.96$, $p = 0.33$
Meditation or yoga practice			
Past, *n*(%)	5 (21.74%)	1 (4.76%)	$\chi^2(1, 44) = 0.31$, $p = 0.58$
Present, *n*(%)	1 (4.35%)	1 (4.76%)	$\chi^2(1, 44) = 0.01$, $p = 0.92$

MiE, Mindfulness in Education.

Setting, design and procedure

At the beginning of the first year, and within the scope of study plans for four undergraduate courses, the Polytechnic of Porto's School of Education gives students the opportunity to choose the curricular option which they would like to attend, based on an offer of four courses: MiE, Philosophy for Children, Education for Free Time or English.

The MiE program was carried out in person at the Polytechnic of Porto's School of Education. MiE took place between February and May, once per week. At the baseline, alongside the presentation of the goals and contents of the course, the commitment to formal and informal daily meditation practices was highlighted. Students were informed that they were expected to attend at least two-thirds of all sessions and to spend 10–20 min completing daily practice. After this presentation, students were invited to participate in the present study.

The MiE program transpired over 12 weeks. However, the Easter holiday period and Academic Week break were respected, therefore there were no weekly sessions during that time. Students were invited to keep their daily practice autonomous, using the audios available for this purpose.

Participants of both groups gave their consent and completed baseline and post-program assessments in person at the Higher School of Education. The study was approved by the Center for Research and Innovation in Education (inED).

Mindfulness in education program

MiE was designed specifically for implementation at this college. It was adapted from MBCT (Teasdale et al., 1995), MBSR (Kabat-Zinn, 1982) and Mindful Self-Compassion (MSC; Neff and Germer, 2013). The MiE program includes 12 weekly group sessions. The sessions lasted an average of 2 h, except for session six—a retreat—which lasted for 5 h. Mindfulness meditation was the most trained and taught skill in MiE and aimed to progressively train in "Full Attention to Breathing" (Didonna, 2009). The main objective of this practice is having awareness of bodily sensations, thoughts and emotions that arise from moment to moment, continually returning the focus of attention to the breath whenever the mind wanders in a non-judgmental and non-reactive way.

The main training components were composed of several types of formal (sitting meditation) and informal (during

daily life) mindfulness and self-compassion practices (e.g., mindfulness of breath, body scan, and loving-kindness meditation), cognitive skills and homework (recording audio with a version of each meditation). All sessions started with a formal practice of 10 min of attention to breathing. There were experiential exercises and discussion periods in each session in addition to homework assignments to help participants learn how to be kinder and more mindful. The goal was to provide participants with several skills to increase mindfulness and self-compassion, and decrease depression, anxiety, and stress symptoms.

Table 2 shows an outline of the program.

Instructors

The sessions were guided by two psychology teachers, both certified and trained in third-generation cognitive-behavioral therapies, with experience and training in a several types of MBIs, namely MBCT, MBSR, MSC, and Compassionate Integrity Training (Compassionate Integrity Training, n.d.). The instructors were the first and second authors of this paper.

Data analysis

The analysis was performed using R (version 3.5.3; R Core Team, 2019). Robust methods were used in order to control the effect of deviations from normality (Wilcox, 2011; Field and Wilcox, 2017). R package WRS2 (Mair and Wilcox, 2020) was used to compute two-way between-within subjects ANOVA on the trimmed means of depression, anxiety, stress, mindfulness, and self-compassion. The WRS2 package was also used to compute *post hoc* Yuen's tests on trimmed means for dependent samples. Robust standardized difference (Algina et al., 2006) was used as a measure of effect size. R package *ggstatsplot* (Patil and Powell, 2018) was used to depict results.

The Reliable Change Index (RCI) was computed for the PSS-10, PHQ-9, and GAD-7 according to the proposal by Christensen and Mendoza (1986). The PSS revealed an RCI of 7.68, the PHQ-9 of 5.75 and GAD-7 of 5.17.

Results

Descriptive statistics are presented in Table 3. The mean PHQ-9 depressive symptoms score for the participants in the MiE condition was 10.30 (SD = 6.28) at the baseline, indicating elevated symptom levels typical of clinical ranges. Similarly, the mean GAD-7 generalized anxiety symptoms score for the participants in the MiE condition was 10.26 (SD = 5.00) at the baseline, indicating elevated symptoms levels typical of clinical or borderline clinical ranges.

