Effects of Acceptance and Commitment Therapy Combined with Sertraline on Depressive Mood, Suicidal Ideation, and Sleep Quality in Adolescents with Depression: A Postprint Study

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Abstract

Background: The detection rate of adolescent depression is increasing, which has become a public health concern, while existing treatment modalities remain relatively limited. Acceptance and Commitment Therapy (ACT), as a core representative of third-generation cognitive behavioral therapy, has seen limited application among adolescent populations in China.

Objective: To examine the intervention effects of ACT combined with sertraline on depressive mood, suicidal ideation, and sleep quality in adolescent patients with depression.

Methods: Adolescent patients with depression (n=70) who presented to Chenjiaqiao Hospital in Shapingba District, Chongqing between October 2023 and April 2024 were enrolled as study subjects. A randomized controlled trial design was employed, with participants allocated to a control group (n=35) and an intervention group (n=35). The control group received mental health education combined with sertraline, whereas the intervention group received ACT combined with sertraline. The intervention duration was 8 weeks. Clinical efficacy was compared between the two groups using pre- and post-intervention assessments with the Athens Insomnia Scale (AIS), Self-Rating Depression Scale (SDS), Self-Rating Idea of Suicide Scale (SIOSS), Acceptance and Action Questionnaire (AAQ-II), Avoidance and Fusion Questionnaire for Youth (AFQ-Y8), and sleep monitoring parameters.

Results: Ultimately, 30 participants in the control group and 32 in the intervention group completed the study. Following 8 weeks of treatment, the intervention group exhibited significantly lower scores on AIS, SDS, SIOSS, AAQ-II, and AFQ-Y8 compared to the control group ($P<0.05$); total sleep time (TST)

and sleep efficiency (SE) were significantly higher in the intervention group (P<0.05), while sleep latency (SL) and wake after sleep onset (WASO) were significantly lower (P<0.05).

Conclusion: ACT can enhance psychological flexibility, alleviate depressive mood, improve sleep quality, and reduce suicidal ideation in adolescent patients with depression, demonstrating favorable clinical utility.

Full Text

The Impact of Acceptance and Commitment Therapy Combined with Sertraline on Depressive Mood, Suicidal Ideation, and Sleep Quality in Adolescents with Depression

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Abstract

Background: The detection rate of adolescent depression has increased, becoming a significant public health concern, yet treatment options remain limited. Acceptance and Commitment Therapy (ACT), a core representative of third-generation cognitive behavioral therapy, has seen relatively limited application in domestic adolescent populations. **Objective:** This study investigated the effects of ACT combined with sertraline on depressive mood, suicidal ideation, and sleep quality in adolescents with depression. **Methods:** Adolescent patients with depression who visited Chenjiaqiao Hospital in Shapingba District, Chongqing, between October 2023 and April 2024 were recruited for this randomized controlled trial (n = 70). Participants were randomly assigned to either a control group (n = 35) receiving mental health education combined with sertraline, or an intervention group (n = 35) receiving ACT combined with sertraline, for an 8-week intervention period. Clinical efficacy was compared between groups using the Athens Insomnia Scale (AIS), Self-rating Depression Scale (SDS), Self-rating Idea of Suicide Scale (SIOSS), Acceptance and Action Questionnaire-II (AAQ-II), Avoidance and Fusion Questionnaire for

Youth (AFQ-Y8), and objective sleep monitoring results. **Results:** Ultimately, 30 participants in the control group and 32 in the intervention group completed the study. After 8 weeks of treatment, the intervention group showed significantly lower scores on the AIS, SDS, SIOSS, AAQ-II, and AFQ-Y8 compared to the control group ($P < 0.05$). Additionally, the intervention group demonstrated significantly greater total sleep time (TST) and sleep efficiency (SE), along with significantly reduced sleep latency (SL) and wake after sleep onset (WASO) ($P < 0.05$). **Conclusion:** ACT can enhance psychological flexibility, alleviate depressive mood, improve sleep quality, and reduce suicidal ideation in adolescents with depression, demonstrating significant clinical value.

