

Effectiveness of Acceptance and Commitment Therapy for Suicidality: A Systematic Review and Meta-analysis

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1. INTRODUCTION

Suicide is a tragic outcome of mental health distress that remains a leading cause of death worldwide, with over 703,000 mortalities annually (World Health Organization, 2021). This highlights the urgent need for effective interventions to prevent and manage suicidal ideation and suicide attempts. Unfortunately, there is no simple treatment that can prevent suicide. Regarding pharmacologic options, clozapine for schizophrenia (Masdrakis and Baldwin, 2023), esketamine for major depressive disorder (Zhdanova et al., 2023), and lithium for bipolar disorder (Smith and Cipriani, 2017) are effective in preventing suicide, but these cases account for only a small percentage of all suicide deaths.

A recent umbrella review reported the effectiveness of cognitive-behavioral therapy (CBT) for reducing suicidal ideation and attempts (Wu et al., 2022). Dialectical behavior therapy (DBT) was effective in reducing suicide attempts but had no significant effect on suicidal ideation (DeCou et al., 2019), while mentalization-based therapy was not effective in reducing self-harm compared with controls (Hajek Gross et al., 2024). Meanwhile, there is a lack of systematic reviews and meta-analyses regarding the effectiveness of major psychotherapeutic approaches, including acceptance and commitment therapy (ACT), in reducing suicidality.

ACT is considered one of the “third-wave” behavioral therapies, which emphasizes acceptance and nonjudgmental attitudes toward thoughts and feelings (Hayes et al., 2012). ACT is action-oriented and focuses on helping people commit to values-based goals and move forward in their lives despite the presence of painful inner experiences. ACT is based on the hexaflex model (Figure 1), which visually represents six core therapeutic processes: acceptance, defusion, self-as-context, contact with the present moment, value clarification, and committed action (Belisle and Dixon, 2022). The term 'hexaflex' derives from the Greek word 'hexa' meaning six and 'flex' meaning flexibility, reflecting ACT's core concept of promoting psychological flexibility through six core therapeutic processes. These interconnected processes aim to promote psychological flexibility, which refers to staying in contact with the present moment while remaining open to a wide range of thoughts, feelings, and bodily sensations and making choices based on personal values and the current situation. The six factors of the hexaflex can be briefly explained as follows. Acceptance is the act of fully and wholeheartedly embracing reality as it is. This is not a passive or resigned attitude but rather an active and intentional process. For instance, if someone were unjustly

imprisoned and practiced acceptance, they would not spend their time helplessly blaming their misfortune or the world. Instead, they might actively work to raise awareness of their injustice, pursue an academic degree, learn a foreign language, or engage in fitness activities while in prison. In essence, acceptance involves willingly embracing one's reality to create a foundation for doing the best one can within those circumstances. Defusion is a technique aimed at minimizing the harmful influence of language. One of the most distinctive aspects of ACT compared to other third-wave cognitive-behavioral therapies is its strong foundation in Relational Frame Theory (RFT). RFT, in simple terms, posits that the human mind operates through a language-based system that shapes and governs our mental world. For example, the word lemon as a linguistic stimulus may evoke past experiences related to lemons. Upon seeing the word, a person might recall the sour taste of a lemon and even experience a physiological response, such as increased salivation. Defusion works to reduce this linguistic influence. If the person were to rapidly repeat the word lemon dozens of times, they would eventually stop associating it with sensory or physiological responses. Instead, they would perceive the word merely as a string of letters without attaching the meaning of sourness or salivation to it. Defusion is particularly effective at diminishing the linguistic influences that contribute to rumination and worry, helping individuals detach from unhelpful thought patterns. Contact with the present moment refers to being fully present in the here and now, a concept closely aligned with mindfulness. Often, while we may be physically awake, our minds are occupied with ruminating on past events or worrying about the future. Contact with the present moment, like mindfulness, helps increase our connection to the present, enabling us to focus on and engage with the current moment more effectively. Self-as-context is the ability to see oneself not as a fixed entity but as a constantly evolving and dynamic being that changes with context and time. For example, if someone holds a rigid self-concept like, "I never make mistakes; I'm always perfect," they might become deeply disappointed in themselves and find it hard to accept even minor errors. However, a person with a strong sense of self-as-context might say, "In such a busy and challenging situation, it's natural to make mistakes," allowing for self-understanding and self-compassion. Values serve as a compass for life, guiding our actions and decisions. They represent aspirations we strive toward but can never fully achieve. For instance, if someone holds the value of "becoming a better person," achievements like earning a certification or getting a promotion may serve as intermediate goals but cannot represent the value itself. Finally, committed action refers to taking concrete steps aligned with one's values. Values-based committed

action is particularly crucial for individuals with depression, as it helps them overcome inertia and lack of motivation, fostering recovery.

The hexaflex model is not linear but circular, as depicted in Figure 1. Therapists can start working at any point within the hexaflex depending on the client's state and move freely between factors as the process unfolds. It is akin to the therapist and client forming a pair and navigating through the hexaflex factors, stepping together in a kind of “ACT dance.”