Depression

There were no significant main effects of condition [$F(1, 23.897) = 0.163$, $p = 0.690$] and session [$F(1, 23.586) = 0.580$, $p = 0.454$] on depression severity. There was a significant

TABLE 2 Mindfulness in education program.

Session	Outline
Baseline	Group presentation Definition of basic operating rules (privacy/confidentiality) and clear guidelines Doubts, clarification and presentation of contents and objectives of the program Provision of consent form Assessment: self-report questionnaires.
1	Breathing meditation Introduction to mindfulness Homework and home practice prescription.
2	Breathing meditation, check-in and homework review Mindfulness origins Nine Foundational Attitudes of Mindfulness according to Kabat-Zinn Sitting meditation (practice and discussion) Homework and home practice prescription.
3	Breathing meditation, check-in and homework review Automatic pilot vs. present mind Meditation types: examples of formal and informal meditation Sitting meditation (practice and discussion) Homework and home practice prescription.
4	Breathing meditation, check-in and homework review Mindfulness-based Interventions Sitting meditation (practice and discussion) Homework and home practice prescription.
5	Breathing meditation, check-in and homework review Exploration: Stress, Anxiety, Depression and Mindfulness Body Scan (practice and discussion) Homework and home practice prescription.
6	**Retreat:** A silence day of meditation (approximately 5 h) of different forms of guided meditation (e.g., sitting meditation, walking meditation, art meditation and eating meditation) Exploration: the experience of the retreat (feelings, sensations, thoughts).
7	Breathing meditation, check-in and homework review Mindful movements (outline, practice and discussion) Sitting meditation (practice and discussion) Homework and home practice prescription.
8	Breathing meditation, check-in and homework review Exploration: Health and Mindfulness Sitting meditation (practice and discussion) Homework and home practice prescription.
9	Breathing meditation, check-in and homework review Introduction to Compassion and Self-compassion Sitting meditation (practice and discussion) Homework and home practice prescription.
10	Breathing meditation, check-in and homework review Exploration: Compassionate response to oneself and others Sitting meditation (practice and discussion) Homework and home practice prescription.
11	Breathing meditation, check-in and homework review Communication: mindful and empathetic listening Sitting meditation (practice and discussion) Homework and home practice prescription.
12	Breathing meditation, check-in and homework review Exploration: challenges and obstacles to daily practice Review of meditations and attitudes of mindfulness, experience of Mindfulness in Education and next steps/directions. Closing: sharing.

TABLE 3 Descriptive statistics.

Variable		MiE	Control	
Depression, *M* (*SD*)	Baseline	10.30 (6.28)	7.95 (4.61)	$t(42) = -1.40$, $p = 0.168$, $d = 0.43$
	Post-program	8.35 (5.36)	9.33 (5.54)	
Stress, *M* (*SD*)	Baseline post-program	22.61 (8.03)20.26 (7.9)	20.05 (7.45)22.86 (8.53)	$t(42) = -1.09$, $p = 0.280$, $d = 0.33$
Anxiety, *M* (*SD*)	Baseline post-program	10.26 (5.00)9.00 (5.95)	9.00 (5.95)11.14 (5.94)	$t(42) = -0.76$, $p = 0.450$, $d = 0.23$
Mindfulness, *M* (*SD*)	Baseline post-program	120.35 (21.29)127.13 (18.24)	122.67 (18.98)120.05 (18.11)	$t(39) = 0.42$, $p = 0.676$, $d = 0.13$
Self-Compassion, *M* (*SD*)	Baseline post-program	75.17 (19.78)83.22 (18.26)	76.57 (19.62)77.24 (20.51)	$t(40) = 0.17$, $p = 0.866$, $d = 0.05$

interaction between session and condition on depression severity [$F(1, 23.586) = 7.409$, $p = 0.012$]. *Post hoc* analysis (see **Figure 2**) revealed a statistically significant and large decrease in the severity of depression in the MiE condition [$t_{Yuen}(14) = 2.315$, $p = 0.036$, $\delta_R = 0.554$, 95% CI (0.217, 1.021)] but not in the control condition [$t_{Yuen}(12) = -1.488$, $p = 0.162$, $\delta_R = -0.338$, 95% CI (−0.749, 0.041)] which displayed a moderate increase in depression.

