Acceptance and Commitment Therapy for the Management of Suicidal Patients: A Randomized Controlled Trial

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Keywords

Cognitive behavior group therapy · Mindfulness · Psychotherapy · Randomized controlled trial · Suicidal ideation

Abstract

Background: The management of suicidal crisis remains a major issue for clinicians, driving the development of new strategies to improve suicide prevention. Methods: We conducted a randomized controlled trial comparing a 7-week acceptance and commitment therapy (ACT) versus relaxation group, as adjunct to treatment as usual for adult outpatients suffering from a current suicidal behavior disorder. The primary outcome was the rate of change in the Columbia Suicide Severity Rating Scale suicidal ideation subscore (adding severity and intensity subscores). Secondary outcomes were the rates of change for depressive symptomatology, psychological pain, anxiety, hopelessness, anger, quality of life, and therapeutic processes. Assessments were performed in the 2 weeks preceding the beginning of the treatment (pretreatment assessment), and within 1 week (posttherapy assessment) and 3 months (follow-up assessment) after therapy completion. Results: Forty adults were included and randomized. The rate of change in ACT for suicidal ideation at the posttherapy assessment was higher than in the relaxation group (β [SE] = –1.88 [0.34] vs. –0.79 [0.37], respectively; p = 0.03). ACT effectiveness remained stable at the 3-month follow-up. We found a similar pattern of change for depressive symptomatology and anxiety, psychological pain, hopelessness, anger, and quality of life. Therapeutic processes improved more in the ACT group than in the relaxation group. Treatment adherence was high in the ACT group, all participants reported satisfaction with the program. Conclusions: Through its effectiveness in reducing suicidal ideation and improving the clinical dimensions associated with suicidal risk in patients suffering from a suicidal behavior disorder, ACT could be developed as an adjunctive strategy in programs for suicide prevention.

Introduction

Worldwide, one million people a year die by suicide, and nearly 20 million attempt suicide [1]. Despite improvements in pharmacological treatments of psychiatric disorders associated with increased risk of suicide, rates of suicidal ideation, suicide attempts, and completed suicides have not substantially decreased in recent years [2]. The commonly accepted “stress diathesis” model posits that suicide attempts result from complex interactions between vulnerability factors (diathesis) and environmental events or psychiatric disorders (stress). Due to the amount of evidence pointing to a specific suicidal pathophysiology, suicidal behavior disorder, defined as the presence of at least 1 suicide attempt within the past 2 years, was

included as an independent clinical entity in the DSM-5 (in the "Conditions for further study" section) [3]. This highlights the need to address the suicidal process as a primary target of treatment and identify effective prevention strategies, including psychotherapy. Acceptance and commitment therapy (ACT) is a "third-wave" behavioral therapy that aims at changing the function rather than the form, content, or frequency of psychological events (i.e., the subject's relationship to his/her psychological and contextual experiences) to facilitate choosing to engage in valued behaviors [4]. ACT targets experiential avoidance (i.e., the tendency to avoid unwanted thoughts or emotions) and cognitive fusion (i.e., the tendency to take one's thoughts literally). Experiential avoidance and cognitive fusion are considered to be processes underlying psychiatric disorders [5]. ACT seeks to train psychological flexibility, the ability (in contact with all that is present to one's experience) to contact one's values and to engage in behavior congruent with one's values [4]. This, ACT does by seeking to help patients learn how to: (1) accept unavoidable innate/private events and simply notice them as transient mental events different from the self; (2) identify and engage in actions guided by valued ends. Several randomized controlled trials have reported that ACT can be useful in the management of psychiatric disorders associated with increased suicidal risk such as depressive episodes, eating disorders, borderline personality disorder, and psychosis. Moreover, 2 case reports published by Luoma and Villatte [6] point to a role for ACT in the prevention of a suicidal reattempt at the 1-year follow-up. Attempting to suppress intrusive thoughts such as unwanted mental images of suicide [7] or suicidal thoughts [8] may increase their intensity and frequency [8, 9], along with the intensity of unpleasant emotions [10]. Suicidal behavior may be considered as the most extreme expression of experiential avoidance and appears as the ultimate means to escape unwanted painful psychological experiences [6]. It also represents an extreme form of cognitive fusion as patients take literally thoughts that their lives are not worth living [4]. Experiential acceptance and suicidal ideation were negatively correlated in veterans having received ACT [11]. Training in mindfulness was found to weaken the association between depressive symptomatology and suicidal thinking in patients with a history of suicidal depression [12]. Finally, in an open pilot study, our group has recently reported the feasibility of a 7-sessions weekly ACT program for patients suffering from current suicidal behavior disorder, as per DSM-5 criteria. We reported a significant reduction in intensity and severity of suicidal ideation between pre- and posttreatment assessments, as well as decreased levels of hopelessness and psychological pain, two clinical dimensions associated with high suicidal risk. In addition, we found that ACT model processes and global functioning had improved after intervention [13]. The aim of the current study was to confirm the effectiveness of ACT (intervention) versus progressive relaxation training (control condition) in a sample of outpatients suffering from a current suicidal behavior. Our hypotheses were that following treatment, participants in the ACT group would exhibit (a) reduced suicidal ideation, (b) reduced levels of depression, anxiety, psychological pain, anger (state) and hopelessness, (c) improved global functioning and quality of life, and (d) an improvement in ACT model processes (acceptance, cognitive defusion, mindfulness, and contact with the present moment). We hypothesized that these changes would be obtained upon treatment completion and maintained at the 3-month follow-up.

