Effectiveness of mindfulness-based stress reduction and attachment-based compassion therapy for the treatment of depressive, anxious and adjustment disorders in mental health settings: A randomized controlled trial

Running head: Comparing the efficacy of MBSR and ABCT

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Abstract

Objectives: To study the effectiveness of Attachment-Based Compassion Therapy (ABCT) for reducing affective distress in a sample of outpatients with depressive, anxiety or adjustment disorders, and to explore its action mechanisms.

Methods: This randomised controlled trial involved assessment time points of pre-treatment, post-treatment, and 6-months follow-up. A total of 90 patients from three mental health units in Castellón (Spain) were recruited and randomly assigned to 'ABCT + treatment as usual (TAU)', 'Mindfulness-based stress reduction (MBSR) + TAU', or 'TAU' alone. Affective distress, as measured by the 'Depression, Anxiety and Stress Scales' (DASS-21) was the main outcome; self-compassion and mindfulness were also assessed. Multilevel mixed-effects models were performed to estimate the efficacy of the programme, and path analysis were conducted to study the potential mechanistic role of mindfulness and self-compassion.

Results: ABCT was not superior to MBSR in any outcome or assessment point. ABCT was superior to TAU both post-treatment ($B=-13.20$; 95% CI: -19.57, -6.84) and at 12-month follow-up ($B=-7.20$; 95% CI: -13.63, -0.76) for reducing DASS-21, and MBSR was superior to TAU both post-treatment ($B=-11.51$; 95% CI: -17.97, -5.05) and at 12-month follow-up ($B=-8.59$; 95% CI -15.09, -2.10), with large effects ($d \geq 0.90$). Changes produced in DASS-21 by ABCT were mediated by self-compassion, while changes produced by MBSR were mediated by both mindfulness and self-compassion.

Conclusion: ABCT is efficacious for reducing affective distress in patients with anxiety, depressive or adjustment disorders, although its effect is not superior to MBSR's. Self-compassion seems to be a significant mediator of the effects of ABCT.

Trial registration number: NCT03425487

Keywords: Attachment-based compassion therapy; mindfulness-based stress reduction; randomised controlled trial; mediation analysis; depression; anxiety; adjustment disorder

1. Introduction

Depressive, anxiety and adjustment disorders are the most prevalent conditions among mental health outpatients, with prevalence rates between 3.6% and 4.4% in the general population and increasing tendencies (Lefstad, 2017; Vos et al., 2016). These mental health problems often have a negative impact on the individual's functionality and health-related quality of life (Bandelow & Michaelis, 2015; Richards, 2011), and in some cases can induce the development of severe psychiatric conditions, such as suicidality (Bisson & Sakhuja, 2006; Casey et al., 2015). Thus, it is essential that effective interventions to treat these conditions become widely available (Harris et al., 2015).

Different psychotherapies have proved to be efficacious for treating these disorders; in the last decades, 'third wave' psychotherapies have been studied with increasing interest due to the positive results that they have achieved when treating different health-related conditions in different contexts (Demarzo et al., 2015; Gotink et al., 2015; Khoury et al., 2013). 'Third wave' psychotherapies constitute an innovation within the classic cognitive-behavioural therapy, as they do not focus on symptom relief as the main outcome but try to promote wellbeing through the practice of mindfulness, compassion, acceptance and spirituality (Jahoda et al., 2017).

Mindfulness-Based Stress Reduction (MBSR) and Attachment-Based Compassion Therapy (ABCT) are two examples of 'third wave' psychotherapies. The first endeavours to train the mind to adopt a non-judgemental present-focused awareness by cultivating full attention through different meditation exercises (Kabat-Zinn, 1991); its efficacy for treating anxiety and depression has been reported in different studies, and 'third wave' variables such as trait mindfulness and self-compassion have been identified as potential mediators of MBSR (Germer & Neff, 2013; Gu et al., 2015). However, its effects are low when compared with other active treatments (Khoury et al., 2013; Sundquist et al., 2015), and its long-term duration has also been questioned (Pérez-Aranda et al., 2019; Wang et al., 2018; Williams & Mercer, 2015).

On the other hand, ABCT explicitly focuses on cultivating compassionate attitudes (García-Campayo & Demarzo, 2015). Compassion refers to an orientation of mind characterized by sensitivity towards suffering—both own and others'—and a commitment to relieve it by recognising its universality and the ability to meet that pain with equanimity (Feldman & Kuyken, 2011; Macbeth & Gumley, 2012). ABCT has

proved efficacy to increase self-compassion in healthy individuals (Navarro-Gil et al., 2020), and to improve different clinical outcomes, including depression and anxiety, in fibromyalgia patients (Montero-Marín et al., 2018), with the possible mediating role of mindfulness and self-compassion (Montero-Marín et al., 2020). Nevertheless, the efficacy of ABCT needs to be studied in more populations to fully understand its applicability and effectiveness, as well as the potential pathways of change involved.

