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Acceptance and Commitment Therapy on suicidal behavior: a systematic review

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Título: Terapia de Aceptación y Compromiso en conducta suicida: una revisión sistemática.

Resumen: El suicidio se ha convertido en un problema social y de salud pública a nivel mundial. En este sentido, la Terapia de Aceptación y Compromiso (ACT) podría ser eficaz en su abordaje, existiendo evidencia sobre la relación entre algunos de sus componentes y la conducta suicida. Así, el presente estudio tuvo por objetivo realizar una revisión sistemática sobre la eficacia de ACT en conducta suicida. Para ello se siguió el protocolo PRISMA, empleando las siguientes bases de datos: PsycInfo, PubMed, Scopus y PsicoDoc. Inicialmente se obtuvieron 108 publicaciones potencialmente relevantes, de las cuales, finalmente, 13 fueron incluidas en la revisión. La calidad de los estudios se analizó a través de un instrumento de evaluación de riesgo de sesgos. Como resultados, a nivel general se observaron disminuciones estadísticamente significativas en ideación suicida (IS) y factores de riesgo de suicidio. Además, algunos estudios señalaron relaciones estadísticamente significativas entre un aumento de flexibilidad psicológica y la disminución de IS. Si bien los datos apuntaron a una posible eficacia de ACT en la reducción de IS, es necesario llevar a cabo mayor número de estudios experimentales que contemplen la complejidad de la conducta suicida y exploren los procesos de cambio implicados.

Palabras clave: Conducta suicida. Suicidio. Terapia de Aceptación y Compromiso. Flexibilidad psicológica. Revisión sistemática.

Abstract: Suicide has emerged as a pressing global issue affecting both society and public health. In this context, Acceptance and Commitment Therapy (ACT) could prove effective in its approach, supported by evidence of the relationship between certain components of ACT and suicidal behavior. Thus, the present study aims to conduct a systematic review on the efficacy of ACT in suicidal behavior. For this, the PRISMA protocol was followed, using the following databases: PsycInfo, PubMed, Scopus and PsicoDoc. Initially, 108 potentially relevant publications were obtained, 13 of which were finally included in the review. We analyzed study quality using a risk of bias assessment instrument. As a result, statistically significant decreases in suicidal ideation (SI) and suicide risk factors were observed. In addition, some studies indicated statistically significant relationships between increased psychological flexibility and decreased SI. While the data suggested the potential effectiveness of ACT in reducing suicidal ideation (SI), more experimental studies are needed to consider the complexity of suicidal behavior and explore the processes of change involved.

Keywords: Suicidal behavior. Suicide. Acceptance and Commitment Therapy. Psychological flexibility. Systematic review.

Introduction

Suicide has become both a social and public health problem on a worldwide scale, as the leading cause of unnatural deaths in many countries and one of the leading causes of death among young adults and adolescents. According to WHO (World Health Organization, 2018), about 800,000 people commit suicide annually worldwide, which is a rate of 10.60 deaths per 100,000 inhabitants. Also, according to the latest report presented by the National Institute of Statistics (Instituto Nacional de Estadística, 2020), in Spain approximately 11 people die by suicide every day.

However, these data only reflect part of the problem, since it is estimated that thereare 20 attempts for every completed suicide, many people present suicidal thoughts without suicidal acts, and each death significantly affects an average of six to ten suicide survivors (Al- Halabí and García Haro, 2021). Thus, suicidal behavior has a relevant human cost for individuals, families, communities, health systems, and societies. However, its approach faces several barriers since it remains both a taboo and stigmatized phenomenon, shrouded in ignorance, false beliefs, and myths even among health professionals (Al-Halabí and Fonseca- Pedrero, 2021).

Although there is currently no agreed definition of suicide, according to O'Connor and Nock (2014) it can be understood as the act by which a person intentionally ends his or her life, while the term suicidal behavior responds to a broader concept that includes thoughts and behaviors related to intentionally taking one's own life. In this sense, thoughts include suicidal ideation (SI) and suicidal planning, while behaviors include suicidal communication, attempted suicide, and completed suicide (Zortea et al., 2020). Thus, it is possible to state that the different expressions of this phenomenon present considerable variability in duration, intensity, control, and lethality (Al-Halabí and Fonseca-Pedrero, 2021).

In recent years, research has sought to develop specific psychological interventions for suicidal behavior, beyond the traditional treatments associated with diagnostic categories (Zortea et al., 2020). As such, it has been found that interventions that directly address suicidal behavior are effective in the short and long term, while treatments that address it indirectly and focus on the psychological disorders themselves are less effective or even fail to do so (Al- Halabí and Fonseca-Pedrero, 2021).