Stress

There were no significant main effects of condition [$F(1, 23.852) = 0.075$, $p = 0.787$] and session [$F(1, 22.467) = 0.008$, $p = 0.931$] in the level of stress. There was a significant interaction between session and condition in the level of the stress [$F(1, 22.467) = 5.662$, $p = 0.026$]. *Post hoc* analysis (see **Figure 3**) did not reveal any statistically significant changes in the level of the stress in the MiE condition [t_{Yuen} (14) = −1.443, $p = 0.171$, = 0.313, 95% CI (−0.091, 0.757)].

Anxiety

There were no significant main effects of condition [$F(1, 22.271) = 0.130$, $p = 0.722$] and session [$F(1, 21.860) = 0.026$, $p = 0.873$]. In the same way, there were no significant interactions between session and condition on anxiety severity [$F(1, 21.860) = 3.905$, $p = 0.061$]. *Post hoc* analysis (see **Figure 4**) did not reveal any statistically significant changes on anxiety severity in the MiE condition [t_{Yuen} (14) = −1.319, $p = 0.208$, $\delta_R = 0.249$, 95% CI (−0.161, −0.756)].

Mindfulness and self-compassion

There were no significant main effects of condition [$F(1, 23.639)$, = 0.031, $p = 0.861$] and session [$F(1, 17.309) = 1.256$, $p = 0.278$] in the level of mindfulness. There was no significant interaction between session and condition in the level of mindfulness [$F(1,17.309) = 4.037$, $p = 0.060$]. *Post hoc* analysis did not reveal any statistically significant changes in the level of mindfulness in the MiE condition [$t_{Yuen}(14) = -1.738$, $p = 0.104$, $\delta_R = -0.233$, 95% CI (−0.797, −0.184)]. However, it should be noted that, in the experimental condition, in contrast to the control condition, there was an average increase of about seven points between baseline [$\mu = 120.348$, 95% CI (112.911–129.232)] and post-intervention [$\mu = 127.130$, 95% CI (119.092–134.240)] for the mindfulness variable. In the same way, there were no significant main effects of condition [$F(1, 23.600) = 0.320$, $p = 0.577$] and session [$F(1, 18.934) = 4.120$, $p = 0.057$] in the level of self-compassion. *Post hoc* analysis did not reveal any statistically significant changes in the level of self-compassion in the MiE condition [$t_{Yuen}(14) = -1.877$, $p = 0.081$, $\delta_R = -0.694$, 95% CI (−1.685, −0.151)]. There was an average increase of about eight points between baseline [$\mu = 75.174$, 95% CI (65.826–81.379)] and post-intervention [$\mu = 83.217$, 95% CI (76.922–90.418)] for the self-compassion variable.

Improved, recovered and deteriorated

Table 4 shows the percentage of improved, recovered and deteriorated participants in both conditions according to the Reliable Change Index (RCI). As noted, the calculation of the RCI points to an improvement and clinical recovery in stress, depression and higher anxiety in the MiE condition. In addition, it appears that it is in the control condition that there are more participants who deteriorated over time, in terms of stress, anxiety, and depression.

Discussion

The mental health of university students has been a public health concern for some time. Previous studies (e.g., Bayram and Bilgel, 2008; DeRoma et al., 2009; Gallego et al., 2014; Goyal et al., 2014; Beiter et al., 2015; Habihirwe et al., 2018; Bamber and Morpeth, 2019) suggest that higher education students tend to experience increased levels of stress, anxiety, and depression as a result of multiple academic, social and institutional challenges (Hindman et al., 2015; Bamber and Kraenzle Schneider, 2016).

TABLE 4 Percentage of improved, recovered and deteriorated participants according to the Reliable Change Index (RCI).

	Improved		Recovered		Deteriorated	
	MiE	Control	MiE	Control	MiE	Control
Stress, *n* (%)	5 (21.74%)	0	3 (13.04%)	0	2 (8.70%)	5 (23.81%)
Depression, *n* (%)	5 (21.74%)	1 (4.76%)	4 (17.39%)	1 (4.76%)	2 (8.70%)	3 (14.29%)
Anxiety, *n* (%)	5 (21.74%)	1 (4.76%)	2 (8.70%)	0	3 (13.04%)	4 (19.05%)

RCI, PSS-10 > 7.68; PHQ-9 > 5.75; GAD-7 > 5.17. Cut-off, PSS-10 = 25; PHQ-9 = 9; GAD-7 = 9.