The main objective of this study was to explore the effectiveness of ABCT added to treatment-as-usual (TAU) compared with MBSR+TAU in a sample of patients from mental health settings suffering from depressive, anxiety or adjustment disorders. Moreover, this study aimed to analyse the possible mediating role of mindfulness and self-compassion on improvements in the intervention groups compared with TAU.

2. Methods

2.1. Design

This study is a multicentre, randomised controlled trial (RCT) comprising three parallel arms ('ABCT+TAU', 'MBSR+TAU' and 'TAU alone'), with pre-treatment, post-treatment and 6-month follow up measurements. The RCT was conducted following the "Consolidated Standards of Reporting Trials" guidelines (Moher et al., 2010).

2.2. Recruitment and inclusion criteria

Study participants were recruited from three mental health units in Castellón (Spain). The following inclusion criteria were applied: 1) aged between 18 and 75 years; 2) depressive and/or anxious disorder, or adjustment disorder with depressive and/or anxious symptomatology (based on the DSM-5 criteria); 3) mild or moderate severity according to the clinical criteria; 4) proficiency in Spanish; and 5) provision of written informed consent. The following exclusion criteria were also considered: 1) having done any type of meditative or contemplative practice in the previous year; 2) diagnosis of any disease that could affect the central nervous system; 3) other psychiatric diagnoses or acute psychiatric illnesses; 4) any medical condition or infectious or degenerative disease that could affect mood; and 5) presence of delusional ideas or hallucinations. Diagnoses were conducted by psychiatrists or psychologists using the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition Research Version

(First et al., 2015). According to the study protocol estimation (Montero-Marin et al., 2019), the total sample size needed was established at 90 patients (30 per group).

2.3. Procedures and ethics

Recruitment was conducted consecutively in one wave from September 2018 to February 2019. Potential participants were referred to the corresponding research unit to be offered information about the study and were subsequently provided with the confidentiality and informed consent documents, if they agreed to participate. A simple random sequence was remotely generated after baseline evaluation. Written informed consent was obtained from all participants included in the study before randomization. This study was approved by the Ethics Committee of the General University Hospital of Castellón (7/2017). All procedures performed in this study were in accordance with the criteria of the 1964 Declaration of Helsinki and the Declaration of Madrid of the World Psychiatric Association. The confidentiality of participants was protected by the Spanish Organic Law on Protection of Personal Data and Guarantee of Digital Rights (3/2018, LOPD-GDD), and all relevant EU legislation on privacy and data protection. This trial was performed in compliance with the study protocol (NCT03425487), as well as with good clinical practice guidelines (Vijayanathan & Nawawi, 2008).

2.4. Interventions

2.4.1. Attachment-based compassion therapy

ABCT intervention consisted of 8 weekly 2 hours group sessions—ranging from 10 to 15 participants—conducted by a clinical psychologist certified in ABCT and specifically trained to ensure the integrity of the programme (García-Campayo et al., 2016). The ABCT protocol includes teachings, daily simple exercises, meditation, visualisations, and specific practices to augment the patients' ability to be considerate and kind towards themselves and their own experience of suffering and others' experience of suffering. Subjects received written and audio materials and resources with theoretical concepts, exercises, and meditation guides to support home practice. Home exercises were commented on in each session to resolve possible doubts and encourage adherence to the programme. A summary of the session structuring in terms of theory and formal and informal practices can be found elsewhere (Montero-Marin et al., 2019).

2.4.2. Mindfulness-based stress reduction

MBSR intervention also consisted of 8 weekly 2.5 hours group sessions conducted by a clinical psychologist certified in MBSR therapy, and specifically trained to ensure the integrity of the programme (Blacker et al., 2017; Kabat-Zinn, 1991). The MBSR protocol presents an educational orientation that includes teachings, informal exercises, formal meditation, as well as individual and group dialogues and inquiries about perceptions and habits. In this study, the full-day retreat of practice of meditation included in the original protocol was ruled out to avoid schedule incompatibility; this same adjustment has also been done in other previous MBSR adaptations (Samuelson et al., 2007; Segal et al., 2002). Subjects received written and audio resources with theoretical concepts, exercises, and meditation guides to support home practice. Home exercises were commented on in each session to resolve doubts and encourage adherence. A summary of the session structuring in terms of theory and formal and informal practices can be found elsewhere (Montero-Marin et al., 2019).

2.4.3. Treatment as usual

TAU was delivered in current daily practice by psychiatrists and clinical psychologists of the national mental health service in Spain. TAU can refer to psychiatric treatment, which typically includes prescription and monitoring of antidepressant and/or anxiolytic medication, psychological treatment, or a combination of both.

2.5. Measures

In addition to the outcomes described next, the following sociodemographic data was collected at baseline: age, gender, marital status, number of children, place of residence, education, employment, and economic level.