Methods

Study Design

The present study was a prospective, randomized controlled trial, registered on the clinical trial website (clinicaltrials.gov; Clinical Trial ID No. NCT 02936700). We determined the sample size based on the requirements of a parallel neuroimaging study. Eligible participants were randomly assigned with a 1:1 ratio to follow either ACT or progressive relaxation training for 7 weeks. The randomization sequence was centralized and computed in permuted blocks of 2 or 4 by the study statistician in an order unknown by the investigators. The primary outcome was the rate of change in the Columbia Suicide Severity Rating Scale (C-SSRS) suicidal ideation subscore [13, 14] between inclusion and final assessment (3-month followup). Even though ACT does not centrally seek to reduce the form (content or frequency) of psychological events, ACT

may modify the intensity of suicidal ideation by reducing believability of suicidal thoughts and increasing acceptance of despair. We thus assessed the intensity and frequency of suicidal ideation. Secondary outcomes were rates of change in the intensity of depressive symptomatology, psychological pain, anxiety, hopelessness, anger, quality of life, global functioning, and ACT processes. The study was conducted in accordance with the CONSORT ethical guidelines. All participants gave their written informed consent. The study was approved by the Montpellier University Hospital (CPP Sud Méditerranée IV) ethics committee.

Participants' Selection

Participants were recruited from the Department of Psychiatric Emergency and Acute Care, Academic Hospital of Montpellier (France). Inclusion criteria were: aged between 18 and 65 years, suffering from a current suicidal behavior disorder according to DSM-5 [3], and being able to speak, read, and understand French. Suicide attempt was defined as a self-damaging act carried out with some intent to die, distinguished from other self-destructive types of behavior such as self-mutilation, noncompliance with medical treatment in severely ill individuals, and the use of substances such as illicit drugs, alcohol, or tobacco [15]. Exclusion criteria were: lifetime history of schizophrenia, a current alcohol/illicit drug use disorder, a current manic or hypomanic episode, a lifetime history of severe brain injury or neurologic disease, and pregnancy. Most of these exclusion criteria are related to the fMRI part of the study.

Treatment Conditions and Procedures

Acceptance and Commitment Therapy

Half the participants were randomized to a standardized ACT program, consisting of 7 weekly sessions, each lasting 2 h. There were 2 therapists (D.D. and V.A.) for each group of participants. Each session followed the same basic pattern and focused on a specific skill. The ACT matrix, an innovative way of presenting and delivering ACT processes, was used throughout the program [16, 17]; see supplementary material for a brief description (for all online suppl. material, see www.karger.com/doi/10.1159/000488715). At the end of each session, a written summary was handed out in order to help participants practice these skills at home. In addition, valued behavioral commitment exercises were assigned. The psychotherapeutic protocol was written based on ACT books of reference, as described in Ducasse et al. [13].