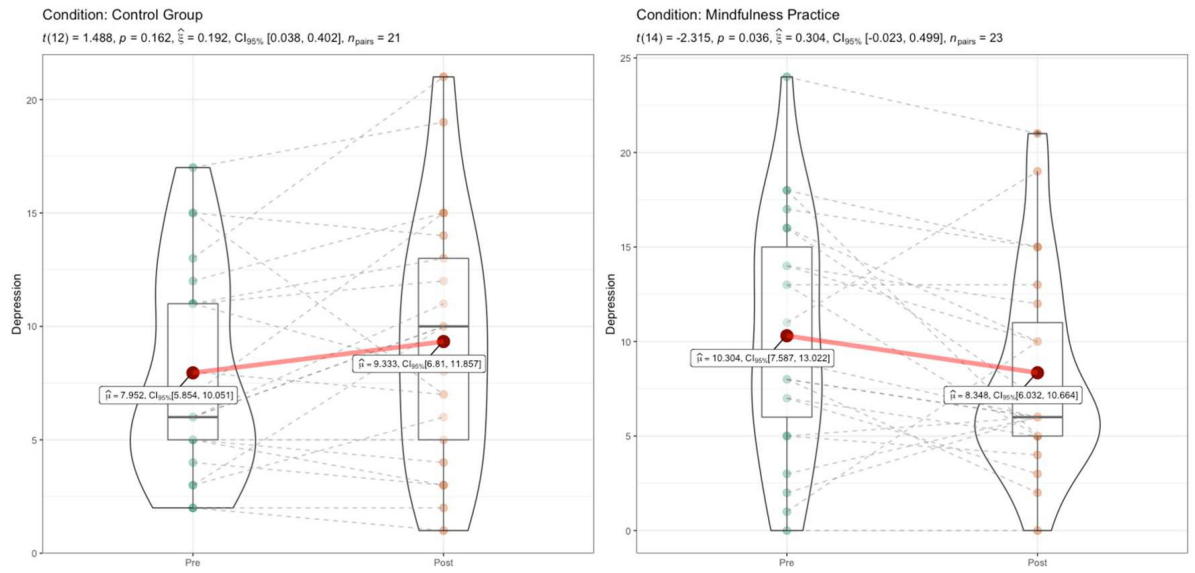

FIGURE 2
Evolution of experimental and control conditions between moment T1 and Moment T2 in the depression variable.