The main effectiveness outcome was general affective distress, considering it as a common symptom according to the tripartite model of anxiety, depression and stress (Clark & Watson, 1991). This was assessed through the ‘Depression Anxiety Stress Scales-21’ (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 is a self-report questionnaire composed of three subscales (depression, anxiety, and stress), each consisting of seven items measured in a 4-point Likert scale. This questionnaire provides us with a one-dimensional global measure of emotional distress which ranges from 0 to 63 and that was considered the main study outcome. The DASS-21 has been validated in the Spanish population, showing strong psychometric properties (Daza et al., 2002).

The ‘Five Facet Mindfulness Questionnaire’ (FFMQ; Baer et al., 2006) was used to evaluate the possible mediating role of mindfulness. The FFMQ is a 39-item self-report that assesses five mindfulness facets: observing, describing, acting with awareness, non-judging of and non-reactivity to inner experience. Each item is answered on a 5-point Likert-type scale, and higher scores reflect higher levels of mindfulness. The facets can be combined to produce a total mindfulness score ranging from 39 to 195. The Spanish version of the FFMQ has shown good psychometric properties (Cebolla et al., 2012).

The ‘Self-Compassion Scale’ (SCS; Neff, 2003) was used to evaluate the potential mediating role of self-compassion. The SCS is a 26-item questionnaire designed to assess the components of self-compassion across the facets of common humanity, mindfulness, and self-kindness. The SCS uses a 5-point Likert-type scale; the subscale scores can be combined to produce a total self-compassion score that ranges between 26 and 130 (Neff et al., 2019), where higher scores indicate higher levels of self-compassion. The Spanish version of the SCS is a valid and reliable instrument (Garcia-Campayo et al., 2014).

2.6. Data analyses

Socio-demographic and clinical data were described at baseline by means of frequencies and percentages or means and standard deviations (SD), depending on the nature and distribution of each variable. The corresponding Chi-squared or one-way ANOVA tests were conducted to assess between-group differences.

Primary analysis consisted of a comparison between ‘ABCT+TAU’ vs ‘MBSR+TAU’ arms at post-test as primary endpoint, considering the DASS-21 total score as a continuous variable. Analysis was performed using a repeated measures design with an intention-to-treat base and hierarchical linear mixed-effects regression. Subjects were introduced as random effects by means of the restricted maximum likelihood method, which produces unbiased estimates of variance and covariance when using small sample sizes or unbalanced data (Egbewale et al., 2014). Raw estimations of slope coefficients (and their 95% CI) were calculated. Cohen’s *d*, as an effect size measure of between-group differences, was calculated by means of pooled pre-treatment SDs to weight the differences in the pre–post marginal means (Morris, 2008). Values of *d*=0.2 are considered small, with 0.5 medium and 0.8 large (Cohen, 1988). Secondary analysis evaluated the maintenance of the improvements achieved at 6-month follow-up. We also

explored results of the subscales of the DASS-21 (depression, anxiety, and stress), and the FFMQ and SCS using the same analytical strategy used for the primary analysis.

A sensitivity analysis on the primary outcome was performed to assess the effects of missing data, which were replaced by multiple imputations of 20 datasets based on chained equations and included all the variables introduced in the analyses, and those baseline variables that were significantly related to non-response as well as routinely collected sociodemographic data. Multilevel models were also used to assess the transdiagnostic effectiveness by including the diagnosis group as a random effect.

The potential role of mindfulness and self-compassion as possible mediators of changes was explored on the DASS-21 and sub-scales. For this, (1) primary outcome and sub-scales pre–follow-up differential scores were calculated and considered dependent variables; (2) pre–post differential scores of mindfulness and self-compassion total scores were calculated and included in the same model as simple process variables; (3) the group condition (‘ABCT+TAU’ vs ‘TAU alone’ or ‘MBSR+TAU’ vs ‘TAU alone’) was considered the independent variable. The mediation analyses were conducted using maximum likelihood-based path analyses for continuous dependent variables. Regression coefficients of bootstrapped indirect effects were estimated, as well as their 95% CIs based on 10,000 bootstrap samples, considering a significant mediating effect when the referenced 95% CI does not include zero (Lockhart et al., 2011). Total or partial mediation was established by calculating the percentage of mediating effects regarding the total effects for each potential mediator independently. Finally, the percentage of variance in the outcome that was explained by the corresponding mediating model was established by means of determination coefficients (R^2).

The overall alpha level was set at .05. No corrections for multiple comparisons were made for the primary analysis—because only one contrast was made in this regard—and for the secondary analyses—because they were considered explorative (Feise, 2002).

3. Results

3.1. Flow and compliance

After excluding 14 participants of the initial 104, the remaining 90 individuals were randomized into the three study arms (see Figure 1). The mean number of sessions attended in both interventions was similar (ABCT+TAU: $M=5.6$, $SD=2.4$; MBSR+TAU:

$M=5.4$, $SD=2.8$; $t=0.76$, $p=.58$). The retention rates ranged from 70% (MBSR) to 86.7% (TAU) posttreatment ($\chi^2=5.42$, $p=.067$), and from 70% (MBSR) to 83.3% (TAU) in the follow-up ($\chi^2=2.61$, $p=.271$). As shown in supplementary table 1, the only variable that significantly predicted dropout was employment status.