Progressive Relaxation Training

Given suicidal behavior can be considered as the ultimate means to escape unwanted painful psychological experiences generating bodily tension due to emotional expression, progressive relaxation training (PRT) was used to identify and relax hidden tension throughout the body. Half the participants were included in a standardized relaxation program, consisting of seven 2-h weekly sessions. An abbreviated version of the PRT protocol based on Bernstein et al. [18] was used. It involves learning to tense and relax groups of muscles. PRT and ACT sessions followed a similar pattern: homework review, new therapeutic skills, handing out a written summary. Both interventions were delivered by the same 2 therapists (D.D. and V.A.) who had received a total of 5 years additional training in ACT and PRT.

Assessments

A clinical assessment was conducted by 2 trained psychiatrists (C.L. and M.V.), who remained blind to group allocation and were independent from the patient's medical care management. Participants were instructed not to communicate their group assignment to the evaluators. Three assessment sessions were planned: inclusion or pretreatment (first) assessment within 2 weeks prior to the beginning of therapy, posttherapy (second) assessment within the week following completion of therapy, and follow-up (third) assessment within 3 months following the completion of therapy, i.e. at 21 weeks of follow-up. During

assessments, sociodemographic and clinical characteristics (including suicidal features), and medication use were recorded.

Outcomes

Suicidal Ideation

The primary effectiveness outcome was the rate of change in the C-SSRS suicidal ideation subscore (adding severity and intensity subscores) [13, 14] within the last month. The C-SSRS is a semistructured interview considered as a gold standard tool to assess suicidal ideation and behavior in clinical trials. The severity of ideation subscale consists of a 5-point ordinal scale comprising the following items: (1) passive wish to be dead, (2) nonspecific active thoughts of suicide, (3) active suicidal ideation with any methods (not plan) without intent to act, (4) active suicidal ideation with some intent to act, without a specific plan, and (5) active suicidal ideation with specific plan and intent. As previously done in Ducasse et al. [13], these 5 dichotomous (absent = 0; present = 1) items were summed to rate suicidal ideation severity. The intensity subscale rates the severest ideation and consists of 5 dimensions: − frequency: (1) less than once a week, (2) once a week, (3) 2–5 times a week, (4) daily or almost daily, (5) many times each day; − duration: (1) few seconds or minutes, (2) less than 1 h/some of the time, (3) 1–4 h/a lot of time, (4) 4–8 h/most of the day, (5) more than 8 h/persistent or continuous; − controllability: (1) easily able to control thoughts, (2) can control thoughts with little difficulty, (3) can control thoughts with some difficulty, (4) can control thoughts with a lot of difficulty, (5) unable to control thoughts; − deterrents: (1) definitely stopped you from attempting suicide, (2) probably stopped you, (3) uncertainly stopped you, (4) most likely did not stop you, (5) definitely did not stop you; − reason for ideation: (1) completely to get attention, revenge or a reaction from others, (2) mostly to get attention, revenge or a reaction from others living with the pain or how you were feeling, (3) equally to get attention, revenge or a reaction from others, (4) mostly to end or stop the pain, (5) completely to end or stop the pain. As previously done in Ducasse et al. [13], these items were summed to rate suicidal ideation intensity. Psychopathology was assessed using the Mini-International Neuropsychiatric Interview and the Screening Interview for Axis II Disorder for borderline personality disorder. Impulsivity and hostility were assessed at baseline as suicidal vulnerability traits using the Barratt Impulsivity Scale 10 and the Buss-Durkee Hostility Scale, respectively. At each assessment time point e assessed quality of life using the World Health Organization Quality of Life Measure instrument, and global functioning using the Global Assessment of Functioning Scale. Several clinical dimensions known to be suicidal risk factors were assessed at each assessment time point (see suppl. material for further details on psychometric assessments): − intensity of depressive symptomatology using the Quick Inventory of Depressive Symptomatology-Self Rating; − usual psychological pain during the past 15 days using a numerical scale; − anxiety state and trait using the State-Trait Anxiety Inventory; − hopelessness using the Beck Hopelessness Scale (BHS); − anger state using the Spielberger State-Trait Anger Expression Inventory. ACT-specific processes were measured at each assessment time point: − acceptance using the Acceptance and Action Questionnaire-II [19]; this 10-item questionnaire provides a broad measure of experiential avoidance (items target a range of ACT-relevant processes that are thought to contribute to psychological inflexibility including unwillingness, lack of action, and cognitive fusion); questions are rated on a 7-point Likert-type scale ranging from 1 (“never true”) to 7 (“always true”), with higher scores indicating greater levels of psychological flexibility; − cognitive fusion using the Cognitive Fusion Questionnaire (CFQ28) [20] based on 28 items rated from 1 (“never true”) to 7 (“always true”); − mindfulness using the Philadelphia Mindfulness Scale [21], based on 20 items rated from 1 (“never”) to 5 (“very often”); − contact with the present moment using the Mindful Attention Awareness Scale [22], consisting of 15 items rated from 1 (“almost always”) to 6 (“almost never”); this scale assesses the ability to be aware of the present moment, including current psychological and physical experience.