While a growing body of research supports the efficacy of ACT for various mental health concerns, such as depression, anxiety, and chronic pain (Gloster et al., 2020), its usefulness for suicidality warrants further investigation. Only one systematic review has reported on the effectiveness of ACT for suicidality, which included two case reports, two before-and-after comparisons, and one randomized controlled trial (RCT) (Tighe et al., 2018). In the case reports by Luoma and Villatte (2012), ACT was applied to two participants, both of whom showed significant improvement in suicidal ideation (Luoma and Villatte, 2012). Similarly, Razzaque (2013) reported case studies involving three participants who underwent one-on-one ACT sessions for 2–3 weeks (Razzaque, 2013). Among them, one individual experienced a significant reduction in self-harm and suicidal ideation, while the other two showed a decrease in expressions of self-harm or suicidal thoughts. Ducasse et al. (2014) recruited 37 psychiatric patients without a control group (Ducasse et al., 2014). The researchers implemented ACT in weekly 2-hour sessions over a total of 7 weeks. They reported that suicidal ideation measured at 1- and 3-month post-intervention significantly decreased. Walser et al. (2015) conducted a study involving 981 veterans, providing a total of 12–16 sessions of depression-focused ACT without a control group. (Walser et al., 2015). They reported a 20.5% overall reduction in the prevalence of suicidal ideation among the participants. Tighe et al. (2017) implemented a mobile ACT app for six weeks among youth from Australia's First Nations people. (Tighe et al., 2017a). The study included a wait-list control group to compare with the intervention group. The results showed that the intervention group experienced a 42% reduction in subjective depression, as measured by the Patient Health Questionnaire-9, which was statistically significant compared to the control group ($p = 0.02$). Although suicidal ideation in the intervention group decreased by 30%, the difference compared with the control group was not statistically significant ($p = 0.3$). Based on those studies, the authors concluded that the lack of evidence makes it difficult to determine the effectiveness of ACT in reducing suicidal ideation. As evidenced by the characteristics of the individual studies included in this systematic review, there was only one

RCT, and even in that study, the effect of ACT on suicidal ideation showed no statistically significant difference compared to the control group. However, given that eight years have passed since this systematic review was published, we felt it was necessary to reassess the effectiveness of ACT on suicidality.

The present systematic review and meta-analysis aims to compile the research on ACT for suicidality and determine if it effectively reduces this. We hypothesized that ACT is effective in reducing suicidality because it encourages psychological flexibility to tolerate pain and take actions that move toward meaning and value in life.

2. MATERIAL AND METHODS

We conducted this study following the PRISMA guidelines (**Figure 2**).

2.1. Selection criteria

Electronic databases such as PubMed, Embase, Scopus, and the Cochrane Library were searched for studies, including only RCTs with no restrictions on language and publication period. Other types of studies such as cross-sectional case-control studies, observational studies, and pre-post comparison studies without appropriate controls were excluded. We included studies in which suicidal ideation or suicide attempts were the primary focus. Only studies that used valid measures for assessing suicidal ideation (e.g., Beck Scale for Suicide Ideation [BSS], Columbia Suicide-Severity Rating Scale [C-SSRS]) were included in the analysis.

2.2. Participants

There was no age limit for the participants. We included individuals with experiences of nonsuicidal self-injury or suicidality (i.e., people with suicidal ideations and/or a previous suicidal attempt). Nonsuicidal self-injury is defined as the deliberate, self-inflicted destruction of body tissue without suicidal intent and for purposes not socially sanctioned (Zetterqvist, 2015).

2.3. Interventions

We included studies that utilized ACT as a stand-alone or primary intervention for suicidality. Studies that used novel therapies that mixed ACT with various modalities or ACT combined with a particular CBT (e.g., DBT, mindfulness-based cognitive therapy, etc.) were deemed ineligible, and thus, those studies were excluded. We did not limit the form (individual or group), delivery (in-person or virtual), duration, and frequency of the intervention.

2.4. Outcomes

We included studies that measured suicidality with instruments that have well-established validity. The primary endpoint was the change in suicidality before and after intervention between the experimental and control groups. For studies with a follow-up period after ACT, we analyzed the results at the last time period tracked.

2.5. Search strategy

Two researchers independently searched PubMed, Embase, Scopus, and the Cochrane Library using the following search terms: suicid* AND Acceptance and Commitment Therapy. The search period was set from the database's inception to January 31, 2024. Since there were no language restrictions, for non-English articles, we asked native speakers familiar with the language and culture to translate them.

After excluding duplicate articles, two researchers independently conducted the initial screening using only the title and abstract. Any disagreements were initially discussed between the two researchers then resolved by a third researcher if a consensus was not reached. Full texts were obtained for all screened articles and reviewed independently by two additional researchers. Any disagreements were resolved in a similar fashion.

2.6. Data extraction

Two researchers independently extracted the following data: publication year, country, first author, number of subjects (i.e., the number and clinical characteristics of each control and experimental group), ACT details (i.e., form, number of sessions, and duration), mean

outcome measures and standard deviations at baseline and endpoint, and follow-up details. Any differences in the extracted data between the two researchers were subject to peer review and discussions to reach a consensus. All data were managed and processed using Covidence.

2.7. Risk of bias assessment

Quality assessment was conducted according to Risk of Bias 2.0 (RoB 2) (Boutron et al., 2019). RoB 2 was first developed by the Cochrane Collaboration in 2008 to address issues such as low inter-rater reliability in some domains and difficulties in properly assessing the risk of bias. It underwent a revision in 2011. RoB 2 is thought to have addressed some of the issues raised in the previous version through changes such as assessing the risk of bias at the level of individual study results rather than outcomes, providing algorithms and signaling questions to guide risk of bias judgments for each domain, distinguishing between the effects of intervention assignment and adherence to intervention, and introducing an explicit process for evaluating the overall risk of bias. RoB 2 is divided into five categories: (1) bias arising from the randomization process, (2) bias due to deviations from intended interventions, (3) bias due to missing outcome data, (4) bias in measurement of the outcome, and (5) bias in selection of the reported result. The overall bias risk level is estimated using the results of all five categories together.

2.8. Statistical analysis

Comprehensive Meta Analysis version 4 (Biostat, Englewood, NJ 2022) was used for statistical analysis. The corresponding authors of the articles were contacted in case of any missing data. Given the use of different instruments for suicidality, we calculated the standardized mean differences (SMD) and 95% confidence interval (CI). A correlation coefficient of $r = 0.5$ was universally accepted and employed as a measure of the association between the pretreatment and posttreatment totals.(Wang et al., 2019). The random-effects model was applied; this assumes that the true effect size may vary between studies, beyond what is expected due to random error or sampling variability alone. However, the fixed effects model assumes that the true effect size is the same in all included studies and that any observed differences in effect sizes between studies are due to random error or sampling variability only (Riley et al., 2011).