FIGURE 1

3.2. Baseline characteristics

Most patients were women, middle-aged, and married (Table 1). Most participants had at least completed primary education ($n=88$, 97.8%); almost 40% of the sample ($n=35$) had paid employment at baseline, and around 50% ($n=43$) earned less than the national minimum wage (NMW). No significant differences were found for sociodemographic characteristics between the three study arms. For what concerns to clinical data, the DASS-21 indicated moderate levels of affective distress in the three branches, with no significant differences among them. The total FFMQ and SCS scores presented moderate-high levels of mindfulness and self-compassion in the three study arms, with no statistical differences.

TABLE 1

3.3. Effects on affective distress

Table 2 shows descriptive statistics and between-group analyses for the DASS-21 (Supplementary table 2 presents the raw results). Compared to MBSR+TAU, ABCT+TAU was not superior at any assessment point. ABCT+TAU achieved a significantly greater reduction of affective distress than TAU post-treatment and at follow-up. MBSR+TAU obtained a greater reduction on affective distress compared to TAU post-treatment and at follow-up. The analyses of the DASS-21 subscales showed similar results; ABCT+TAU obtained significant reductions for all the subscales posttreatment compared to TAU, but in the follow-up two effects were lost: ‘Anxiety’ and ‘Stress’; MBSR+TAU was superior to TAU in the three subscales both posttreatment and in the follow up.

TABLE 2

The sensitivity analysis conducted after imputing missing data (Supplementary table 3) indicated that ABCT+TAU was superior both to TAU and MBSR+TAU, with effect sizes ranging from small to medium in this latter case. The models computed to

assess the transdiagnostic effectiveness of MBSR+TAU and ABCT+TAU indicated no significant differences between the two intervention arms, while both were individually superior to TAU (Supplementary table 4).

3.4. Effects on mindfulness and self-compassion

Table 2 displays descriptive statistics and between-group analyses for the process variables (Supplementary table 2 presents the raw results). Compared to TAU, patients receiving ABCT+TAU achieved a significant increase post-treatment in the FFMQ and the SCS-12. At 12-month follow-up, similar effects were found. MBSR+TAU was superior to TAU alone for increasing mindfulness and self-compassion both posttreatment and in the follow-up. No differences were observed between ABCT+TAU and MBSR+TAU at any assessment point.

3.5. Mediating role of mindfulness and self-compassion

Indirect effects analyses are detailed in Table 4. When comparing ABCT+TAU to TAU, the SCS resulted a significant mediator for the long-term change observed in DASS-21 total score and the ‘Stress’ subscale; for the ‘Depression’ subscale, both SCS and FFMQ resulted significant mediators; and no significant indirect effect was found for the ‘Anxiety’ subscale. On the other hand, the comparison between MBSR+TAU and TAU indicated that both FFMQ and SCS were significant mediators of DASS-21 total scores and its three subscales (Supplementary table 5 presents the direct effects).

TABLE 3

4. Discussion

The main aim of this study was to assess the efficacy of ABCT to reduce affective distress in a sample of outpatients with depressive, anxiety or adjustment disorders, compared to an active intervention (MBSR) and to an inactive control group (TAU). Our results indicate that ABCT is efficacious for reducing affective distress when compared to TAU, both posttreatment and at 6-months follow-up (these results can be complemented with the number needed to treat, see Appendices). The effect sizes were large in both cases, which means that the efficacy of ABCT on affective distress is maintained in the long-term; this represents a very promising result considering the generalized limitation that many psychotherapies have previously presented regarding their loss of effects at follow-up (Wang et al., 2018; Williams & Mercer, 2015). The study

conducted by Montero-Marin et al. (2018) on ABCT's effect on different clinical outcomes in a sample of fibromyalgia patients also reported large effects both posttreatment and at 3-months follow-up; similarly, Navarro-Gil et al. (2020) observed that ABCT's effects on different self-compassion dimensions were large, and that they were maintained after 6 months. Thus, our findings add to the promising body of evidence regarding ABCT's capacity to produce long term effects on different outcomes. In addition, and regarding treatment adherence, the present study observed low attrition rates and a high proportion of completers (76.7%), like the ones reported in previous studies, and very positive opinions regarding the intervention (see Appendices).

However, the results of the present study suggest that ABCT is not more efficacious than other mindfulness-based interventions such as MBSR. This latter was clearly superior to TAU, both posttreatment and in the follow-up, with large effect sizes in all the outcomes; in the same line, both ABCT and MBSR presented superior transdiagnostic effectiveness compared to TAU, but no differences were observed between the two interventions. MBSR has been described as an efficacious intervention for addressing different symptomatology, including anxiety and depression (Bohlmeijer et al., 2010; Chiesa & Serretti, 2009; Lauche et al., 2013); one of the main limitations of this intervention has typically been the loss of efficacy in the long-term, and some authors have hypothesized that the mechanisms that produce the therapeutic change might be too practice-dependent (Parsons et al., 2017; Pérez-Aranda et al., 2019). Nonetheless, in our study, MBSR's effect was maintained in the long-term, which could possibly be related to a great ability acquisition by those individuals who completed the intervention.