Firstly, Cognitive Therapy (CT) and Cognitive Behavioral Therapy (CBT) are the psychological treatments with the most research and evidence (Brodsky et al., 2018). These interventions are based on the idea that, through the modifying of thoughts and behaviors, people can exert control over their psychological problems and disorders (Chang et al., 2016). Regarding their efficacy, several systematic reviews and meta-analyses (Leavey & Hawkins, 2017; Zalsman et al., 2016) have concluded that these interventions reduce suicidal ideation and behavior statistically significantly compared to treatment as usual (TAU). However, other meta-

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analyses and reviews (D'Anci et al., 2019; Hawton et al., 2016; Riblet et al., 2017) have shown that, despite significantly reducing SI and suicide attempts, they are not effective in reducing or preventing completed suicide. Yet, according to the Clinical Practice Guidelines of the Spanish National Health System, these therapies have a level of evidence 1++ and an A grade of recommendation for the treatment of suicidal behavior (Fonseca Pedrero et al., 2021). Another possible treatment for suicidal behavior is the Acceptance and Commitment Therapy (ACT). This is a third-wave therapy developed by Hayes et al. (2012), based on Relational Frame Theory. ACT does not seek to challenge unpleasant thoughts and the distress linked to them, but rather these thoughts are considered part of the human experience. These would be the result of six interrelated processes that make up the model of psychological inflexibility (Table 1). In this sense, ACT promotes the acceptance of unpleasant internal experiences through the development of psychological flexibility (Hayes et al., 2014). This is understood as the ability to behave according to values in the presence of unwanted thoughts, emotions, and bodily sensations, being also comprised of six interacting processes (Table 2). Thus, it differs in the theoretical approach and addressing of psychological problems with respect to other treatments such as those of CT and CBT, the latter being oriented to the questioning and subsequent modification of thoughts and emotions that cause discomfort (Hapenny & Fergus, 2017).

Table 1
Psychological inflexibility model processes (Hayes et al., 2014)

Process	Description
Experiential avoidance	Trying to suppress or not being in contact with unpleasant experiences, thoughts, and emotions.
Cognitive fusion	Getting entangled in unpleasant private events, considering the literal content of thoughts and emotions as real.
Rigid attention	Focusing attention on private and environmental events of the past or possible future, ignoring the present moment.
Conceptualized self	Identifying with private events related to one's self-concept.
Values disturbance	Ignoring deep priorities and goals, acting in accordance with experiential avoidance.
Inaction	Remaining in compliance with experiential avoidance and cognitive fusion, losing touch with values.

Table 2
Psychological flexibility model processes (Hayes et al., 2014)

Process	Description
Acceptance	Mindful awareness, without trying to modify the different experiences or private events that occur.
Cognitive defusion	Reducing the credibility given to private events, practicing detachment towards their content.
Contact with the present moment	Focusing attention on internal and environmental events of the present, observing them without judgement as they occur.
Self as context	Taking a broad perspective on private events, considering oneself as the context of these events.
Values	Attending to one's internal priorities and goals, setting life directions in accordance with them.
Committed action	Acting in accordance with one's defined values to achieve concrete goals and objectives.

A further examination of the processes that make up the model of psychological inflexibility (Table 1) highlights experiential avoidance as a particularly relevant aspect in the understanding of suicidal behavior (Hayes et al., 2008). To this effect, SI can be understood a form of experiential avoidance by allowing the suppression of unpleasant emotions and completed suicide can be understood as the most extreme form of such process as it involves an escape from all situations and emotions (Hennings, 2020). In contrast, among the processes of the psychological flexibility model (Table 2), acceptance is considered as the conscious awareness of the different experiences or private events that occur, without trying to alter them (Hayes et al., 2014). In this sense, Ducasse et al. (2014) point out how acceptance may be related to reductions in the intensity and frequency of SI.

The relationship between ACT elements and factors involved in the development of suicidal behaviors (Hayes et al., 2008) has led to conduct different pilot studies (Ducasse et al., 2014; Meyer et al., 2018; Morton et al., 2012; Tighe et al., 2017) with the purpose of studying the suitability of ACT in addressing this problem. To this effect, preliminary data points to the fact that ACT can significantly reduce SI in samples with different diagnoses. Likewise, a randomized controlled trial (RCT) was conducted whose results suggested that certain components of ACT appear to be significant in reducing risk factors associated with suicide (Ducasse et al., 2018). However, the authors noted that further research is needed in this regard. Although it is true that there are data that supports the convenience and efficacy of applying ACT in the treatment of suicide, it is necessary to create a comprehensive assessment of these results. In this regard, although a systematic review was conducted in 2018 that addressed suicidal behavior and self-injurious behaviors using ACT (Tighe et al., 2018), the data obtained were preliminary, with only five articles reviewed, and the quality of only one of the studies was assessed through a bias analysis. Thus, the purpose of the present study was to conduct a systematic review on the efficacy of ACT on suicidal behavior. The specific objectives were to analyze the implementation of ACT in the treatment of suicidal behavior, as well as the efficacy of the interventions in the different expressions of this phenomenon.