Statistical Analysis

The characteristics of the study population were described using the means (and standard deviation) for quantitative variables, and proportions for categorical variables. $\chi 2$ or Fisher's exact tests were run to compare categorical variables between the two groups, and Student's t test for continuous variables. Piecewise linear mixed models were used to examine the rates of change in suicidal ideation, functional assessments, and treatment processes from pretreatment (2 weeks prior to treatment) to posttreatment assessments (week 1 following treatment completion) and from posttreatment assessment to follow-up assessment (at 3 months). These models accounted for the dependence between repeated measures within individuals by introducing a random intercept. They kept in the analyses subjects lost at follow-up, and they also allowed distinguishing slope estimates for the periods before and after the end of the treatment (pre- and posttreatment assessments, i.e. first and second assessments). Estimates of the mean rates of change were thus modeled with 2-time variables: one using data from pretreatment to posttreatment assessment (1st to 2nd assessment) and the other using data from posttreatment assessment to the follow-up assessment (2nd to 3rd assessment). Treatment group interactions with each time variable were assessed to examine whether groups differed significantly with regard to changes in outcome. In order to express the changes with time in the same unit for all outcome measures, an effect size was defined as the standardized regression coefficient. This coefficient corresponds to the estimated time slope (β) divided by the sample standard deviation (SD) of the outcome. The changes per week in the outcome measures are thus expressed in numbers of SD. Statistical analyses were performed using SAS software, version 9.4 (SAS Institute, Cary, NC, USA).

Results

Participant Flow

The participant flowchart through the study is given as Figure 1. Among 42 eligible patients, 40 participants were enrolled and randomized. Two patients declined participation (travel, not enough time), 21 were allocated to the ACT group and 19 to the relaxation group. Eighteen participants completed the second assessment, and 15 participants completed the third assessment in the relaxation group. All participants from the ACT group completed both the second and third assessments.

Sample Description

The sample consisted of 35 females (87.5%), with a mean age of 38.19 years (SD: 11.8 years). Baseline sociodemographic and clinical characteristics for each treatment group are reported in Table 1. Participants in the ACT and relaxation groups did not differ significantly, except for a higher level of psychological pain in the ACT group ($p = 0.03$).

Primary Outcome: Severity and Intensity of Suicidal Ideation

A group difference in the rates of change was reported for suicidal ideation severity and intensity from pre- (first) to posttreatment (second) assessments (Table 2; Fig. 2). There was a significant decrease of –0.79 per week ($p = 0.03$) in the relaxation group, whereas the decrease was significantly higher in the ACT group with an estimated change of –1.88 ($p = 10–3$) (effect size [β/SD] = –0.07 vs. β/ SD = –0.17 in the relaxation vs. ACT group, respectively). At the follow-up assessment (from the 2nd to 3rd assessment), there were no treatment group differences in rates of change (β [SE] = –0.01 [0.23] vs. 0.40 [0.26] in the ACT vs. relaxation group, respectively; $p = 0.23$). Between pre- and posttreatment assessments, 2 participants attempted suicide in the relaxation group versus none in the ACT group. During the follow-up period, 3 participants attempted suicide in the relaxation group versus 1 patient in the ACT group. In order to address multifactorial ingredients of treatment outcome [23], description of patients having attempted suicide during the study period are available in the supplementary material.