Keywords: Depressive disorder; Adolescent; Acceptance and commitment therapy; Sertraline; Suicidal ideation; Sleep quality; Psychological flexibility; Randomized controlled trial

Introduction

Depression is a common mental disorder among adolescents, characterized by high rates of prevalence, recurrence, disability, and suicide [1]. Suicidal ideation —defined as thoughts of harming or killing oneself without specific plans or actions—is more prevalent than actual suicide attempts among adolescents with depression [2]. Depressive mood, poor sleep quality, and suicidal ideation are common clinical problems in this population, with these three factors being closely interrelated and mutually influential. Approximately 85% of patients with depression experience insomnia symptoms, and more severe depression is associated with greater sleep disturbances. Both short sleep duration and poor sleep quality can trigger and exacerbate suicidal ideation [3]. Therefore, improving suicidal ideation and sleep quality is as important as alleviating depressive mood for reducing suicide risk among adolescents.

Acceptance and Commitment Therapy (ACT) represents a core component of third-generation cognitive behavioral therapy and has demonstrated strong empirical support in clinical applications [4-5]. However, current domestic and international research on ACT for adolescent depression has primarily focused on depressive mood, suicidal ideation, and non-suicidal self-injury, with less attention paid to sleep quality. This randomized controlled trial addresses this gap by developing an individualized ACT intervention protocol tailored to adolescents' physiological, cognitive, social development, and interests, aiming to evaluate the effects of ACT combined with sertraline on depressive mood, suicidal ideation, and sleep quality in adolescents with depression.

Methods

1.1 Study Participants Seventy adolescent patients with depression who visited the Department of Psychology at Chenjiaqiao Hospital in Shapingba District, Chongqing, between October 2023 and April 2024 were recruited. Using a random number table, participants were assigned to a control group (n = 35) and an intervention group (n = 35). Inclusion criteria were: (1) diagnosis by two attending psychiatrists meeting ICD-10 criteria for moderate or severe depressive episodes [6]; (2) first episode with insomnia symptoms and suicidal ideation; and (3) age between 12-18 years. Exclusion criteria included: (1) psychotic symptoms or other mental disorders; (2) severe self-harm or suicide attempts; (3) prior psychiatric medication or psychotherapy; and (4) education below the primary school level with poor communication and comprehension making psychotherapy difficult. This study was approved by the Ethics Committee of Chenjiaqiao Hospital (Approval No. CJQYY-ECKY-2023011), and all participants and their guardians provided informed consent.

1.2 Interventions **Control Group:** Participants received sertraline combined with conventional mental health education for 8 weeks. (1) Sertraline was administered orally (50 mg/tablet, National Drug Approval No. H20051076) at 25 mg/day in week 1, 50 mg/day in week 2, and 100 mg/day from week 3 onward, taken after breakfast. (2) Mental health education was provided once weekly, including psychoeducation to establish mental health awareness; helping patients identify and manage negative emotions and suicidal ideation; improving sleep quality through appropriate exercise; and providing listening, empathy, and positive psychological support while answering questions.

Intervention Group: Participants received sertraline combined with ACT for 8 weeks. The medication regimen was identical to the control group. ACT sessions were conducted weekly for 50 minutes each in a fixed psychotherapy room by two hospital psychotherapists who had completed 2-year systematic ACT training and possessed over 2 years of clinical experience. Based on ACT' s six-pathology model, an 8-week intervention protocol was developed integrating core ACT principles with patients' symptom characteristics. **Week 1:** Introduced ACT methods and efficacy, establishing treatment goals. **Week 2:** Cognitive defusion—patients selected a distressing thought and repeated it to understand that thoughts are merely strings of words that, while unavoidable, need not prevent them from living, creating distance between thoughts and present reality. **Week 3:** Emotional acceptance—examined patients' responses to depressive emotions and their short- and long-term effectiveness, fostering openness to previously avoided internal experiences. **Week 4:** Self-as-context —used self-practice exercises to help patients accept both positive and negative aspects of self, increasing positive beliefs. **Week 5:** Present moment awareness —helped patients understand that living in the present is vital for a valuable life, while living in the past or future distracts from the now; instructed them to tell themselves nightly, "I need to rest. Rest is to replenish my energy, and I believe