If more than 10 individual studies were retrieved, we planned to perform subgroup analysis or meta-regression to identify variables associated with pooled statistical results (Deeks et al., 2019) and funnel plot test for assessing publication bias (Tarsilla, 2019). We decided to use Egger's regression test as an alternative to the funnel plot to assess publication bias when the number of studies included in the meta-analysis is fewer than ten. Heterogeneity was defined using I^2 statistics, with I^2 values of 25%, 50%, and 75% indicating low, moderate, and high levels of heterogeneity, respectively (Higgins et al., 2003).

3. RESULTS

3.1. Study characteristics

The systematic review included eight studies, with their characteristics shown in **Table 1**. The country with the most studies conducted was Iran, with four studies (Sara et al., 2021, Bagheri-Sheykhangafshe et al., 2022, Shareh and Robati, 2022, Bahram et al., 2023), followed by France (Ducasse et al., 2018), the United States (Barnes et al., 2021), Egypt (El-Sayed et al., 2023), and Australia (Tighe et al., 2017b), with one study each. The most commonly utilized measure of suicidality was the BSS (Beck and Steer, 1991) (5 studies), followed by the C-SSRS (Posner et al., 2007) (2 studies) and the Depressive Symptom Inventory-Suicidality Subscale (DSI-SS, Joiner et al., 2002) (1 study). Most studies were conducted over a timeframe of 1–3 months.

In Egger's regression test, there was no significant publication bias (standard error [95% CI] = 2.86 [-3.19 to 21.4], $p = 0.036$). There seemed to be high heterogeneity ($I^2 = 88.2$) among the studies included.

3.2. Efficacy of ACT

Only four of eight studies included in the systematic review were eligible for meta-analysis (Tighe et al., 2017b, Barnes et al., 2021, Bahram et al., 2023, El-Sayed et al., 2023). The four ineligible studies lacked at least one essential quantitative indicator necessary for conducting a meta-analysis. Despite multiple efforts to contact the corresponding and first authors of each study via email, we did not receive any responses. Consequently, these four studies were excluded from meta-analysis. Among the four eligible studies, the pooled SMD (95% CI) for suicidal ideation was 1.122 (95% CI = 0.261–1.982). With only four RCTs included in the meta-analysis, we were unable to perform the publication bias and meta-regression that was originally planned.

3.3.Risk of bias

Overall, individual studies included in the systematic review had significant levels of bias (Table 2). All eight studies had 'High' in the Overall Risk Bias. Among subcategories, all eight studies had 'High' in the Measurement Outcome. The study by El-Sayed et al. (2023) had the lowest risk of bias, with four domains (Randomization Process, Intended Interventions, Missing Outcome Data, Selection of Reported Data) rated as 'Low'. The study by Tighe et al. (2017) followed, with three domains (Randomization Process, Intended Interventions, Missing Outcome Data) rated as 'Low'. In contrast, none of the four studies conducted in Iran received a 'Low' rating in any domain.

4. DISCUSSION

This systematic review and meta-analysis evaluated the effectiveness of ACT in reducing suicidality. The meta-analysis revealed a significant effect size across the 4 RCTs eligible for inclusion, suggesting that individuals undergoing ACT experienced a substantial reduction in suicidal ideation compared to controls. This outcome underscores the potential of ACT to address suicidal ideation effectively.

ACT conceptualizes suicidality as a learned and reinforced response to emotional distress, rather than solely a symptom of mental illness (Chiles et al., 2019). This perspective allows for a more nuanced understanding of suicidal behavior, recognizing that it can occur in individuals with or without diagnosed mental disorders. ACT views suicidal behavior as existing on a continuum of problem-solving methods, rather than as an absence of solutions. From the perspective of ACT, a suicidal crisis is fundamentally rooted in an individual's relationship with their own distress. While suffering is an inevitable part of life, we are culturally conditioned to believe that we must eliminate or escape from uncomfortable thoughts, emotions, or sensations. This tendency to control, remove, or suppress negative thoughts, emotions, or sensations rather than accepting them is known as experiential avoidance. When individuals engaging in the experiential avoidance fail to control or eliminate their negative internal events, they may resort to increasingly avoidant strategies, with suicidal behavior representing one such extreme. Researches consistently demonstrated that emotionally avoidant coping strategies are strongly associated with various psychopathological phenomena, including suicidal tendencies (Hayes et al., 2011, Chiles et al., 2018). In contrast to traditional emotion-focused problem-solving, which aims to resolve mental suffering, ACT's values-based problem-solving approach treats mental suffering as a

given and aims to help individuals respond to life's challenges in accordance with their beliefs and values.

The key difference of ACT from other major CBT approaches lies in the RFT (Hayes et al., 2001). ACT directly targets the RFT and changes the context. For example, suicidal thoughts often arise from maladaptive relational networks (e.g., "I am worthless" leading to "I should die"). ACT helps reframe these networks in a more adaptive way and changes the way we respond to certain stimuli based on their relational context. ACT can reduce the significance of suicidal ideas by altering the relational context of suicidal thoughts (i.e., seeing them as just thoughts rather than commands). Additionally, by fostering a nonjudgmental stance toward painful emotions, individuals can learn to manage distress without resorting to suicidal behaviors.

