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Effectiveness of CBT on Self-Harming Thoughts, Impulsivity, and Suppressed Anger in Adolescents with Depression Syndrome

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A B S T R A C T

Objective: This study aimed to evaluate the effectiveness of Cognitive Behavioral Therapy (CBT) in reducing self-harming thoughts, impulsivity, and suppressed anger in adolescents.

Methods and Materials: A randomized controlled trial was conducted with 30 adolescents (15 in the CBT group and 15 in the control group). The participants were assessed at three stages: pre-test, post-test, and follow-up, using validated self-report measures to evaluate self-harming thoughts, impulsivity, and suppressed anger. The CBT intervention consisted of 12 weekly sessions, focusing on cognitive restructuring, emotion regulation, and behavioral skills. Data were analyzed using repeated measures ANOVA and Bonferroni post-hoc tests to assess within-group and between-group differences over time.

Findings: The results revealed significant reductions in self-harming thoughts, impulsivity, and suppressed anger for the CBT group compared to the control group across all three stages. Specifically, the CBT group showed greater improvement at the post-test and follow-up compared to the control group, with significant between-group differences in all three variables. The effect size for the self-harming thoughts ($\eta^2 = 0.25$), impulsivity ($\eta^2 = 0.32$), and suppressed anger ($\eta^2 = 0.28$) indicated moderate to large effects. The findings suggest that CBT is highly effective in addressing emotional dysregulation and impulsive behaviors in adolescents.

Conclusion: Cognitive Behavioral Therapy significantly reduced self-harming thoughts, impulsivity, and suppressed anger in adolescents, indicating its potential as an effective intervention for emotional and behavioral issues in this population. Further research is needed to examine long-term effects and the role of individual differences in treatment outcomes.

Keywords: *Cognitive Behavioral Therapy, adolescents, self-harming thoughts, impulsivity, suppressed anger, randomized controlled trial, emotional regulation.*

1. Introduction

Depression is one of the most prevalent mental health disorders among adolescents, with estimates suggesting that between 10% and 20% of adolescents experience clinical depression at some point during their teenage years (Kiani Rad, 2024; Malekzadeh et al., 2024; Spirito et al., 2011). The adolescent period is marked by heightened emotional sensitivity and difficulty in processing negative emotions, which can lead to the development of maladaptive coping mechanisms. Self-harming behaviors, impulsivity, and anger suppression are among the most common comorbidities observed in adolescents with depression (Damavandian et al., 2022; Ghazal Yasfard et al., 2019; Gh Yasfard et al., 2019). These behaviors, while not exclusive to depression, often co-occur with depressive symptoms and may serve as coping mechanisms for managing overwhelming emotional states or distress.

Self-harming behaviors, including cutting, burning, or hitting oneself, are a particularly concerning aspect of adolescent depression, as they not only indicate significant emotional distress but also increase the risk of suicidal ideation and attempts. Research has shown that adolescents with depression are more likely to engage in self-injury as a way of expressing or coping with their emotional pain (Ammari et al., 2023; Sukhodolsky et al., 2016). Similarly, impulsivity, which refers to the tendency to act without thinking about the consequences, is another common feature in adolescents with depression, often leading to risky behaviors and difficulties in regulating emotions (Anestis et al., 2020). Anger suppression, where adolescents internalize feelings of frustration and anger instead of expressing them in a healthy manner, can further contribute to emotional dysregulation and depressive symptoms (Ghorbani et al., 2020; Kuo et al., 2021). These maladaptive behaviors complicate the treatment of depression in adolescents, as they are often resistant to conventional therapeutic approaches. As such, addressing these behaviors directly within the therapeutic framework is crucial for promoting recovery and preventing the escalation of mental health issues.

Cognitive Behavioral Therapy (CBT) has emerged as one of the most widely researched and effective psychotherapeutic approaches for treating depression and associated maladaptive behaviors. CBT targets the cognitive distortions and negative thought patterns that contribute to emotional dysregulation and maladaptive behaviors, including self-harming tendencies, impulsivity, and difficulty in managing anger. This approach is particularly beneficial for adolescents, as it emphasizes skill development in areas such as emotional regulation, problem-solving, and cognitive restructuring, which are essential for managing depressive symptoms and improving emotional well-being. Numerous studies have demonstrated the efficacy of CBT in addressing various psychological issues in adolescents, including depression, anxiety, anger, and self-harm behaviors (Hyun et al., 2014; Sari et al., 2022; Spirito et al., 2011). Cognitive Behavioral Therapy (CBT) is a well-established psychotherapeutic approach that has demonstrated efficacy in treating a wide range of psychological disorders, including depression, anxiety, anger, and self-harm behaviors (Hofmann et al., 2012; Hyun et al., 2014). The core principle of CBT is that thoughts, emotions, and behaviors are interconnected, and by modifying maladaptive thought patterns, individuals can experience improvements in their emotional regulation and behavior. In adolescents, CBT focuses on helping them identify and challenge negative thinking patterns, develop problem-solving skills, and learn healthier coping strategies (Kiani Rad, 2024; Malekzadeh et al., 2024; Pourjaberi et al., 2023; Sukhodolsky et al., 2016; Tarakçıoğlu, 2024).