tomorrow will be better."**Week 6:** Values clarification—conducted values-target exercises to identify what matters and its importance, helping patients clarify their valued directions and face reality positively. **Week 7:** Committed action —patients completed exercises on suitable and unsuitable goals, identified potential obstacles and available resources, and set goals for the following week aligned with their current situation. **Week 8:** Facing new life—patients described progress and gains from ACT treatment, while therapists addressed separation emotions and affirmed patients' changes.

1.3 Measurements Questionnaires: Before treatment and after the eighth session, a psychotherapist administered the Acceptance and Action Questionnaire-II (AAQ-II) [7], Avoidance and Fusion Questionnaire for Youth (AFQ-Y8) [8], Self-rating Depression Scale (SDS) [9], Athens Insomnia Scale (AIS) [10], and Self-rating Idea of Suicide Scale (SIOSS) [11]. Each questionnaire was required to be completed within 15 minutes without missing items to be considered valid. (1) The AAQ-II comprises 7 items scored on a 1-7 scale, with higher total scores indicating greater experiential avoidance (Cronbach' s $\alpha = 0.94$) [7]. (2) The AFQ-Y8 includes 8 items scored on a 1-5 scale, with higher scores indicating greater psychological rigidity and lower flexibility (Cronbach' s $\alpha = 0.78$, test-retest r = 0.76) [8]. (3) The SDS contains 20 items reflecting subjective depressive feelings scored on a 1-4 scale, with standard scores $\geq$ 53 indicating depression (53-62 mild, 63-72 moderate, $\geq$ 73 severe; Cronbach' s $\alpha = 0.78$) [9]. (4) The AIS is an internationally recognized sleep quality self-assessment with 8 items scored 0-3 (total 0-24), where higher scores indicate more severe insomnia ($<$ 4 no disorder, 4-6 suspected insomnia, $>$ 6 insomnia; Cronbach' s $\alpha = 0.868$) [8]. (5) The SIOSS includes 26 items across four dimensions (optimism, sleep, despair, concealment), with higher scores indicating stronger suicidal ideation and $\geq$ 12 indicating suicidal ideation (Cronbach' s $\alpha = 0.906$, test-retest r = 0.860) [9].

Sleep Monitoring: Sleep quality was monitored using a portable sleep monitor (PSM 100A) operated by an attending psychiatrist following manufacturer instructions. Monitoring occurred before treatment and on the evening after the eighth session, conducted in a fixed quiet and comfortable room from 22:00 to 7:00, with valid data requiring $\geq$ 7 hours of continuous monitoring. Parameters included: total sleep time (TST), sleep efficiency (SE), sleep latency (SL), and wake after sleep onset (WASO).

1.4 Statistical Analysis Data were analyzed using SPSS version 27.0. Normally distributed continuous variables were expressed as mean $\pm$ standard deviation ($\bar{x} \pm s$) and compared between groups using independent samples t-tests, while within-group comparisons used paired samples t-tests. Categorical data were expressed as frequencies and compared using ^{2} tests. Statistical significance was set at $P < 0.05$.

Results

2.1 Comparison of Baseline Characteristics Of the 70 initially enrolled patients, 8 dropped out (5 from the control group, 3 from the intervention group), primarily due to gastrointestinal side effects (nausea, vomiting, appetite loss) leading to medication refusal. Sixty-two participants completed the study (control group n = 30, intervention group n = 32). The control group included 14 males and 16 females with mean age (15.3 ± 1.8) years; the intervention group included 15 males and 17 females with mean age (14.6 ± 1.6) years. No significant differences were found between groups in gender (^{2} = 0.001, P = 0.987) or age (t = 1.632, P = 0.108).