ACT also emphasizes connecting with personal values and engaging in committed action aligned with those values. This focus on meaningful living can provide a sense of purpose and direction, potentially counteracting feelings of hopelessness often associated with suicidal ideation (Ramaci et al., 2019). Furthermore, the emphasis on mindfulness and awareness of the present moment can help individuals break cycles of rumination and catastrophic thinking that can fuel suicidal thoughts (Baer, 2008, Ramaci et al., 2019). Clinicians can integrate ACT techniques into their therapeutic approach by practicing mindfulness and acceptance strategies during and in between sessions. For example, they can guide patients in examining the thoughts that emerged during a suicidal crisis or use visualization techniques, such as imagining placing distressing thoughts into clouds in a clear sky and allowing them to float by without judgment. Another effective method is to have patients complete values clarification exercises, helping them recognize their values across various domains and set specific behavioral goals aligned with those values (Hayes et al., 2011, Ciles et al., 2018).

Several limitations must be considered in our study. First, a high risk of bias was observed across all eight studies, with particular concerns regarding the randomization process, deviations from intended interventions and selective reporting, especially in studies conducted in Iran. This high risk of bias raises concerns that the results of the meta-analysis would not be reliable. We believe the main reason for this issue is the lack of sufficient information available from individual studies. According to the algorithm of the RoB 2, if even one of the five individual items is classified as high risk, the overall risk of bias is also

categorized as high risk. Notably, all studies were assessed as high risk in the “Measurement of Outcome” domain due to insufficient information. As mentioned in Methods, we made several attempts to contact the corresponding authors of the studies included via email to obtain the missing information, but we did not receive any responses. These communication challenges likely led to a classification of high risk of bias. Second, the number of studies included in the analysis was limited; only eight out of 604 studies identified across multiple databases met the inclusion criteria for our systematic review. This may be attributed to the relative novelty of ACT compared with more established therapies such as CBT, although suicidality is infrequently studied even in these more established treatments. Ethical concerns inherent in suicide research also necessitate stringent safety protocols for participants at elevated risk (Lakeman and FitzGerald, 2009, Bhasin et al., 2022). Third, the preponderance of Iranian studies in this analysis is noteworthy, given the increasing suicide rates in the country. While the prevalence of suicide attempts in Iran remains below the global average, it has shown a significant upward trend, with suicide-related mortality rising from approximately 0.2 to 6.2 per 100,000 from 1991 to 2002 (Hossein Hassanian-Moghaddam and Zamani, 2017, Mahboobeh Asadiyun and Daliri, 2023). Additionally, recent data indicated a 60% increase in suicide rates between 2015 and 2019, thus underscoring the urgency for intervention (Hossein Hassanian-Moghaddam and Zamani, 2017, Mahboobeh Asadiyun and Daliri, 2023). This urgency likely drives research into various therapeutic approaches on suicidality, including ACT. Nevertheless, the geographical concentration of the included studies may limit the generalizability of our findings to populations outside Iran, potentially affecting the external validity of the meta-analysis results. Fourth, most studies included in this review had relatively short study periods. Most of the studies were conducted for 8 weeks or less, whereas only one study reported an outcome at 3 months (Barnes et al., 2021). This limits the ability of our manuscript to assess the long-term effectiveness of ACT on suicidality. There are significant challenges in conducting long-term studies on suicidality due to the rarity of events, resulting in low base rates and small samples (Lakeman and FitzGerald, 2009). This complexity makes it challenging to isolate the effects of a single therapeutic approach such as ACT in an RCT setting. Fifth, although the SMD indicates a considerable effect size, its interpretation requires significant caution. While no significant publication bias was detected, the potential influence of confounding factors (e.g., short study durations, small number of included studies) cannot be ruled out. Lastly, we were unable to perform a subgroup analysis or meta-regression to identify potential moderators of ACT (e.g.,

follow-up duration, intervention type, severity of suicidal ideation) due to the small number of studies included in the meta-analysis. This limitation may have hindered a more detailed and specific interpretation of our findings and, as a result, could make it challenging to directly apply our results in clinical practice.

Despite the limitations, our meta-analysis provides evidence supporting the efficacy of ACT for reducing suicidal ideation. By including 8 RCTs in the systematic review and 4 RCTs in the meta-analysis, we provided a higher level of evidence compared to the previous systematic review (Tighe et al., 2018), which included only a single RCT. This meta-analysis is the first quantitative assessment of the effect of ACT on suicidality, which was not possible in the previous review due to the heterogeneity of the studies included.

We suggest several aspects that future research should focus on. First, longitudinal studies with extended follow-up periods are needed. These would allow for a more comprehensive evaluation of the durability of treatment effects and provide stronger evidence for the sustained impact of ACT on suicidality and other psychiatric conditions. Second, studies with populations from diverse geographical regions and sociocultural settings are needed. Third, a structured or reproducible protocol of ACT would be necessary. ACT is a technique that emphasizes psychological flexibility, and because of this, the developers did not initially create a structured protocol (Hayes et al., 1999). Therefore, ACT is often described with the term “transdiagnostic approach.” However, over time, as ACT has been optimized for use in various settings and conditions, cases of its application have increased, leading to the natural development of structured or optimized protocols (Bethay et al., 2022, Jeong et al., 2022). Currently, ACT is delivered through various formats, including one-on-one or group face-to-face sessions, pre-produced digital content, and interactive applications. Each of these formats has its own advantages and disadvantages. Having structured or reproducible protocols tailored to these representative settings would make it much easier to verify their effectiveness, and the results would also be more reliable. Fourth, researchers reporting RCTs should be encouraged to provide sufficient information to allow for the assessment of items required by credible risk of bias tools, such as RoB 2. Insufficient information can lead to an overall classification of high risk of bias, which may ultimately raise concerns about the reliability of meta-analysis results. Lastly, it is crucial to investigate the specific mechanisms of ACT that impact suicidality.

5. CONCLUSIONS

This systematic review and meta-analysis suggested that suicidal ideation decreased among individuals who received ACT compared to controls. This outcome underscores the potential of ACT in effectively addressing suicidal ideation. However, due to the heterogeneity and the risk of bias issues, more well-designed RCTs with larger sample sizes are warranted. Future studies should aim to replicate these findings and to elucidate the mechanisms by which ACT reduces suicidality.