Secondary Outcomes

From pre- to posttreatment assessments, significant group differences in rates of change were found in a number of measures (Table 2; see online suppl. data). Psychological pain: ACT β (SE) = –0.54 (0.09); relaxation β (SE) = –0.04 (0.09) (p = 10–3). Depressive symptomatology: ACT β (SE) = –1.31 (0.21); relaxation β (SE) = –0.22 (0.23) (p = 10–3). Anxiety: ACT β (SE) = –3.13 (0.52); relaxation β (SE) = 0.03 (0.52) (p = 10–3). Hopelessness: ACT β (SE) = –1.02 (0.18); relaxation β (SE) = –0.38 (0.21) (p = 0.03). Anger: ACT β (SE) = –0.89 (0.23); relaxation β (SE) = 0.06 (0.25) (p = 10–2). The previous measures significantly decreased only within the ACT group. As evidenced by the standardized regression coefficients, ACT had the most impact on psychological pain, depressive symptomatology, and anxiety. At the follow-up, there were no significant differences in rates of change for either group. From pre- to posttreatment assessments, we found significant group differences in rates of change quality of life measure: ACT β (SE) = 3.23 (0.54); relaxation β (SE) = 1.16 (0.61) (p = 0.01). We found no significant group differences for global functioning: ACT β (SE) = 3.10 (0.50); relaxation β (SE) = 1.76 (0.56) (p = 0.08). Improvements in global functioning were significant for each group (p < 10–2 and p < 10–3 in relaxation and ACT groups, respectively). A significant improvement in quality of life was reported in the ACT (p < 10–3) but not in the relaxation group (p = 0.06). At the follow-up, there were no significant rates of change for these two measures. ACT significantly improved all the aforementioned measures with high standardized regression coefficients.

Therapeutic Processes

Between pre- and posttreatment assessments, rates of changes were significantly different for all process measures (i.e. acceptance, mindfulness, cognitive fusion and contact with the present moment) (Table 2). Acceptance: ACT β (SE) = 3.02 (0.40); relaxation β (SE) = 0.55 (0.45) (p < 10–2). Mindfulness: ACT β (SE) = 1.88 (0.32); relaxation β (SE) = 0.31 (0.36) (p < 10–2). Cognitive fusion: ACT β (SE) = –8.85 (0.98); relaxation β (SE) = –1.94 (1.03) (p < 10–2). Contact with the present moment: ACT β (SE) = 2.77 (0.38); relaxation β (SE) = 0.68 (0.43) (p < 10–2). A significant improvement in these process measures was reported for ACT but not for relaxation. At the follow-up, there were no significant rates of change for these measures.

Treatment Evaluation

Participants in the ACT group missed fewer sessions and reported greater treatment usefulness than participants in the relaxation group (Table 3). They also reported subjective improvement in (1) emotion regulation, (2) the ability to engage in efficient decision-making, (3) engagement in actions in significant life areas, and (4) the ability to be aware of the quality of each moment and enjoy it. All participants in the ACT group (vs. 73.3% in the relaxation group) would recommend this therapy to a friend.

Pharmacological Treatments

Participants in the ACT and relaxation groups did not differ significantly for the frequency of pharmaceutical class intake at the posttherapy assessment and at the 3-month follow-up (see online suppl. data). As a change in pharmacological treatment during the follow-up may bias the rates of changes of the different outcomes, additional analyses were performed after excluding participants who reported a modification in their pharmacological treatment during the study (7 participants in the ACT group and 9 participants in the relaxation group). The results remained unchanged.