Method

Search procedure and selection criteria

The systematic review was carried out following the standards of the PRISMA 2020 statement (Page et al., 2021). Table 3 shows the databases used, as well as the search strategies and filters that were employed. Furthermore, as inclusion criteria, the articles had to include the use of ACT-based interventions, address suicidal behavior, and be published in English or Spanish. As exclusion criteria, the articles should not be congress communications, doctoral theses, or term papers. In addition, no time limit was established for the selection of the studies.

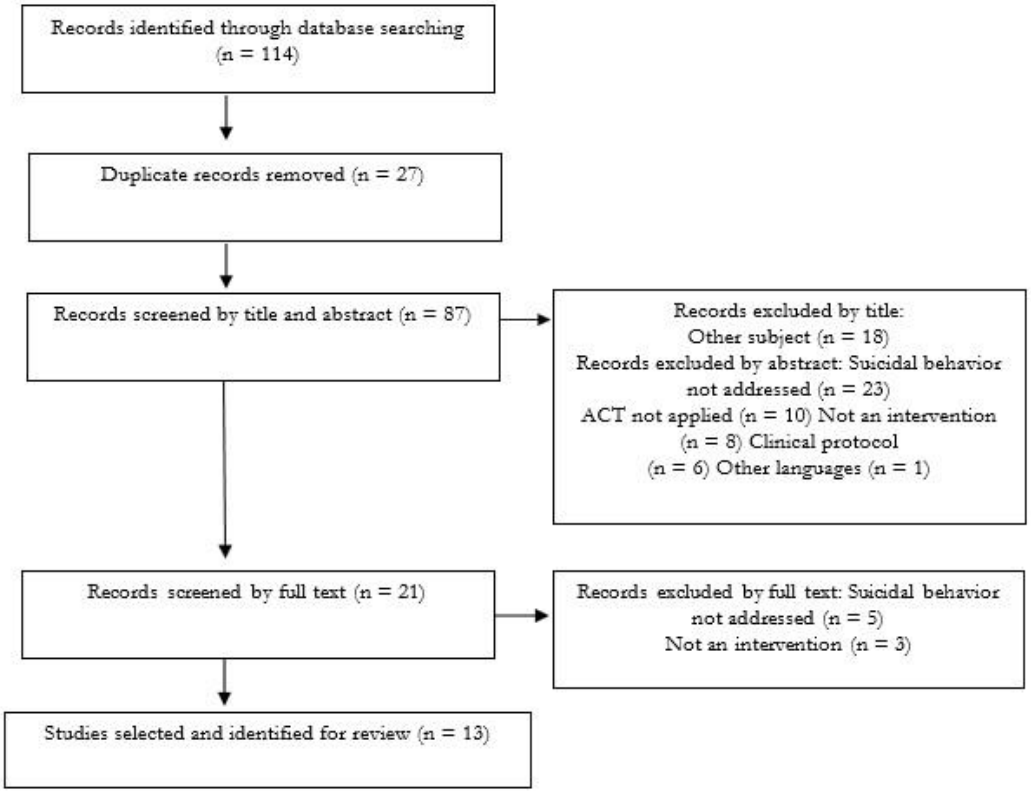
Table 3
Search strategies

Database	Table 3	Filters used	Number of results
PsycInfo	["Suicid* AND "Acceptance and Commitment Therapy"]	Journal articles	32
PubMed	["Suicid* AND "Acceptance and Commitment Therapy"]	Clinical trials and Randomized clinical trials	6
Scopus	["Suicid* AND "Acceptance and Commitment Therapy"]	Articles	75
PsicoDoc	["Suicid* AND "Aceptación y compromiso"]	Journal articles	1

Procedure and synthesis of results

The systematic review was carried out simultaneously and independently by the two authors, following the successive stages presented in the flowchart in Figure 1. After screening by title and abstracts and in full text, respectively, the two authors shared the results to review possible doubts and solve disagreements.