The second objective of this study was to explore the potential mediating role of mindfulness and self-compassion in the effects produced by the two interventions on the outcomes. Our results indicated that ABCT's long-term effects on affective distress were mediated by self-compassion, and not by mindfulness. On the other hand, and in line with previous findings (Gu et al., 2015; Kuyken et al., 2010; Pérez-Aranda et al., 2019), MBSR's effect was mediated by both mindfulness and self-compassion. These results seem to corroborate that mindfulness could be a specific mechanism of change of mindfulness-based interventions, whereas self-compassion might be a more extended mediator of 'third wave' interventions, since it could be being worked implicitly in many of them. In summary, mindfulness and self-compassion could be functioning as strong mediators in MBSR, but they could not be so strong in the case of ABCT, in which other

mechanisms like psychological flexibility or the attachment style might also be relevant (Hayes et al., 2011; Montero-Marín et al., 2018; Navarro-Gil et al., 2020).

Some limitations need to be acknowledged. First, our results were based on self-reported measures, which may imply a certain bias. On the other hand, the DASS-21 has been criticized due to its subscales not being a precise way to measure some outcomes, specially anxiety (Luciano et al., 2014); however, the total score, which was our main outcome, is considered a consistent measure of general affective distress (Zanon et al., 2020), and the subscales were only used as secondary outcomes. In addition, as stated previously, it needs to be reminded that the MBSR programme was modified by ruling out the full-day retreat of practice of meditation included in the original protocol; nonetheless, this modification did not minimize MBSR's efficacy. Finally, regarding process variables, both FFMQ and SCS offer subscales that were not used for the present study and that could offer an interesting view on some effects.

In summary, our findings support the efficacy of ABCT for treating anxiety, depressive and adjustment disorders, as its effects on affective distress were significant and large both posttreatment and in the 6-months follow-up when compared to TAU. Nonetheless, ABCT was not superior to MBSR, which also produced similar results when compared to the control group. Self-compassion seems to be a generic mediator of these two 'third-wave' interventions, which means that it could be being trained more or less explicitly, while mindfulness could be a specific pathway of change of MBSR.

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Conflict of interests

The authors declare that there is no conflict of interests.

Data availability statements

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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TABLES

Table 1. Baseline characteristics of patients by treatment group.

	ABCT+TAU (<i>n</i> = 30)	MBSR+TAU (<i>n</i> = 30)	TAU (<i>n</i> = 30)	<i>p</i>
Sociodemographic data				
Age, <i>mean (SD)</i>	46.83 (10.84)	44.30 (12.50)	47.90 (10.99)	.462
Gender (<i>n females</i> , %)	27 (90.0)	25 (83.3)	26 (86.7)	.925
Marital status, <i>n</i> (%)				.770
Single	6 (20.0)	3 (10.0)	4 (13.3)	
Married / relationship	20 (66.7)	22 (73.3)	19 (63.4)	
Separated / divorced	3 (10.0)	5 (16.7)	6 (20.0)	
Widowed	1 (3.3)	0 (0.0)	1 (3.3)	
Place of residence, <i>n</i> (%)				.833
Own home	22 (73.3)	22 (73.3)	20 (66.7)	
Relative's home	3 (10.0)	4 (13.3)	5 (16.7)	
Neighbor/friend's home	2 (6.7)	0 (0.0)	1 (3.3)	
Other	3 (10.0)	4 (13.3)	4 (13.3)	
Education, <i>n</i> (%)				.407
No studies	2 (6.7)	1 (3.3)	0 (0.0)	
Primary studies	11 (36.7)	8 (26.7)	15 (50.0)	
Secondary studies	12 (40.0)	13 (43.3)	8 (26.7)	
University	5 (16.7)	8 (26.7)	7 (23.3)	
Employment, <i>n</i> (%)				.253
Unemployed	3 (10.0)	2 (6.7)	4 (13.4)	
Employed	11 (36.7)	14 (46.5)	10 (33.3)	
Home duties	8 (26.6)	2 (6.7)	6 (20.0)	
Student	2 (6.7)	2 (6.7)	0 (0.0)	
Sick leave	2 (6.7)	5 (16.7)	1 (3.3)	
Retired	4 (13.3)	5 (16.7)	9 (30.0)	
Economic level, <i>n</i> (%)				.518
≤ NMW	15 (50.0)	15 (50.0)	13 (43.3)	
1-2 x NMW	11 (36.7)	6 (20.0)	11 (36.7)	
2-4 x NMW	3 (10.0)	8 (26.7)	6 (20.0)	
> 4 x NMW	1 (3.3)	1 (3.3)	0 (0.0)	
Time on treatment, <i>n</i> (%)				.822
0 to 2 months	4 (13.3)	6 (20.0)	5 (16.7)	
2 months to 1 year	6 (20.0)	7 (23.3)	9 (30.0)	
more than 1 year	20 (66.7)	17 (58.6)	16 (53.3)	
Type of treatment, <i>n</i> (%)				.702
Psychological	10 (33.3)	14 (46.5)	12 (40.0)	
Psychiatric	10 (33.3)	6 (20.2)	10 (33.3)	
Psychological and Psychiatric	10 (33.3)	10 (33.3)	8 (26.7)	
Diagnosis, <i>n</i> (%)				.260
Depression	7 (23.3)	5 (16.7)	9 (30.0)	
Anxiety	9 (30.0)	14 (46.5)	7 (23.3)	
Adaptive	9 (30.0)	8 (26.7)	13 (43.3)	
Mixed	5 (16.7)	3 (10.0)	1 (3.3)	
Clinical and process variables				
DASS-21 total, <i>mean (SD)</i> [0-63]	27.40 (12.56)	26.50 (15.11)	26.47 (14.08)	.958
DASS-21 depression, <i>mean (SD)</i> [0-42]	17.80 (10.97)	15.87 (11.99)	17.00 (11.82)	.811
DASS-21 anxiety, <i>mean (SD)</i> [0-42]	15.27 (9.59)	15.07 (11.31)	16.00 (9.32)	.932
DASS-21 stress, <i>mean (SD)</i> [0-42]	21.73 (8.01)	22.07 (9.72)	19.93 (10.35)	.642
FFMQ total, <i>mean (SD)</i> [39-195]	106.07 (12.76)	114.03 (15.49)	111.40 (19.24)	.153
SCS total, <i>mean (SD)</i> [26-130]	66.53 (10.42)	64.63 (17.19)	64.80 (14.40)	.850