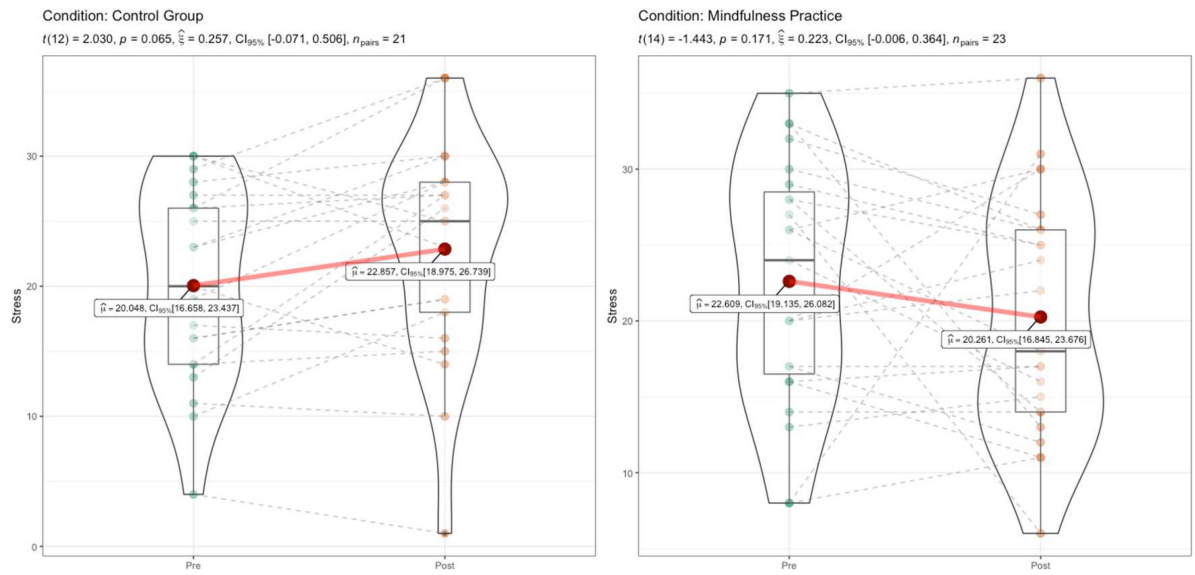

FIGURE 3
Evolution of the experimental and control condition between moments T1 and T2, in the stress variable.

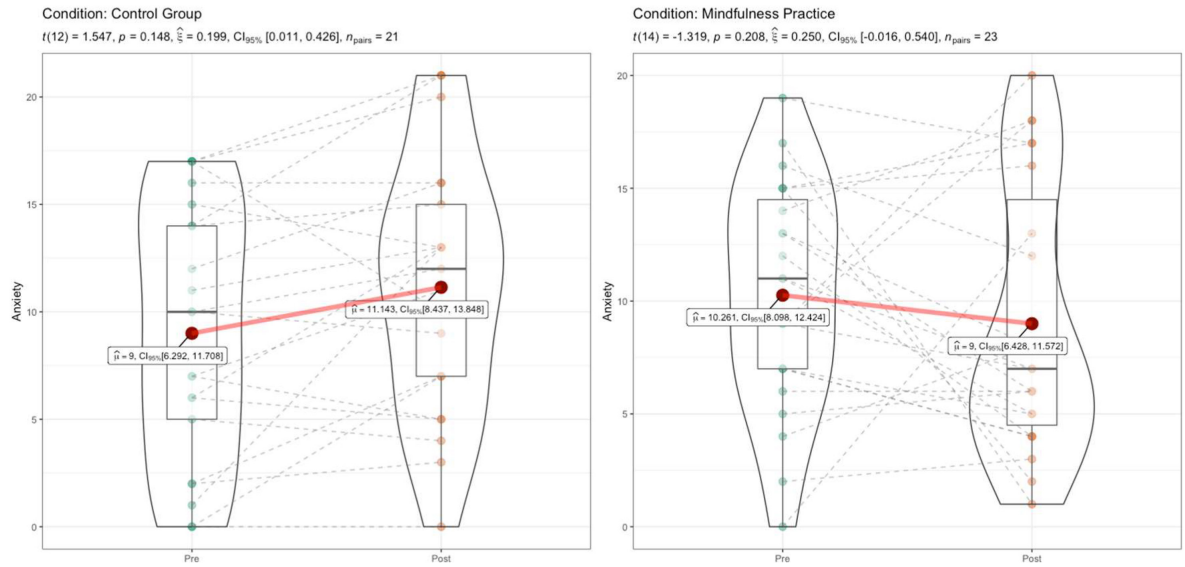

FIGURE 4
Evolution of experimental and control conditions between T1 and T2 for the anxiety variable.

The present study aimed to evaluate the effects of MiE on stress, generalized anxiety, depression, mindfulness and self-compassion in first-year students. It also aimed to train students in terms of self-care skills, essential in this period of development, thus determining whether MBIs can be protective to promote good adaptation of students to the different demands of higher education.

In accordance with prior research (e.g., Palmer and Rodger, 2009; Erogul et al., 2014; Gallego et al., 2014; Bamber and Kraenzle Schneider, 2016; Shearer et al., 2016), students in the MiE condition reported significantly reduced perceived stress and depression. These results appear to be consistent with earlier systematic reviews (e.g., McConville et al., 2017; Halladay et al., 2019). However, there are no statistically significant differences in terms of anxiety, mindfulness and self-compassion. Compared to previous studies (e.g., Benjet et al., 2019), at the baseline, students reported higher rates of psychiatric or psychological treatment in the past, which may indicate some type of emotional or behavioral problems, namely depression or anxiety. This may explain the results obtained, particularly the fact that students in the MiE condition did not differ significantly in measures of generalized anxiety compared to the control condition. One reason for this result could be the number of sessions in the program, since there are authors (e.g., Bamber and Morpeth, 2019) who suggest that programs with around thirty sessions show better results in terms of reducing anxiety. Another aspect to note is the fact that MBIs increase the mindfulness daily practice as a habit and a routine (Halladay et al., 2019). This aspect may also explain the results obtained in terms of anxiety as, although home practice has always been encouraged and reinforced in all MiE sessions, it may be the case that student engagement has decreased over time. In addition, although MIBs are effective in decreasing symptoms in a variety of disorders, the psychological mechanisms are not entirely understood, particularly amongst individuals with generalized anxiety symptoms (e.g., Hoge et al., 2015). Nevertheless, it should be noted that the experimental condition showed a decrease in the mean values of generalized anxiety (measured by the GAD-7) compared to the control condition.