Figure 1
Article review process flowchart



Risk of bias assessment instrument

The risk of bias was assessed through an adaptation for this review of the "Academy of Nutrition and Dietetics Quality Criteria Checklist: Primary Research Tool" (Academy of Nutrition and Dietetics, 2016). This instrument was selected since it allows for the review of methodological quality of different types of studies simultaneously, from cross-sectional to experimental. In this regard, in addition to the 10 original criteria of the instrument, criteria 11 and 12 were included regarding whether the study is an RCT and the inclusion of psychometric instruments specific to suicidal behavior, respectively (Table 4).

Table 4
Bias risk assessment tool criteria

Criterion 1	Was the research question clearly stated?
Criterion 2	Was the selection of participants free from bias?
Criterion 3	Were study groups comparable?
Criterion 4	Was the method of handling withdrawals described?
Criterion 5	Was blinding used to prevent introduction of bias?
Criterion 6	Were intervention/therapeutic regimes described in detail?
Criterion 7	Were outcomes clearly defined and the measurements valid and reliable?
Criterion 8	Was the statistical analysis appropriate for the study design and type of outcome indicators?
Criterion 9	Are conclusions supported by results with biases and limitations taken into consideration?
Criterion 10	Is bias due to study's funding or sponsorship unlikely?
Criterion 11	Was a Randomized Controlled Trial (RCT) carried out?
Criterion 12	Was any psychometric instrument used to measure suicide behavior?

Likewise, if the criterion was met, a score of 1 was given, while a score of 0 was used when the criterion was not met. When compliance with the criterion could not be determined, it was recorded as unclear (UN). In addition, those criteria that could not be applied due to the type of study were considered as 'Not to be evaluated' (N/E). Regarding quality assessment, it was established that obtaining at least half of the attainable score while also meeting criteria 2, 3, 6, and 7, implied high quality. Obtaining half of the possible points, without meeting the specified criteria, implied medium quality, and obtaining less than half of the points implied low quality. Thus, the maximum score varied according to the study design, being 12 points in RCTs and quasi-experimental studies, and 10 points in single cases, as criteria 3 and 4 could not be assessed in the latter.

Results

Initially, a total of 114 publications were obtained, of which 27 duplicate articles were removed (Figure 1). Next, 87 records were reviewed based on their title and abstract, removing 66 articles, most of them for not addressing suicidal behavior (n = 23) or not applying ACT (n = 10). Then, 21 articles were reviewed in full text and 13 were finally selected to be included in the systematic review, excluding those publications that did not address suicidal behavior (n = 5) or were not an intervention (n = 3). In this sense, case studies such as the one conducted by Brem et al. (2020) or the one by Hiraoka et al. (2015) were excluded from the review because, despite conducting ACT-based interventions, they did not address suicidal behavior in their analyses or observations. Likewise, other publications were not included because they were theoretical proposals of the ACT approach to suicidal behavior (Bennett & Taylor, 2019).

Risk of bias in the studies analyzed

The risk of bias assessment (Table 5) was performed independently by the two researchers. Thus, the quality scores ranged from 4 to 12 points, with a mean score of 8.16 (SD = 2.37). Depending on the study design, the RCTs (n = 4) achieved a mean score of 10.5 (SD = 1.73), the quasi-experimental studies (n = 7), a mean score of 7.86 (SD = 0.69), and the single case studies (n = 2), a mean score of 4.5 (SD = 0.7). Therefore, most of the studies (n = 12) met at least half of the specified criteria, with nine of them being classified as medium quality, three as high quality, and one as low quality.

Table 5
Risk of bias assessment

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	T	C
As'hab et al. (2022)	1	1	N/E	0	UN	1	1	1	1	1	0	1	8	A
Barnes et al. (2021)	1	1	1	1	1	1	1	1	1	1	1	1	12	A+
Ducasse et al. (2014)	1	1	N/E	0	UN	1	1	1	1	1	0	1	8	A
Ducasse et al. (2018)	1	1	1	1	1	0	1	1	1	1	1	1	11	A
Hinrichs et al. (2020)	1	1	N/E	N/E	0	1	0	0	1	1	0	0	5	A
Kumpula et al. (2019)	1	1	1	UN	UN	0	1	1	1	1	0	0	7	A
Luoma & Villatte (2012)	1	1	N/E	N/E	UN	1	UN	0	1	UN	0	0	4	B
Meyer et al. (2018)	1	1	N/E	1	UN	1	1	1	1	1	0	0	8	A
Morton et al. (2012)	1	1	1	1	UN	1	1	1	1	UN	0	0	8	A+
Sokol et al., (2021)	1	1	N/E	1	UN	1	1	1	1	1	0	1	9	A
Tighe et al. (2017)	1	1	1	UN	1	1	1	1	1	1	1	1	11	A+
Vaca- Ferrer et al. (2020)	1	1	N/E	1	UN	1	1	1	1	UN	0	0	7	A
Walser et al. (2015)	1	1	N/E	1	UN	1	1	1	1	1	0	0	8	A

Note. UN, unclear; N/E, not to be evaluated; T = total score; C = classification; A+ = high; A = medium; B = low

Overview of the selected studies

The overview of the 13 studies reviewed is shown in Table 6. It contains data on the characteristics of the sample (number of participants, sex, and age), study design, type of intervention, and results. In addition, the publications included in the review have been marked with an asterisk in the references list of this paper.