AUTHOR CONTRIBUTIONS

J.H.T. contributed to data extraction, risk of bias assessment, and writing the original and revised versions of the manuscript. S-E.C. participated in data extraction and risk of bias assessment. S-G.K. and S.M.B conducted a literature search and review. S-J.C contributed to the data analysis and the interpretation. K-S.N. conceptualized, funded, designed the project, and wrote original and revised versions of the manuscript. All authors approved the final version of the article.

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COMPETING INTERESTS

None.

ETHICAL STANDARDS

Because the present study is a systematic review and meta-analysis based on already published research papers and does not involve direct research on human subjects, there are no ethical issues to consider (Sullivan, 2011).

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REFERENCES

- Baer RaH, Debra B.** (2008) Mindfulness- and acceptance-based therapy approaches. *In:* LEBOW, J. (ed.) *Twenty-first century psychotherapies*. Hoboken, New Jersey: John Wiley & Sons.
- Bagheri-Sheykhgafshe F, Kiani A, Savabi-Niri V, Aghdasi N and Bourbour Z** (2022) The Efficacy of Acceptance and Commitment Therapy on Psychological Capital and Emotion Regulation of Students with Suicidal Ideation. *Int J Behav Sci*, **16**, 96-102.
- Bahram P, Saeed A, Sayed Abbas H and Maryam G** (2023) Effectiveness of Acceptance and Commitment Therapy (ACT) on Levels of Self-Criticism and Suicidal Thoughts in Adolescents with Self-Harm. *مطالعات روانشناختی*, **19**, 23-37.
- Barnes SM, Borges LM, Smith GP, Walser RD, Forster JE and B. hraini NH** (2021) Acceptance and Commitment Therapy to Promote Recovery from suicidal crises: A Randomized Controlled Acceptability and Feasibility Trial of ACT for life. *Journal of Contextual Behavioral Science*, **20**, 35-45.
- Beck AT and Steer RA** (1991) Manual for the Beck Scale for Suicide Ideation. San Antonio, TX: Psychological Corporation.
- Belisle J and Dixon MR** (2022) Relational Behavior and ACT: A Dynamic Relationship. *Behav Anal Pract*, **15**, 71-82.
- Bethay JS, Weinstein JH and Stubbs W** (2022) Acceptance and commitment therapy strategies: Guide for anxiety and trauma-related problems in living. Ridgeland, MS.
- Bhasin SK, Bharadwaj IU, Penivel RP, Gupta V, Bhatia T and Deshpande SN** (2022) Ethical dilemmas encountered in suicide research and management: Experiences of young mental health professionals. *Indian J Med Ethics*, **VII**, 93-102.
- Boutron I, Page M, Higgins J, Altman D, Lundh A and Hróbjartsson A** (2019) Considering bias and conflicts of interest among the included studies. *In:* HIGGINS JPT, T. J., CHANDLER J, CUMPSTON M, LI T, PAGE MJ, WELCH VA (ed.) *Cochrane Handbook for Systematic Reviews of Interventions version 6.0*. Cochrane.
- Chiles JA, Strosahl D and Laura Weiss Roberts MDMA** (2018) *Clinical Manual for Assessment and Treatment of Suicidal Patients, Second Edition*, American Psychiatric Association Publishing.
- Chiles JA, Strosahl KD and Roberts LW** (2019) *Clinical Manual for the Assessment and Treatment of Suicidal Patients, Second Edition*, Washington, D.C., American Psychiatric Association Publishing.

- Decou CR, Comtois KA and Landes SJ** (2019) Dialectical Behavior Therapy Is Effective for the Treatment of Suicidal Behavior: A Meta-Analysis. *Behavior Therapy*, **50**, 60-72.
- Deeks JJ, Higgins JP and Altman DG** (2019) Chapter 10: Analysing data and undertaking meta-analyses. In: HIGGINS, J., THOMAS, J., J, C., M, C., T, L., MJ, P. & VA, W. (eds.) *Cochrane Handbook for Systematic Reviews of Interventions*. 2nd ed. Chichester: John Wiley & Sons.
- Ducasse D, Jaussent I, Arpon-Brand V, Vienot M, Laglaoui C, Béziat S, Calati R, Carrière I, Guillaume S, Courtet P and Olié E** (2018) Acceptance and Commitment Therapy for the Management of Suicidal Patients: A Randomized Controlled Trial. *Psychotherapy and Psychosomatics*, **87**, 211-222.
- Ducasse D, Rene E, Beziat S, Guillaume S, Courtet P and Olie E** (2014) Acceptance and commitment therapy for management of suicidal patients: a pilot study. *Psychother Psychosom*, **83**, 374-6.
- El-Sayed MM, Elhay ESA, Taha SM, Khedr MA, Mansour FSA and El-Ashry AM** (2023) Efficacy of acceptance and commitment therapy on impulsivity and suicidality among clients with bipolar disorders: a randomized control trial. *BMC Nurs*, **22**, 271.
- Gloster AT, Walder N, Levin ME, Twohig MP and Kurekla M** (2020) The empirical status of acceptance and commitment therapy: A review of meta-analyses. *Journal of Contextual Behavioral Science*, **18**, 181-192.
- Hajek Gross C, Oehlke SM, Prillinger K, Goreis A, Plener PL and Kothgassner OD** (2024) Efficacy of mentalization-based therapy in treating self-harm: A systematic review and meta-analysis. *Suicide Life Threat Behav*.
- Hayes SC, Barnes-Holmes D and Roche B** (2001) *Relational frame theory: A post-Skinnerian account of human language and cognition*, New York, NY, US, Kluwer Academic/Plenum Publishers.
- Hayes SC, Strosahl KD and Wilson KG** (1999) *Acceptance and commitment therapy: An experiential approach to behavior change*, New York, NY, US, Guilford Press.
- Hayes SC, Strosahl KD and Wilson KG** (2011) *Acceptance and Commitment Therapy: The Process and Practice of Mindful Change*, Guilford Publications.
- Hayes SC, Strosahl KD and Wilson KG** (2012) *Acceptance and commitment therapy: The process and practice of mindful change, 2nd ed*, New York, NY, US, Guilford Press.
- Higgins JP, Thompson SG, Deeks JJ and Altman DG** (2003) Measuring inconsistency in meta-analyses. *BMJ*, **327**, 557-60.
- Hosseini Hassanian-Moghaddam and Zamani N** (2017) Suicide in Iran: The Facts and the Figures from Nationwide Reports. *Iranian Journal of Psychiatry*, **12**, 73-77.