Discussion

This is the first randomized controlled trial assessing the effectiveness of ACT in the treatment of patients suffering from current suicidal behavior disorder. As hypothesized, ACT was more effective than a relaxation control condition to reduce the severity and intensity of suicidal ideation between pre- and posttreatment assessments, with an effect sustained at the 3-month follow-up. Only participants in the ACT condition went from highly suicidal at baseline to not suicidal at the end of treatment, with a medium

effect size. In addition, ACT was more effective than relaxation in reducing the levels of depressive symptomatology, anxiety, psychological pain, hopelessness, and anger. This is significant as all these factors are known to be associated with increased suicide risk. Finally, ACT improved global functioning and quality of life, with a large effect size. In terms of effect sizes, ACT appeared particularly effective in reducing psychological pain and improving global functioning. This is in line with ACT's stated goal of promoting global functional rather than simply symptom reduction [4]. Psychological pain is highly related to suicidal ideation and suicide attempts [24], unifying all suicidal behaviors [25], and a number of authors have suggested that suicide attempts occur when psychological pain is intolerable. More generally, psychological pain should be more widely measured to develop clinical psychopharmacology [26]. Given ACT's impact in reducing suicidal ideation (mental events preceding the suicidal act), our results suggest that ACT could be effective in preventing future suicide attempts. However, long-term follow-up studies assessing the effectiveness of ACT in the prevention of suicide attempts are needed. In terms of underlying processes, ACT process measures progressed more for participants in the ACT group than in the relaxation group, both at posttreatment and follow-up assessments, suggesting ACT's effectiveness and specificity in impacting its postulated processes. Notably, participants in the ACT group had a high adherence rate and were satisfied with the ACT program. Our study sample was at a very high risk for suicide, given that all participants had attempted suicide in the 12 months preceding inclusion. Furthermore, 27.5% had attempted suicide within the month preceding inclusion. Most participants were currently depressed and highly suicidal at treatment onset. Therefore, this study confirms both feasibility and effectiveness of an ACT group program among patients at high risk for suicide, as suggested in our previous pilot study [13]. The "stress diathesis" model for suicidal behavior disorder posits that suicide attempts result from complex interactions between vulnerability factors (diathesis) and environmental events or psychiatric disorders (stress) [27]. ACT targets processes that favorably impact both vulnerability factors and the pathological processes involved in suicidal behavior disorder. ACT aims to reduce experiential avoidance [4], i.e. the tendency to avoid unpleasant psychological events. Experiential avoidance is associated with increased intensity and frequency of unpleasant psychological events including suicidal ideation [8–11]. Whereas unpleasant emotions are common, the tendency to avoid them is a maladaptive coping strategy that over time can generate invasive painful experiences or psychological pain [28]. This can lead to extreme experiential avoidance strategies such as suicidal ideation (private behavior) or suicide attempts (public behavior) [6, 29, 30]. However, a person can experience that emotions can be accepted rather than eliminated through mindfulness and acceptance skills. These may weaken the association between unpleasant emotions and suicidal thinking in vulnerable patients [12]. The present study evidences a reduction in cognitive fusion, as measured by the CFQ. Cognitive fusion, the tendency to respond literally to the content of thoughts, as if they were reliable descriptions of the world, may, when people take literally thoughts about life "not being worth living," play a large part in suicidal behavior. Furthermore, by improving the regulation of emotions, mindfulness and acceptance may lead to decreased intensity and duration of unpleasant psychological events [31], such as anger, anxiety, sadness, and hopelessness, thus contributing to psychological pain decrease. Considering that physical and psychological pain share some neurobiological pathways [32], it is important to highlight that ACT is effective to reduce pain intensity as well as pain avoidance in chronic pain patients [33–35]. ACT also improves the management of pain catastrophizing (i.e., a tendency to magnify or exaggerate the threat value or seriousness of pain sensations, which may be thought as the opposite of acceptance) [36]. Pain catastrophizing was associated with increased suicidal ideation and behavior in patients suffering from headaches [37]. In our study, mindfulness and acceptance skills improved for the participants in the ACT group. This is in line with previous findings regarding the positive effect of mindfulness skills on suicidal ideation [38]. Secondly, ACT seeks to increase psychological flexibility [4], leading to the ability to choose valued actions in the presence of unpleasant psychological events. This may be of particular relevance to suicidal patients who are prone to suffering from a higher level and/or lower tolerance of psychological pain [39]. Our results on subjective program experience further suggest that ACT may impact neuropsychological features of suicidal risk: altered decision-making [40], reduced cognitive