2.2 Comparison of AAQ-II and AFQ-Y8 Scores Before treatment, no significant differences existed between groups in AAQ-II or AFQ-Y8 scores (P > 0.05). After treatment, the intervention group showed significantly lower AAQ-II and AFQ-Y8 scores than the control group (P < 0.05). Both groups demonstrated significant reductions in these scores from baseline (P < 0.05) .

2.3 Comparison of SDS, AIS, and SIOSS Scores Before treatment, no significant differences existed between groups in SDS, AIS, or SIOSS scores (P > 0.05). After treatment, the intervention group showed significantly lower SDS, AIS, and SIOSS scores than the control group (P < 0.05). Both groups demonstrated significant reductions in these scores from baseline (P < 0.05) .

2.4 Comparison of Sleep Quality Parameters Before treatment, no significant differences existed between groups in TST, SE, SL, or WASO (P > 0.05). After treatment, the intervention group showed significantly higher TST and SE, and significantly lower SL and WASO compared to the control group (P < 0.05). Both groups demonstrated significant improvements in these parameters from baseline (P < 0.05) .

Discussion

3.1 ACT Combined with Sertraline Effectively Reduces Cognitive Fusion and Experiential Avoidance While Improving Psychological Flexibility ACT is grounded in functional contextualism and relational frame theory. It advocates for changing individuals' relationships with psychological events through acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action to enhance psychological flexibility [12]. Psychological flexibility refers to the ability to consciously perceive one' s environment in the present moment and take values-directed action. ACT posits that cognitive fusion and experiential avoidance are primary causes of reduced psychological flexibility and suffering. Since suffering is inevitable, ACT encourages embracing reality and pursuing meaningful life despite hardship.

Our findings indicate that adolescents with depression exhibit high levels of experiential avoidance and cognitive fusion. After the ACT intervention, the intervention group showed significantly lower AAQ-II and AFQ-Y8 scores than the control group ($P < 0.05$), suggesting that ACT reduces experiential avoidance and cognitive fusion while improving psychological flexibility. These results align with LIVHEIM et al. [13] ACT-based mental health education studies among 66 Australian and 32 Swedish high school students focusing on depression. This may be because ACT helps adolescents with depression face reality more calmly and openly experience various emotions and bodily sensations, thereby reducing experiential avoidance. Through cognitive defusion, patients learn to distinguish mental content and memories from the actual events they represent, allowing them to focus more on present environmental and psychological activities. This enables them to make choices aligned with long-term valued directions and flexibly take corresponding actions, thereby enhancing psychological flexibility.

3.2 ACT Combined with Sertraline More Effectively Reduces Depressive Mood Our study demonstrated that after ACT treatment, the intervention group had significantly lower SDS scores than the control group ($P < 0.05$), indicating that ACT combined with sertraline more effectively improves depressive mood in adolescents. These findings are consistent with HAYES et al. [14] positive outcomes using ACT with 30 adolescent depression patients and ZHAO Bing et al. [15] confirmation of both immediate and long-term ACT effects for adolescent depression. Adolescents face immature psychological development alongside academic, social, and interpersonal pressures, making them prone to high cognitive fusion and experiential avoidance. Cognitive fusion causes individuals to confuse thoughts with facts, becoming immersed in negative emotional connections—for example, interpreting the thought "this pain will never disappear" as a certain future rather than a present mental event. Experiential avoidance is a risk factor for depression, where greater avoidance correlates with more severe depressive symptoms [16]. When individuals temporarily escape painful experiences, this reinforces and maintains the suffering. ACT helps adolescents reduce experiential avoidance and cognitive fusion, increase acceptance of painful experiences and emotions, enhance positive emotional experiences and subjective well-being, and demonstrates notable therapeutic effects in alleviating depressive mood.