- Jeong N, Jeon H, You D and Lee YS** (2022) Effects of structured group Acceptance and Commitment Therapy for psychological acceptance and recovery among inpatients with psychotic disorder: A pilot study. *Korean J Schizophr Res*, **25**, 32-42.
- Joiner TE, Jr., Pfaff JJ and Acres JG** (2002) A brief screening tool for suicidal symptoms in adolescents and young adults in general health settings: reliability and validity data from the Australian National General Practice Youth Suicide Prevention Project. *Behav Res Ther*, **40**, 471-81.
- Lakeman R and Fitzgerald M** (2009) The ethics of suicide research: The views of ethic committee members. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, **30**, 13-19.
- Luoma JB and Villatte JL** (2012) Mindfulness in the Treatment of Suicidal Individuals. *Cogn Behav Pract*, **19**, 265-276.
- Mahboobeh Asadiyun and Daliri S** (2023) Suicide Attempt and Suicide Death in Iran: A Systematic Review and Meta-Analysis Study. *Iranian Journal of Psychiatry*, **18**, 191-212.
- Masdrakis VG and Baldwin DS** (2023) Prevention of suicide by clozapine in mental disorders: systematic review. *Eur Neuropsychopharmacol*, **49**, 4-23.
- Posner K, Brown GK, Stanley B, Brent DA, Vershova KV, Oquendo MA, Currier GW, Melvin GA, Greenhill L, Shen S and Mann JJ** (2011) The Columbia-Suicide Severity Rating Scale: initial validity and internal consistency findings from three multisite studies with adolescents and adults. *Am J Psychiatry*, **168**, 1266-77.
- Ramaci T, Bellini D, Presti G and Sanfisi G** (2019) Psychological Flexibility and Mindfulness as Predictors of Individual Outcomes in Hospital Health Workers. *Front Psychol*, **10**, 1302.
- Razzaque R** (2013) An acceptance and commitment therapy based protocol for the management of acute self-harm and violence in severe mental illness. *Journal of Psychiatric Intensive Care*, **9**, 72-76.
- Riley RD, Higgins JP and Deeks JJ** (2011) Interpretation of random effects meta-analyses. *BMJ*, **342**, d549.
- Sara J, Mahmood N, Fatemeh Sadat G and Isaac R** (2021) The effectiveness of Treatment Acceptance and Commitment on suicidal ideation and psychological resilience in Patients with bipolar disorder. *مطالعات روانشناختی*, **17**, 7-22.
- Shareh H and Robati Z** (2022) Effect of Acceptance and Commitment Group Therapy on Cognitive Flexibility, Suicidal Ideation, Depression, and Hopelessness in Conscripts. *Iranian Journal of Psychiatry and Clinical Psychology*, **27**, 412-427.

- Smith KA and Cipriani A** (2017) Lithium and suicide in mood disorders: Updated meta-review of the scientific literature. *Bipolar Disord*, **19**, 575-586.
- Tarsilla M** (2019) Cochrane handbook for systematic reviews of interventions.
- Tighe J, Nicholas J, Shand F and Christensen H** (2018) Efficacy of Acceptance and Commitment Therapy in Reducing Suicidal Ideation and Deliberate Self-Harm: Systematic Review. *Jmir Mental Health*.
- Tighe J, Shand F, Ridani R, Mackinnon A, De La Mata N and Christensen H** (2017a) Ibbobbly mobile health intervention for suicide prevention in Australian Indigenous youth: a pilot randomised controlled trial. *BMJ Open*, **7**, e013518.
- Tighe J, Shand F, Ridani R, Mackinnon A, De La Mata N and Christensen H** (2017b) Ibbobbly mobile health intervention for suicide prevention in Australian Indigenous youth: a pilot randomised controlled trial. *Bmj Open*, **7**.
- Walser RD, Garvert DW, Karlin BE, Trockel M, Ryu DM and Taylor CB** (2015) Effectiveness of Acceptance and Commitment Therapy in treating depression and suicidal ideation in Veterans. *Behav Res Ther*, **74**, 25-31.
- Wang X, Li P, Pan C, Dai L, Wu Y and Deng Y** (2019) The Effect of Mind-Body Therapies on Insomnia: A Systematic Review and Meta-Analysis. *Evid Based Complement Alternat Med*, **2019**, 9359807.
- World Health Organization** (2021) Suicide worldwide in 2019: Global Health Estimates. Geneva: World Health Organization.
- Wu H, Lu L, Qian Y, Jin XH, Yu HR, Du L, Fu XL, Zhu B and Chen HL** (2022) The significance of cognitive-behavioral therapy on suicide: An umbrella review. *J Affect Disord*, **317**, 142-149.
- Zetterqvist M** (2015) The DSM-5 diagnosis of nonsuicidal self-injury disorder: a review of the empirical literature. *Child Adolesc Psychiatry Ment Health*, **9**, 31.
- Zhdanova M, Teeple A, Pilon D, Shah A, Caron-Lapointe G and Joshi K** (2023) Esketamine nasal spray for major depressive disorder with acute suicidal ideation or behavior: description of treatment access, utilization, and claims-based outcomes in the United States. *J Med Econ*, **26**, 691-700.