Another objective of this study was to ascertain whether participation in MiE would lead to changes in the levels of mindfulness, as measured by the FFMQ. Contrary to what was seen in other studies, the results indicated the absence of significant effects of the intervention (e.g., Erogul et al., 2014; De Bruin et al., 2015; Song and Lindquist, 2015; Lynch et al., 2018; Serrão and Alves, 2019). Facing this unexpected result, some hypotheses are raised. As we can see at the baseline, participants of the MiE group had a high average level of mindfulness, which may have explained the results of the present study, since these could have overestimated their mindfulness skills (e.g., De Bruin et al., 2015; Serrão and Peixoto, 2020), particularly non-judgmental, observe, non-reactive skills, at an early stage. The hypothesis we put forward is that with the development of the MiE the participants gained a better understanding of each of the attitudes, which may have led to a greater awareness of the skills they hold and what they need train and learn.

The present findings suggest that the mindfulness-based meditative practices, when included in academic curriculum programs, appear to be a promising response to mental health care as they provide opportunities for the development of skills to deal with and manage stressful events. The reduction of psychological stress in higher education students seems to have

a clear effect in terms of preventing diseases and promoting mental health (Gallego et al., 2014). It seems, however, that some students do not benefit from these practices, suggesting that caution is required in the use of these programs in general (e.g., Baer and Kuyken, 2016; Baer et al., 2019; Halladay et al., 2019). In addition, some potential harmful effects may also be underestimated/neglected, which are likely to be more common than thought (Britton and Sydnor, 2015; Baer et al., 2019). These programs, although promising, do not seem to replace psychotherapeutic interventions targeting specific populations and are eventually even contraindicated (Arch and Ayers, 2013). In addition, findings support the higher risk of psychological distress amongst students and the need for urgent intervention by higher education policy to integrated approaches to the mental health promotion (Schofield et al., 2016).

Although the results of this study are encouraging, they must be analyzed with caution, given the sample size and the characteristics of the study developed. Thus, additional research should be carried out, identifying, for example, the mechanisms of action and their interactions with the different symptoms, using a larger number of students, complementary qualitative measures and including psychophysiological markers and neurocognitive measures, since these measures are more sensitive to subtle changes in anxiety, stress, and depression.

Finally, it is suggested that studies are carried out which make it possible to identify the psychosocial characteristics that predict a good response from students to this type of interventions and generate differentiated responses to mental health care in the context of higher education. It is also important, based on the use of more consistent monitoring methods, to assess, for example, the relationship between the effect of these interventions and the daily time devoted by each participant, both to formal and informal practices.

Limitations

Several limitations should be mentioned. Firstly, the findings are limited by small sample size. Secondly, mindfulness is a complex construct which may not be fully captured by self-report tools. Thirdly, the absence of the follow-up moment, it being impossible to see whether the results have changed over time. Finally, it is also important to mention the fact that there are no concrete indicators of the time spent by each student in the formal practice of mindfulness throughout the entire intervention.

Conclusion

In higher education, students are confronted with multiple academic, social and institutional challenges. MBIs as part of the core curriculum in first-year courses could teach students self-care skills during this important developmental period. The results of this study suggest that the mindfulness-based meditative practices, when included in academic curriculum programs, appear to be a promising response to mental health care as they provide opportunities for the development of skills to deal with and manage stressful events.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by INED. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CS and AR contributed to conception and design of the study, project administration—supervision and coordination, were involved in the data collection, wrote the first draft of the manuscript, manuscript preparation, manuscript revision, reviewing, editing, and manuscript final version approval. TF organized the database and performed the statistical analysis. All authors contributed to manuscript revision, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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