Table 6
Overview of the studies

Reference	Sample	Design	Intervention	Results
As'hab et al. (2022)	31 patients diagnosed with MDR-TB 67.70% male	Quasi-experimental	6 home visits SNI+ACT	SSI: decreased SI (**)
Barnes et al. (2021)	70 veterans hospitalized due to suicide risk 81.40% male Age: *M* = 47 (22 - 73)	RCT	3 modules (3-6 individual sessions up to 5h) G1: ACT+TAU (*n* = 35) G2: TAU (*n* = 35)	C-SSRS: decreased SI intensity CFQ-SI: decreased cognitive fusion with SI G1 > G2: lower attempted suicide rate (15% vs. 18%)
Ducasse et al. (2014)	35 outpatients suffering SBD 57.10% male Age: *M* = 38.40 (18 - 60)	Quasi-experimental	7 weekly sessions of ACT lasting 2h	C-SSRS: decreased SI (**) SSI: decreased SI (**)
Ducasse et al. (2018)	40 outpatients suffering SBD 87.50% female Age: *M* = 38.19 (*SD* = 1.80)	RCT	7 weekly sessions lasting 2h G1: ACT (*n* = 21) G2: PRT (*n* = 19)	G1. C-SSRS: decreased SI posttherapy (**; β/SD = - 0.17) and follow-up (n.s.; β/SD = - 0.0009) Decreased SRF posttherapy (**) and follow-up (n.s.). G1 > G2. C-SSRS: greater decrease of SI posttherapy (β/SD = -0.17 vs. β/SD = - 0.07) Differences (**) in SRF rate of change; hopelessness (*)
Hinrichs et al. (2020)	1 veteran with CSI and life- limiting illness Age: 77	Case studies	8 ACT-D+CP sessions	Clinical judgment: decreased SI
Kumpula et al. (2019)	1780 veterans 79.60% male Age: *M* = 52.30 (*SD* = 12.60)	Quasi-experimental	G1: 12-16 IPT individual sessions (*n* = 271) G2: 16 DBT-D individual sessions (*n* = 844) G3: 12 ACT-D individual sessions (*n* = 723)	G3. BDI-II (item 9): decreased SI posttherapy (**) and follow-up (**) G1 = G2 = G3: no significant differences
Luoma & Villatte (2012)	2 patients with SI 1 male and 1 female Age: *M* = 34.50 (*SD* = 17.68)	Case studies	Individual ACT treatment	Clinical judgment: decreased SI
Meyer at al. (2018)	43 veterans with PTSD- AUD 88.40% male Age: *M* = 45.26 (*SD* = 8.60)	Quasi-experimental	12 ACT individual sessions	PHQ-P (item 9): decreased SI posttherapy (n.s.) and follow-up (*)
Morton et al. (2012)	41 patients with BPD G1: 90.50% female G2: 95% female Age: G1: *M* = 35.60 (*SD* = 9.33) G2: *M* = 34 (*SD* = 9.02)	RCT	12 group sessions of 2h G1: ACT+TAU (*n* = 21) G2: TAU (*n* = 20)	G1. BHS: decreased hopelessness posttherapy (**; *d* = 0.91) and follow-up (**; *d* = 1.12) G1 > G2. BHS: greater decrease in hopelessness (** vs. n.s.)
Sokol et al., (2021)	17 veterans with 82.40% male Age: *M* = 59.70 (*SD* = 9.50)	Quasi-experimental	4 weeks of CI-CT group sessions (ACT partially)	BSSI: decreased SI posttherapy (**) and does not increase in follow-up
Tighe et al. (2017)	61 indigenous Australians 64% female Age: *M* = 26.25 (*SD* = 8.13)	RCT	6 weeks G1: ACT app (*n* = 31) G2: Waitlist (*n* = 30)	G1. DSI-SS: decreased SI (*) G1 = G2. DSI-SS: no significant differences
Vaca-Ferrer et al. (2020)	21 women victims of GV Age: *M* = 35	Quasi-experimental	11 group sessions of 2h ACT+FAP+AC	CORE-OM (R scale): decreased clinical indicators of suicide risk (**)
Walser et al. (2015)	981 veterans 22.60% female 75.50% male 1.80% not reported Age: *M* = 50.50 (*SD* = 12.50)	Quasi-experimental	12-16 individual sessions of ACT-D	BDI-II (item 9): decreased SI probability (**)