flexibility [41], and poor problem-solving ability [42]. Participants in the ACT but not the relaxation group reported improvements in effective decision-making in daily life. Finally, ACT seeks to promote personal engagement in valueoriented actions, and increase one's sense of leading a meaningful life [4, 43]. Values may prove important to help anchor patients to life and increase their intrinsic motivation to engage in meaningful actions [44]. This may be particularly significant in light of the fact that suicidal patients show a decreased motivation to hedonic experience and increased pain avoidance [45], as well as a reduced sense of purpose in life [46]. Contact with values may promote internal locus of control [47], thus decreasing suicidal risk [48]. Besides, contact with values may act as a buffer between stressful life events and suicidal vulnerability [49]. Finally, contact with the present moment could increase choosing to engage in effective action through (1) decreasing ruminative processes, which have been implicated in suicidal behaviors [50], and (2) focusing one's attention on the current valued action. Quality of life improved for the participants in the ACT group, but not in the relaxation group. This accords with the literature showing that subjects trained in mindfulness were more optimistic and satisfied with life [51]. Low meaning in life was associated with depression and suicide [52], whereas high meaning in life was found to be a protective factor against suicidal ideation [46, 53]. Meaning in life, which is promoted by ACT, was also associated with mental health and well-being [54]. This study has several limitations. First the main limitation of the present study is the short 3-month followup. Current alcohol use disorder and history of severe brain injury were exclusion criteria, limiting the generalization of our results. Altogether, the sample may not be fully representative of the broader suicidal population, mainly due to restriction of the fMRI task. Future studies should assess the effectiveness of ACT in more ecological conditions. Second, as regards the epidemiology of suicide attempts [55], the majority of the sample consisted of females. Although this is representative of the usual clinical population, men with a history of suicide attempts are at higher risk of death by suicide [56]. It is thus important to devise strategies that increase access to treatment for males. Third, one cannot exclude that ACT improved the severity of suicidal ideation through improvements in depression. Should that be the case, it might still represent a worthwhile path to reducing suicidal ideation, given that antidepressants have been shown to be less effective in suicidal patients [57]. Fourth, given the number of comparisons being performed on secondary outcomes, the risk of chance findings may be increased. However, controlling for type I error using the Bonferroni correction gives similar results for the treatment period, with only hopelessness (BHS) and quality of life (World Health Organization Quality of Life Measure) becoming nonsignificant. Fifth, we were not able to control for the number of medical consultations each participant attended as part of their ongoing treatment. However, changes in pharmacological treatments were recorded at each assessment and did not differ between groups. This study has several strengths. First, it relies on a robust methodology based on a randomized controlled design, validated scales to assess suicidal ideation and other outcomes, a clinical assessment by independent raters blind to treatment allocation and follow-up. Second, the intervention and control groups had the same protocol structure with sessions conducted by the same trained therapists. However, allegiance bias may be raised given the therapists' high expertise in ACT. Third, both objective (standardized validated psychometric scales) and subjective perception of treatment therapeutic process assessments were performed. Finally, participants were highly adherent and satisfied with the ACT intervention. This is particularly significant in light of the fact that less than 50% of people at a high risk of suicide interface with some form of mental health service. Designing highly acceptable interventions that suicidal patients adhere to and which increase their chance of connecting with and receiving effective care services is thus a major public health concern. In conclusion, to overcome the gap between the need for treatment and evidence-based treatment availability, cost-effective low-threshold accessible interventions are needed. Our study indicates that an ACT group program may represent one such intervention. Our results provide further support to evidence-based psychotherapybased interventions for suicide prevention. Beyond its effectiveness on suicidal ideation, ACT may also be effective in reducing suicide risk factors and improving patients' global quality of life. We would therefore encourage dissemination of as well as further research in ACT programs in the management of individuals with a history of recent suicide attempts.

Acknowledgments

The authors thank Bénédicte Clément for the careful reading of the manuscript. This study received financial support from CHU Montpellier, France (UF 9519), Fondation pour la Recherche Médicale (DPP20151033981), Fondation de l'Avenir pour la Recherche Médicale Appliquée (AP-RMA-2015–031), Paris, France, and the Fondation FondaMental, Créteil, France

Disclosure Statement

Dr. Ducasse reports no financial relationships with commercial interests. None of the authors declares conflicts of interest related to this paper.

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