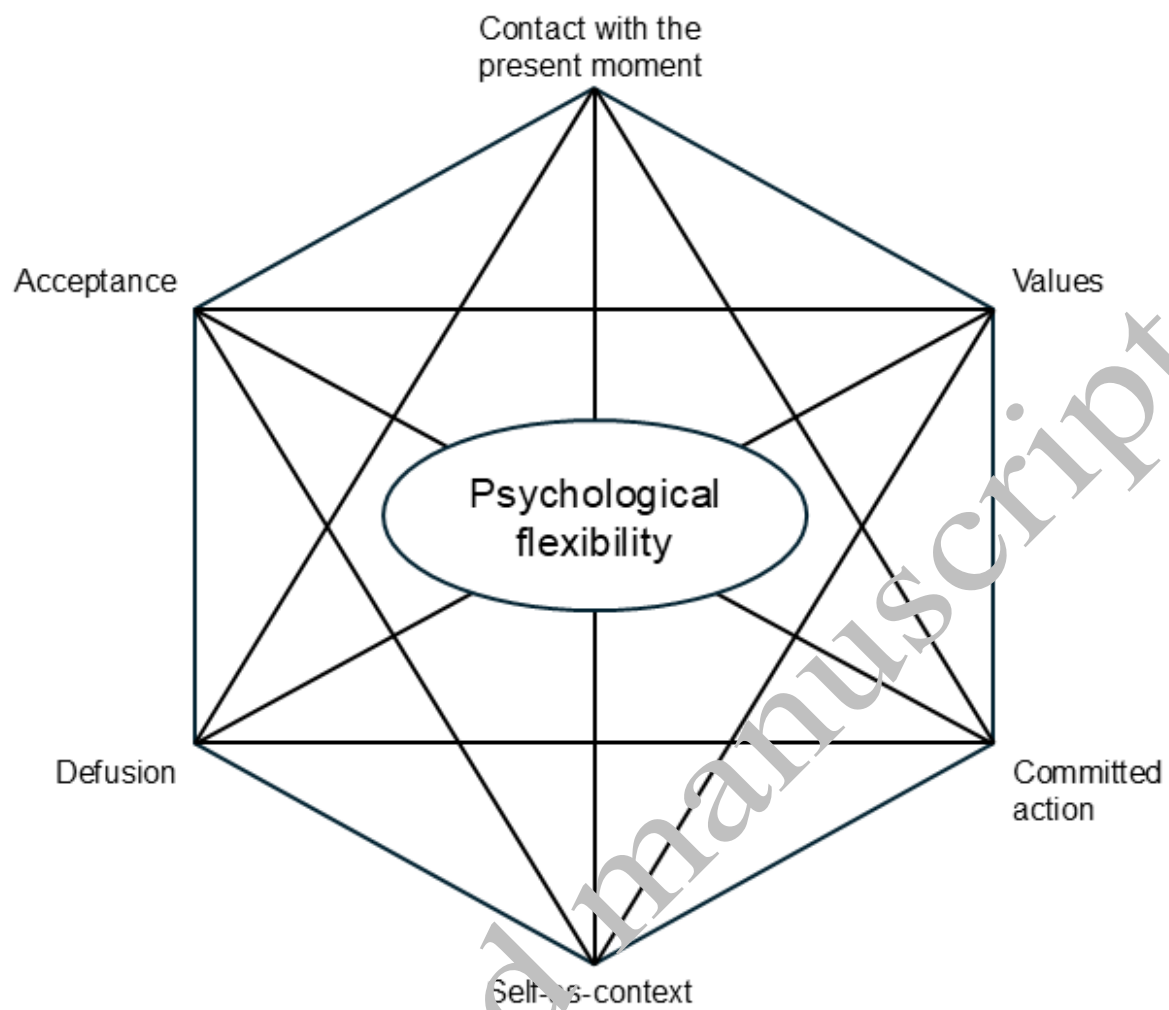


Figure 1

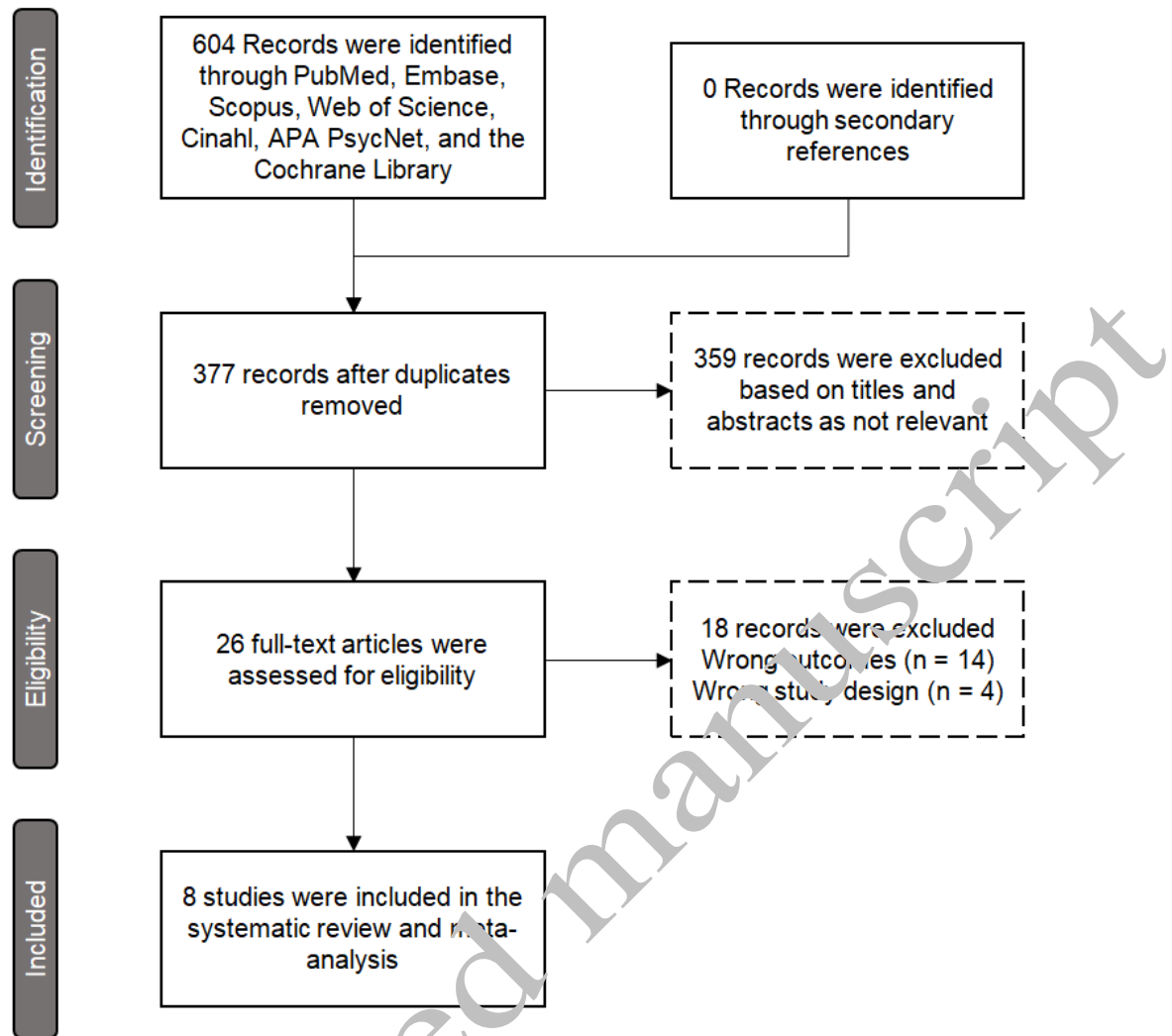


Figure 2

Table 1: Study characteristics

Study ID	Country	Participants	Outcome measure	Intervention group				Control group		
				Treatment	Treatment duration	Sample size	Mean age(SD)	Treatment	Sample size	Mean age (SD)
Parsa Bahram, 2023	Iran	Male adolescents aged 13–18 in Ardbil, surveyed in the second half of 2021	BSSI	ACT, eight 90-minute sessions, weekly	8 weeks	15	-	No intervention	15	-

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Sean M. Barnes, 2021	USA	Patients admitted to a VHA psychiatric inpatient unit at an urban VA medical center because of the risk of suicide, per patients' admission note	C-SSRS	ACT + TAU, "ACT for Life"	30 days or 90 days	35	42(22-70)	TAU	35	49 (27-73)
Mona Metwally El-Sayed, 2023	Egypt	Clients with a DSM-5 bipolar diagnosis	BSSI	ACT + TAU, eight 90-minute sessions, weekly	8 weeks	30	33.47(6.91)	TAU + Waitlist	30	35.10 (7.81)
Joseph Tighe, 2017	Australia	Indigenous Australians aged 18-35 years	DSI-SS	ACT, biweekly program	6 weeks	31	27.48(9.54)	Waitlist	30	24.97 (6.28)
Déborah Ducasse, 2018	France	Patients from the Department of Psychiatric Emergency and Acute Care, Academic Hospital of Montpellier	C-SSRS suicidal ideation subscore	ACT, seven 2-hour sessions, weekly	7 weeks	21	38.34(12.73)	Progressive Relaxation Training	19	38.04 (11.08)

		(France)								
Sara Jamali, 2021	Iran	Patients with Bipolar Disorder	BSSI	ACT, eight 90-minute sessions, two per week	4 weeks	15	-	-	15	-