Instruments notes. SSI = Scale for Suicide Ideation; C-SSRS = Columbia-Suicide Severity Rating Scale; CFQ-SI = Cognitive Fusion Questionnaire – Suicidal Ideation; BDI-II = Beck Depression Inventory II; PHQ-9 = Patient Health Questionnaire; BHS = Beck Hopelessness Scale Beck; BSSI = Beck Scale for Suicide Ideation; DSI-SS = Depressive Symptom Index – Suicidality Subscale; CORE-OM = Clinical Outcomes in Routine Evaluation-Outcome Measure
Table notes. MDR-TB = multidrug-resistant tuberculosis; SNI = standard nursing intervention; ACT = Acceptance and Commitment Therapy; SI = suicide ideation; TAU = treatment as usual; SBD = suicidal behavior disorder; PRT = progressive relaxation training; SRF = suicidal risk factors; CSI = chronic suicidal ideation; ACT-D = Acceptance and Commitment Therapy for Depression; PC = palliative care; IPT = Interpersonal Therapy; CBT-D = Cognitive-Behavioral Therapy for Depression; PTSD- AUD = posttraumatic stress disorder and alcohol use disorder; BPD = borderline personality disorder; CI-CT = Continuous Identity Cognitive Therapy; GV = gender violence; FAP = Functional Analytic Psychotherapy; BA = Behavioral Activation
Probability notes. *$p < .05$; **$p < .01$; n.s. = not statistically significant

Firstly, all studies aimed to determine the impact of ACT on several variables, including SI or related variables such as hopelessness, with some studies testing the feasibility with pilot trials.

Regarding the sample, different populations were targeted such as: war veterans (Barnes et al., 2021; Hinrichs et al., 2020; Kumpula et al., 2019; Meyer et al., 2018; Sokol et al., 2021; Walser et al., 2015), individuals with a diagnosis of suicidal behavior disorder (Ducasse et al., 2014; Ducasse et al., 2018), with a diagnosis of borderline personality disorder (Morton et al., 2012), with multidrug-resistant tuberculosis (As'hab et al., 2022), indigenous Australians with suicidal ideation (Tighe et al., 2017), and victims of gender-based violence (Vaca-Ferrer et al., 2020). As for sample size, it ranged from $n = 1$ to $n = 1780$. Referring to gender, all the studies had mixed samples with generally higher percentage of men, except for the single case study conducted by Hinrichs et al. (2020) in which only one man was involved, and the quasi-experimental study conducted by Vaca-Ferrer et al. (2020), in which only women were involved. In terms of age, the interventions were carried out in adult samples and the studies presented means from 26.25 to 59.70 years, except for the single case study by Hinrichs et al. (2020), which carried out the treatment with a 77-year-old person.

In terms of interventions, five studies conducted ACT (Ducasse et al., 2014; Ducasse et al., 2018; Luoma & Villate, 2012; Meyer et al., 2018; Tighe et al., 2017), two applied ACT- D (Kumpula et al., 2019; Walser et al., 2015) and six combined ACT with other types of interventions. Furthermore, the most frequent format of intervention was individual sessions. In addition, the number of sessions ranged from three to 26, with a usual length of two hours except for the intervention proposed by Barnes et al., (2021), which proposed intensive sessions of up to five hours.

Finally, the most used variable to test the efficacy of the intervention was SI. In addition, six of the studies conducted follow-up assessments three months after completion, while one study conducted a follow-up at one month.

ACT-based interventions

In five of the studies, interventions were conducted using the six elements of the ACT psychological flexibility model (Table 2), except for the research by Tighe et al. (2017), which did not use the self-as-context process. Thus, in three of the studies (Ducasse et al., 2014; Ducasse et al., 2018; Luoma & Villate, 2012) individual interventions were conducted, while Meyer et al. (2018) considered a group intervention consisting of 12 sessions.

Meanwhile, Tighe et al. (2017) provided an intervention divided into three units or modules of content through the *ibobbly* app. Thus, they first sought to identify suicidal thoughts, as well as the emotions and behaviors that are associated with them, followed by learning cognitive defusion techniques. The second module included mindfulness exercises and the acceptance of difficulties as an alternative to suicidal behavior. In the last unit, contact with values and committed action were practiced.