ABCT+TAU: attachment-based compassion therapy plus treatment as usual. MBSR+TAU: mindfulness-based stress reduction plus treatment as usual. TAU: treatment as usual.

Table 2. Descriptive statistics and between-group analyses for primary, secondary and process outcomes (ITT approach of complete cases).

Outcomes	TAU <i>M (SD)</i>	MBSR+TAU <i>M (SD)</i>	ABCT+TAU <i>M (SD)</i>	TAU vs MBSR+TAU			TAU vs ABCT+TAU			MBSR+TAU vs ABCT+TAU		
				<i>d</i>	<i>t (p)</i>	<i>B (95% CI)</i>	<i>d</i>	<i>t (p)</i>	<i>B (95% CI)</i>	<i>d</i>	<i>t (p)</i>	<i>B (95% CI)</i>
Primary												
DASS-tot (0–63)												
Baseline	26.93 (8.05)	26.94 (7.37)	27.11 (7.55)									
Post-treatment	28.45 (8.50)	16.95 (8.79)	15.42 (8.63)	-1.46	-3.49 (<.001)	-11.51 (-17.97 to -5.05)	-1.66	-4.07 (<.001)	-13.20 (-19.57 to -6.84)	-0.22	-0.58 (.563)	-1.71 (-7.49 to 4.08)
Follow-up	25.53 (8.55)	16.96 (8.78)	18.52 (8.81)	-1.09	-2.60 (.009)	-8.59 (-15.09 to -2.10)	-0.90	-2.19 (.029)	-7.20 (-13.63 to -0.76)	0.18	0.46 (.647)	1.36 (-4.46 to 7.18)
Secondary												
DASS-D (0-21)												
Baseline	17.14 (6.15)	16.87 (5.63)	17.32 (5.76)									
Post-treatment	17.10 (6.35)	10.93 (6.69)	9.09 (6.56)	-0.98	-2.37 (.018)	-5.91 (-10.80 to -1.02)	-1.35	-3.33 (.001)	-8.19 (-13.01 to -3.38)	-0.40	-0.97 (.334)	-2.28 (-6.90 to 2.35)
Follow-up	15.69 (6.60)	10.35 (6.70)	9.62 (6.70)	-0.84	-2.01 (.044)	-5.07 (-10.01 to -0.14)	-1.03	-2.50 (.012)	-6.25 (-11.16 to -1.36)	-0.20	-0.50 (.617)	-1.19 (-5.84 to 3.47)
DASS-A (0-21)												
Baseline	15.68 (5.75)	15.47 (5.26)	15.51 (5.39)									
Post-treatment	17.53 (5.95)	10.56 (6.27)	9.59 (6.14)	-1.20	-2.86 (.004)	-6.76 (-11.39 to -2.13)	-1.37	-3.34 (.001)	-7.78 (-12.34 to -3.22)	-0.19	-0.51 (.609)	-1.11 (-5.35 to 3.13)
Follow-up	15.15 (6.15)	9.04 (6.28)	11.86 (6.28)	-1.05	-2.47 (.013)	-5.90 (-10.58 to -1.23)	-0.55	-1.32 (.187)	-3.12 (-7.76 to -1.51)	0.51	1.21 (.225)	2.64 (-1.62 to 6.91)
DASS-S (0-21)												
Baseline	21.06 (6.45)	21.59 (5.91)	21.50 (6.05)									
Post-treatment	22.69 (6.70)	12.57 (7.05)	12.37 (6.89)	-1.69	-4.05 (<.001)	-10.65 (-15.79 to -5.50)	-1.69	-4.16 (<.001)	-10.76 (-15.83 to -5.69)	-0.02	-0.05 (.960)	-0.12 (-4.80 to 4.56)
Follow-up	20.29 (6.95)	14.66 (7.06)	15.69 (7.03)	-0.98	-2.32 (.020)	-6.15 (-11.35 to -0.95)	-0.79	-1.92 (.055)	-5.04 (-10.19 to 0.12)	0.18	0.47 (.637)	1.13 (-3.57 to 5.84)
Process												
FFMQ-tot (39-195)												
Baseline	109.71 (12.35)	110.03 (11.41)	109.06 (11.63)									
Post-treatment	111.61 (12.75)	130.87 (13.38)	124.37 (13.27)	1.56	4.21 (<.001)	18.94 (10.13 to 27.76)	1.10	3.03 (.002)	13.41 (4.73 to 22.08)	-0.47	-1.09 (.276)	-5.59 (-16.64 to 4.47)
Follow-up	115.40 (13.40)	134.16 (13.39)	127.76 (13.50)	1.52	4.25 (<.001)	19.44 (10.48 to 28.41)	1.06	3.09 (.002)	14.01 (5.12 to 22.90)	-0.46	-1.06 (.289)	-5.49 (-15.61 to 4.64)
SCS-tot (26-130)												
Baseline	64.71 (10.75)	64.66 (9.85)	65.21 (10.08)									
Post-treatment	65.18 (11.10)	78.59 (11.68)	78.97 (11.44)	1.28	3.33 (.001)	13.46 (5.54 to 21.39)	1.25	3.34 (.001)	13.30 (5.50 to 21.10)	-0.02	-0.09 (.930)	-0.42 (-9.82 to 8.97)
Follow-up	68.82 (11.45)	87.74 (11.69)	83.57 (11.67)	1.80	4.64 (<.001)	18.97 (10.96 to 26.98)	1.34	3.52 (<.001)	14.26 (6.31 to 22.21)	-0.47	-1.03 (.302)	-4.99 (-14.45 to 4.48)