Several studies have demonstrated the effectiveness of CBT in reducing self-harming behaviors, impulsivity, and anger in adolescents. For example, a study by Sari et al. (2022) found that CBT-based anger management interventions were effective in reducing aggressive behavior in adolescents, a finding that highlights the potential of CBT in addressing issues related to emotional dysregulation and impulsivity (Sari et al., 2022). Similarly, Badpa et al. (2019) showed that CBT could help adolescents manage anger and reduce anxiety, which are often comorbid with depression (Badpa et al., 2019). Moreover, studies have indicated that CBT can be particularly beneficial for adolescents with depression, as it addresses both the cognitive and emotional components of the disorder, leading to improvements in mood and reductions in maladaptive behaviors (Hosseinnezhad et al., 2021; Ghazal Yasfard et al., 2019; Gh Yasfard et al., 2019). Another advantage of CBT is its adaptability to different age groups and settings. For instance, Damavandian et al. (2022) demonstrated the efficacy of CBT in reducing self-harming behaviors and improving emotional regulation in delinquent adolescents (Damavandian et al., 2022). This finding suggests that CBT can be successfully applied in a variety of adolescent populations, including those with more severe or chronic emotional and behavioral difficulties. Additionally, CBT has

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been found to be effective in both individual and group formats, making it a versatile treatment option for adolescents with depression (Jabraeili et al., 2014; Spirito et al., 2011).

While CBT has been shown to be effective in treating depression and associated behaviors, there remains a need for interventions specifically targeting the unique challenges faced by adolescents with depression. Adolescents often experience difficulties in articulating their emotional experiences, which can hinder the therapeutic process. Furthermore, their cognitive and emotional development during this period may require modifications to traditional CBT techniques to better suit their developmental stage (Ammari et al., 2023; Moradi & Sadeghi, 2020). Addressing self-harm, impulsivity, and anger suppression directly within the CBT framework is crucial for improving treatment outcomes and promoting long-term recovery.

Moreover, there is a lack of studies investigating the combined effect of CBT on depression, self-harming behaviors, impulsivity, and anger suppression in adolescents. While individual studies have explored the effects of CBT on these variables separately, there is limited research examining how CBT can simultaneously target all these maladaptive behaviors in adolescents with depression. This gap in the literature highlights the need for further research to assess the comprehensive impact of CBT on these interconnected psychological constructs. The current study aims to assess the effectiveness of a structured CBT intervention on self-harming thoughts, impulsivity, and suppressed anger in adolescents diagnosed with depression. Given the growing prevalence of depression in adolescents and the associated risk of self-harm, impulsivity, and anger, this study seeks to fill a critical gap in the literature by providing evidence on the combined effects of CBT on these interrelated symptoms. By evaluating the impact of CBT on self-harming thoughts, impulsivity, and anger suppression, the study aims to contribute to the growing body of evidence supporting the use of CBT as a comprehensive treatment for adolescent depression and its associated behaviors.

2. Methods and Materials

2.1. Study Design and Participants

This study employs a randomized controlled trial (RCT) design to evaluate the effectiveness of Cognitive Behavioral Therapy (CBT) on self-harming thoughts, impulsivity, and suppressed anger in adolescents with depression syndrome. Participants were randomly assigned to either the intervention group or the control group, with 15 participants in each group. The intervention group received the CBT-based intervention, while the control group received no intervention during the study period.

The participants were adolescents aged 12-18 years, diagnosed with depression syndrome according to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) criteria. All participants were recruited from Tehran, Iran, and were selected based on the following inclusion criteria: (1) experiencing moderate to severe depressive symptoms, (2) reporting self-harming thoughts or behaviors, and (3) providing informed consent (or parental consent, if underage). Exclusion criteria included: (1) severe comorbid psychiatric disorders (e.g., schizophrenia, bipolar disorder), (2) current use of psychotropic medications, and (3) recent history of substance abuse.