Interventions based on ACT-D

A second group of publications includes two studies in which ACT-D was applied (Kumpula et al., 2019; Walser et al., 2015). In this sense, ACT-D is a structured treatment based on the acceptance of internal experiences and contact with values that can act as intrinsic motivators (Hayes et al., 2013). Its application is carried out through a series of individual sessions ranging from 12 and 16 sessions, specifically designed for war veterans with depressive symptomatology (for more information on ACT-D, see Zettle, 2007).

Interventions combining ACT with other therapies

A third group of articles includes six studies in which specific ACT processes are combined with other treatments. Thus, Barnes et al. (2021) and Morton et al. (2012) applied elements of ACT together with TAU, the latter consisting of psychotropic medication together with CBT in the first article, and supportive contacts together with psychotropic medication in the second. Hinrichs et al. (2020) combined ACT-D with palliative care, while As'hab et al. (2022) carried out an intervention developed as home visits in which the first four sessions were based on a standard nursing intervention and the last two sessions on ACT components. Lastly, in the studies conducted by Vaca-Ferrer et al. (2020) and Sokol et al. (2021), treatments integrated ACT components with elements from other therapies, such as Functional Analytic Psychotherapy (FAP) and Behavioral Activation (BA) in the former, and elements of CBT in the latter.

Outcome variable: suicidal behavior

Regarding the instruments used to measure suicidal behavior, it was assessed in three of the studies (Barnes et al., 2021; Ducasse et al., 2014; Ducasse et al., 2018) through the Columbia-Suicide Severity Rating Scale (C-SSRS, Posner et al., 2011). In two of the studies (As'hab et al., 2022; Ducasse et al., 2014) SI was measured by the Scale of Suicide Ideation (SSI; Beck et al., 1979), in one of the papers (Sokol et al., 2021), by using an adaptation of the Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) for suicide ideation (CFQ-SI). Likewise, in two papers (Kumpula et al., 2019; Walser et al., 2015) SI was measured through item 9 of the Beck Depression Inventory II (BDI-II; Beck et al., 1996), in another one (Meyer et al., 2018), through item 9 of the Patient Health Questionnaire (PHQ-P; Kroenke et al., 2001) and, finally, in one article (Tighe et al., 2017) it was measured with the Depressive Symptom Inventory – Suicidality Subscale (DSI-SS; Metalsky & Joiner, 1997).

Additionally, in the study conducted by Morton et al. (2012), hopelessness was measured through the Beck Hopelessness Scale (BHS; Beck & Steer, 1988) due to its relation-

ship with suicide risk (Beck et al., 1990). In the study conducted by Vaca-Ferrer et al. (2020), clinical indicators of suicide risk were evaluated through the R scale of the Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM; Feixas et al., 2012).

The results of all the studies showed a decrease in SI, as well as in variables related to suicidal behavior such as hopelessness, clinical indicators of suicide risk or suicidal risk factors. Furthermore, when comparing ACT with other conditions, in Barnes et al. (2021) a lower percentage of suicide attempts was observed, and in Morton et al. (2012) a greater decrease in hopelessness was observed in the groups in which ACT was applied together with TAU than in those in which only TAU was used. Similarly, in Ducasse et al. (2018) there was a greater decrease in SI and suicidal risk factors in the group in which ACT was applied, versus the one in which progressive relaxation training was performed. However, in Tighe et al. (2017) no significant differences were observed between the group in which ACT was delivered and the one in which participants were on a waiting list.

Regarding ACT process variables, in Barnes et al. (2021), Ducasse et al. (2018), and Morton et al. (2012), a significant improvement in psychological flexibility measured through the Acceptance and Action Questionnaire II (AAQ-II; Bond et al., 2011) was observed. Furthermore, significant relationships between decreased SI and increased psychological flexibility were observed in Ducasse et al. (2014) and Walser et al. (2015).

Discussion

The aim of the present study was to carry out a systematic review of the efficacy of ACT on suicidal behavior. For this purpose, 13 articles were selected in which interventions based on ACT, ACT-D, or the combination of ACT with other procedures were conducted. Despite the variability of designs and the diversity of instruments used to assess suicidal behavior, in general, reductions in SI were observed in accordance with the preliminary data obtained in the systematic review of the efficacy of ACT on suicidal behavior conducted by Tighe et al. (2018).

Many of the studies reported a significant reduction in SI or related variables, such as hopelessness. Notably, three of the RCTs showed differences in favor of ACT between groups that received interventions with ACT components and those that did not, aligning with findings from a previous review (Tighe et al., 2018).