Note: Significant effects are presented in bold. TAU: treatment as usual (n = 25). ABCT+TAU: attachment-based compassion therapy + TAU (n = 22). MBSR+TAU: mindfulness-based stress reduction + TAU (n = 21). DASS-tot: depression, anxiety and stress scale-total score. DASS-D: depression, anxiety and stress scale-depression score. DASS-A: depression, anxiety and stress scale- anxiety score. DASS-S: depression, anxiety and stress scale-anxiety score. FFMQ-tot: five facets mindfulness questionnaire-total score. SCS-tot: self-compassion scale-total score.

Table 3. Bootstrap indirect effects in the mediational models [effects of pre-to-post-changes in the process outcomes of FFMQ and of SCS on pre-to-follow-up changes in the DASS total and subscales].

<i>INDIRECT EFFECTS</i>				
ABCT+TAU vs. TAU				
<i>Outcome and mediators</i>	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>% of total</i>
DASS total				
<i>FFMQ total</i>	-1.51	1.01	-4.09 to 0.00	40.6%
<i>SCS total</i>	-2.17	0.91	-4.38 to -0.72	59.0%
DASS depression				
<i>FFMQ total</i>	-1.59	0.89	-3.83 to -0.22	47.5%
<i>SCS total</i>	-1.43	0.86	-3.56 to -0.08	42.7%
DASS anxiety				
<i>FFMQ total</i>	-0.23	0.60	-1.62 to 0.79	17.8%
<i>SCS total</i>	-1.23	0.77	-3.01 to 0.07	95.3%
DASS stress				
<i>FFMQ total</i>	-1.18	0.88	-3.46 to 0.14	42.5%
<i>SCS total</i>	-1.69	0.74	-3.55 to -0.55	60.6%
MBSR+TAU vs. TAU				
<i>Outcome and mediators</i>	<i>B</i>	<i>SE</i>	<i>95% CI</i>	<i>% of total</i>
DASS total				
<i>FFMQ total</i>	-5.70	2.82	-12.59 to -1.33	62.8%
<i>SCS total</i>	-5.58	2.56	-12.00 to -1.69	61.5%
DASS depression				
<i>FFMQ total</i>	-3.08	1.77	-7.85 to -0.45	55.5%
<i>SCS total</i>	-3.45	1.58	-7.68 to -1.11	62.2%
DASS anxiety				
<i>FFMQ total</i>	-3.77	1.83	-8.36 to -0.90	65.1%
<i>SCS total</i>	-3.83	1.72	-8.09 to -1.18	66.2%
DASS stress				
<i>FFMQ total</i>	-4.54	2.52	-10.62 to -0.55	66.6%
<i>SCS total</i>	-3.89	2.27	-9.55 to -0.54	57.0%

B: regression coefficient of the bootstrapped indirect effect. SE: standard error. 95% CI: Bias corrected 95% confidence interval of indirect effects. % of total: percentage of total effects. DASS: depression, anxiety and stress scale. FFMQ: five facets of mindfulness questionnaire. SCS: self-compassion scale.