Hossein Shareh, 2022	Iran	All depressed conscripts referred to military counseling centers in the Khorasan Razavi Province of Iran	BSSI	ACT, eight 90-minute sessions, weekly	8 weeks	30	-	Waitlist	30	-
Farzin Bagheri-Sheykhangafshe, 2022	Iran	Students of Guilan University in 2021	BSTQ	ACT, eight 2-hour sessions, weekly	8 weeks	15	-	No intervention	15	-

Note: -, not available

Abbreviations: ACT, Acceptance and Commitment Therapy; BSSI, Beck Scale for Suicidal Ideation; BSTQ, Beck Suicide Thought Questionnaire; C-SSRS, Columbia Suicide-Severity Rating Scale; DSI-SS, Depressive Symptom Inventory-Suicidality Subscale; TAU, Treatment-As-Usual

Table 2 : Quality Assessment of Included Studies Using Risk of Bias 2.0 Tool

Study	Randomization Process	Deviation from Intended Interventions	Missing Outcome Data	Measurement of Outcome	Selection of Reported Result	Overall Bias Risk
Parsa Bahram, 2023	Some concerns	Some concerns	High	High	Some concerns	High
Sean M. Barnes, 2021	Low	Low	High	High	Low	High
Mona Metwally El-Sayed, 2023	Low	Low	Low	High	Low	High
Joseph Tighe, 2017	Low	Low	Low	High	Some concerns	High
Déborah Ducasse, 2018	Low	Some concerns	Low	High	Low	High
Sara Jamali, 2021	Some concerns	Some concerns	High	High	Some concerns	High
Hossein Shareh, 2022	Some concerns	Some concerns	High	High	Some concerns	High
Farzin Bagheri-Sheykhangafshe, 2022	Some concerns	Some concerns	High	High	Some concerns	High

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