Simultaneously, statistically significant relationships were observed between decreased SI and reduced psychological inflexibility, consistent with previous research (Crasta et al., 2020; Chou et al., 2018; Krafft et al., 2018; Weeks et al., 2020). Reduced experiential avoidance also correlated significantly with decreased SI (Ducasse et al., 2014; Walser et al., 2015), supporting the notion that suicidal behavior may be a form of avoidance (Hennings, 2020).

However, one RCT conducted by Tighe et al. (2017) did not find significant differences between the group receiving ACT and the waitlisted groups. It's worth noting that delivering the intervention through an app may have affected the results, as it addressed only five of the six processes in the psychological flexibility model.

In this regard, it should be noted that the disparity of designs and forms of application restricted the comparison between treatments, and it was difficult to determine the involvement of ACT variables in the reduction of suicidal behavior, since there were also different combinations with other types of interventions in six of the 13 studies. In addition, there are no data on the processes of change and therefore, when applying ACT in combination with other treatments, it is not possible to determine which components were effective.

Likewise, there was great variety in the sample size of the studies, which, together with the diversity of the populations considered, prevents the generalization of the results. In this respect, it is noteworthy that six of the 13 interventions analyzed were carried out with war veterans, being by far the largest number of the sample addressed in the studies included in this systematic review. This, in turn, may lead to confirming the existence of consistent data pointing to a possible efficacy in the approach to SI in this population.

Furthermore, the comparison of results was constrained due to variations in the assessment measures employed among the studies, with only five of them utilizing psychometric instruments for evaluating suicidal behavior. Among these instruments, only the BSSI and DSI-SS scales present adequate characteristics for research (Batterham et al., 2015). In this regard, although three of the studies employed the C-SSRS, a scale also recommended for assessing both suicidal thoughts and behaviors (Fonseca-Pedrero & Pérez de Albéniz, 2020), they only presented results related to SI. Thus, other aspects of suicidal behavior such as suicidal planning, suicidal communication, or suicide attempt were not considered, with only data on the latter in the work by Barnes et al. (2021). Moreover, three studies relied on a single- item measure for assessing SI, warranting caution when interpreting their results.

Similarly, two studies evaluated other variables such as hopelessness, clinical indicators of suicide risk, or suicide risk factors, offering results hardly comparable with those obtained in other publications. In the scientific literature, there has been a question about the ability of suicide risk assessment instruments to predict suicidal acts, leading to their recommendation as complementary measures (Runeson et al., 2017). Additionally, the single case studies showed results based on the clinical judgment of the psychologist who conducted the intervention, lacking psychometric measures to support their observations. To this effect, to obtain reliable data on suicidal behavior, the assessment should be conducted along with observations, self-reports, interviews, and psychometric measures, considering thoughts and behaviors while also trying to understand their idiographic function in

the context of each individual (Fonseca-Pedrero & Pérez de Albéniz, 2020).

In future studies, based on the preliminary data provided by the reviewed studies, it would be necessary to use RCTs to evaluate the efficacy of applying ACT on suicidal behavior in the clinical population. Thus, according to the recommendations made by Hayes et al. (2021) on the future directions of ACT, these RCTs should examine how the intervention results are influenced by different dimensions of change at the individual level and explore the roles played by the components of the psychological flexibility model. Along these lines, measurements should be aimed at identifying the key components of the treatment, studying and testing ACT change processes in different settings. To this end, different assessment measures that address the complexity of suicidal behavior, as well as its role in the particular context of each individual, need to be employed (Fonseca-Pedrero & Pérez de Albéniz, 2020). Regarding the limitations of the present review, we can highlight the number of studies included. Due to the small number of RCTs, it is difficult to reach conclusions on the efficacy of ACT on suicidal behavior. Likewise, publications with different designs, disparate populations and interventions in which ACT was applied in different ways were also included.

However, the results obtained suggest that ACT may be effective in addressing SI and may have clinical implications for the treatment of this problem. Thus, based on the interventions reviewed, an intervention consisting of 7-16 individual sessions, lasting about two hours, could achieve a significant decrease in thoughts related to taking one's own life. To this end, it would be convenient to address the six components of the psychological flexibility model through metaphors and experiential exercises that allow for the acceptance of negative private events as an alternative to suicidal thoughts that act as a form of experiential avoidance.

Suicide behavior is a primarily psychological human phenomenon that has emerged as a pressing global issue affecting both society and public health with alarming annual rates. Given this situation, it is necessary to study the efficacy of psychological treatments in addressing it, exploring the core of the intervention and the processes of change involved in therapeutic success. ACT seems to be a treatment with great potential due to the preliminary data obtained, pointing out the need to continue researching its efficacy in the treatment and prevention of suicidal behavior.

Complementary information

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