3.3 ACT Combined with Sertraline More Effectively Improves Insomnia Symptoms and Sleep Quality Our results show that after treatment, the intervention group had higher TST and SE, and lower SL and WASO compared to the control group, indicating that ACT improves insomnia symptoms and sleep quality in adolescents with depression. WELLS-DI GREGORIO et al. [17] found that ACT significantly increased SE and shortened sleep latency. ACT has also been shown to affect TST by increasing total sleep time in patients with sleep disorders [18]. ZAKIEI et al. [19] demonstrated that ACT increased

TST duration while reducing awakening frequency. SALARI et al. [20] reported positive effects of ACT on sleep quality. These findings are highly consistent with our results.

The established mechanism of insomnia is the "three-factor model" comprising predisposing factors (biological and personality traits), precipitating factors (negative life events or schedule disruptions), and perpetuating factors (maladaptive coping and cognitive patterns). Cognitive fusion is a predisposing factor for insomnia, while experiential avoidance is a perpetuating factor. ACT changes patients' attitudes and cognitive patterns toward insomnia by accepting its reasonableness and avoiding ineffective avoidance and maladaptive behaviors. Through cognitive restructuring, individuals move away from rigid thought content and reduce catastrophic thinking about insomnia. Mindfulness training slows heart rate and breathing, reduces sympathetic activity, and enhances positive sleep experiences, thereby improving insomnia symptoms and sleep quality.

3.4 ACT Combined with Sertraline More Effectively Reduces Suicidal Ideation WALSER et al. [21] evaluated ACT' s effectiveness for depression and suicidal ideation in veterans, showing significant reductions in both. TIGHE et al. [22] conducted a 6-week ACT intervention with 60 Australian participants exhibiting impulsivity and suicidal ideation, confirming ACT' s efficacy in reducing suicidal ideation. Our study found that after ACT treatment, the intervention group' s SIOSS scores were significantly lower than the control group' s ($P < 0.05$), indicating that ACT significantly improves suicidal ideation in adolescents with depression, consistent with these previous findings.

BRYAN et al. [23] identified reduced cognitive fusion as an important mechanism through which ACT decreases suicide risk, representing a crucial component of effective self-regulation and coping strategies during crises. Suicidal ideation is influenced by individual vulnerability and depressive mood, with cognitive fusion being a complex vulnerability factor that increases sensitivity to negative life events, reduces sense of value, and makes individuals more susceptible to stress-induced suicidal ideation. ACT reduces cognitive fusion in adolescents with depression through cognitive defusion, preventing confusion between thoughts and reality and immersion in fear and worry about the future. This buffers the impact of negative emotions and thoughts, clarifies values to enhance action, and encourages effective values-guided engagement in life domains, thereby increasing survival value, meaning in life, and reducing suicidal ideation.

Limitations This study had a relatively short duration; our research team will extend the observation period to evaluate long-term efficacy in future work. Additionally, we used portable sleep monitors; subsequent studies will employ polysomnography combined with EEG analysis for more comprehensive, rigorous, and intuitive sleep data. Family and social support systems play important roles in ACT implementation; we will develop family and group ACT interven-

tion protocols to improve patients' family and peer relationships and expand ACT' s application among adolescents.

Author Contributions

YANG Handan proposed the research objectives, designed the study, delivered ACT and mental health education, supervised data review, and was responsible for manuscript writing and revision, with overall accountability. QIAO Wen delivered ACT, collected and organized data, performed statistical analysis, created tables, and drafted the manuscript. HE Shu and CHEN Yi contributed to feasibility analysis and reference collection. TONG Yunmei revised the manuscript format.

Conflict of Interest

The authors declare no conflicts of interest.

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Note: Figure translations are in progress. See original paper for figures.