FIGURE LEGENDS

Figure 1. Study flowchart

APPENDICES

Number needed to treat

Other secondary analyses explored the clinical significance of improvements using the Jacobson and Truax method (1991) to establish both the cut-off point and reliable change index on the DASS-21 total score. This criterion of classification was used to calculate absolute risk reduction and number needed to treat (NNT); a 95% CI for each NNT was calculated. The results are summarized in Table A1. Using the Jacobson and Truax method of reliable change, the absolute risk reduction (ARR) in ABCT vs. TAU was 41.06% (95%CI= 17.46–64.67%) with NNT= 3 (95%CI= 1.5–5.7), meaning that 3 patients would need to be treated with ABCT for one of them to become a responder, who would not have done so in the TAU group. The ARR in MBSR vs. TAU was 31.75% (95%CI= 7.49–56.01%) with NNT= 4 (95%CI= 1.8–13.4). At follow-up, no significant ARRs were found in any case, and therefore the NNTs computed were not statistically significant.

Table A1. Number needed to treat (NTT) and Absolute Risk Reduction (ARR)

Post-treatment		
	NNT	ARR
ABCT+TAU vs. TAU	3 (1.5 – 5.7)	41.06% (17.46 to 64.67)
MBSR+TAU vs. TAU	4 (1.8 to 13.4)	31.75% (7.49 to 56.01)
Follow-up		
	NNT	ARR
ABCT+TAU vs. TAU	5 *	23.78% (-3.57 to 51.12)
MBSR+TAU vs. TAU	5 *	21.61% (-6.16 to 49.38)

Note: Using the Jacobson and Truax method of reliable change (Jacobson & Truax, 1991).

*Because the 95% confidence interval for the absolute risk reduction extends from a negative number (treatment may harm) to a positive number (treatment may benefit), it is tricky to compute a 95% CI for the NNT

Credibility and unwanted effects of the interventions

The adapted version of the Credibility/Expectancy questionnaire (CEQ) (Devilly & Borkovec, 2000) was used to assess possible differences between the acceptance and potential aversive effects that the interventions produced on the participants; it is a 6-item questionnaire, and it was used for assessing participants' opinion at the end of the last treatment session.

As presented in Table A2, both ABCT and MBSR were considered more logic, satisfactory, recommendable and useful than TAU, with high scores in all the categories; no significant differences were observed between the two interventions. For what concerns to aversive effects, and as expected, the three groups reported very low frequencies, with no significant differences between groups.

Table A2. Credibility and unwanted effects of TAU, MBSR+TAU, and ABCT+TAU intervention arms at post-test.

Outcomes	TAU <i>M (SD)</i>	MBSR+TAU <i>M (SD)</i>	ABCT+TAU <i>M (SD)</i>	TAU vs MBSR+TAU		TAU vs ABCT+TAU		MBSR+TAU vs ABCT+TAU	
				<i>d</i>	<i>t (p)</i>	<i>d</i>	<i>t (p)</i>	<i>d</i>	<i>t (p)</i>
Credibility (0–10)	n = 22	n = 20	n = 23						
Total score	6.87 (2.11)	9.15 (1.02)	8.97 (1.10)	1.36	4.52 (<.001)	1.26	4.16 (<.001)	-0.17	0.55 (.583)
Logic	7.18 (2.09)	8.95 (1.47)	9.00 (1.04)	0.97	3.14 (.003)	1.11	3.67 (.001)	0.04	0.13 (.897)
Satisfaction	6.86 (2.12)	9.10 (1.25)	9.04 (1.15)	1.27	4.22 (<.001)	1.29	4.26 (<.001)	-0.05	0.16 (.871)
Recommend to a friend	6.85 (2.82)	9.60 (0.75)	9.35 (1.07)	1.31	4.41 (<.001)	1.18	3.91 (.001)	-0.27	0.87 (.387)
Utility for other problems	6.77 (2.29)	8.95 (1.23)	9.00 (1.17)	1.17	3.89 (.001)	1.24	4.09 (<.001)	0.04	0.14 (.892)
Personal utility	6.73 (2.49)	9.15 (1.23)	8.43 (2.23)	1.21	2.93 (<.001)	0.72	2.42 (.020)	-0.39	1.33 (.191)
Aversive effects (0–10)	n = 22	n = 20	n = 23						
Post-treatment	1.95 (2.90)	0.75 (2.02)	1.82 (2.82)	-0.48	1.54 (.131)	-0.05	0.15 (.880)	0.43	1.41 (.166)

TAU: treatment as usual. MBSR+TAU: mindfulness-based stress reduction + TAU. ABCT+TAU: attachment-based compassion therapy + TAU