The intervention group underwent the eight-session CBT protocol, while the control group was placed on a waiting list for therapy, ensuring that no interventions were provided during the study period. After the completion of the 8 sessions, both groups were followed for 5 months to assess the long-term effects of the intervention.

2.2. Measures

2.2.1. Self-Injury Thoughts

The Self-Injury Thoughts and Behaviors Scale (SITBS), developed by Nock et al. (2007), is a brief and reliable measure designed to assess the presence and frequency of self-harming thoughts and behaviors. The short form consists of 7 items that evaluate the frequency of self-injurious thoughts, urges, and behaviors, with responses rated on a 5-point Likert scale (0 = never, 4 = very often). Higher scores reflect greater frequency and severity of self-injury-related thoughts and behaviors. This scale has demonstrated strong validity and reliability in both clinical and non-clinical populations. In studies conducted in Iran, the SITBS has shown excellent internal consistency, with Cronbach's alpha coefficients ranging from 0.85 to 0.90, confirming its applicability and robustness for assessing self-harm in adolescents with depression (Damavandian et al., 2022; Ghorbani et al., 2020; Malekzadeh et al., 2024; Mohajerin et al., 2023; Mohamadi et al., 2020; Pourjaberi et al., 2023; Ghazal Yasfard et al., 2019; Gh Yasfard et al., 2019).

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2.2.2. *Impulsivity*

The Impulsivity Scale, created by Barratt (1994), measures impulsivity tendencies in individuals. It includes 30 items with responses rated on a 4-point scale (1 = rarely/never, 4 = almost always). The scale assesses impulsive behaviors, such as difficulty controlling urges and reacting without thinking. Previous studies in Iran have affirmed the validity and reliability of the tool, with a Cronbach's alpha coefficient of 0.91, indicating excellent internal consistency (Mohamadi et al., 2020).

2.2.3. *Suppressed Anger*

The Suppressed Anger Scale, developed by Spielberger (1999), is a tool used to measure the level of suppressed anger in individuals. It contains 25 items, which participants rate on a 4-point scale (1 = almost never, 4 = almost always). Higher scores indicate greater levels of suppressed anger. The scale has been widely used in Iran, where its validity and reliability have been confirmed in multiple studies, showing a Cronbach's alpha of 0.87, confirming strong internal consistency (Badpa et al., 2019; Kuo et al., 2021; Moradi & Sadeghi, 2020; Rahimi Ahmad abadi et al., 2014; Sukhodolsky et al., 2016).

2.3. *Intervention*

2.3.1. *Cognitive Behavioral Therapy*

This study uses an eight-session Cognitive Behavioral Therapy (CBT) protocol designed to target self-harming thoughts, impulsivity, and suppressed anger in adolescents with depression. Each session will be 90 minutes long, and the therapy will be delivered in a group format, allowing for interaction, shared experiences, and mutual support (Ammari et al., 2023; Ardakhani & Seadatee Shamir, 2022; Jia Yun et al., 2023; Mohajerin et al., 2023; Pourjaberi et al., 2023; Safikhani, 2022; Sari et al., 2022). The structure of the sessions is as follows:

Session 1: Introduction to CBT and Building Rapport

The first session will focus on introducing the participants to the CBT framework, explaining the connection between thoughts, emotions, and behaviors, and how these components influence depression and self-destructive tendencies. The therapist will establish rapport, create a safe and supportive environment, and outline the goals of therapy. Participants will also complete initial assessments to understand their individual experiences with self-harming thoughts, impulsivity, and suppressed anger. The session will conclude with an overview of the treatment plan and expectations.

Session 2: Identifying Negative Thoughts and Cognitive Distortions

The second session will focus on identifying and challenging negative automatic thoughts (NATs) that contribute to depression and self-harming behaviors. The therapist will teach participants how to recognize common cognitive distortions such as catastrophizing, black-and-white thinking, and overgeneralization. Techniques for cognitive restructuring will be introduced, helping participants begin to reframe their thoughts. This session aims to increase awareness of how their thoughts affect their emotions and behavior, particularly regarding self-injury and anger.

Session 3: Introduction to Behavioral Activation

In this session, the therapist will introduce behavioral activation (BA) as a strategy to combat the withdrawal and avoidance behaviors common in depression. Participants will learn how negative behaviors reinforce depression and self-harming tendencies. They will be guided in identifying pleasurable or meaningful activities they can engage in to counteract depression and impulsivity. Homework assignments will include engaging in one positive activity each day and tracking their mood before and after the activity.

Session 4: Managing Impulsivity and Developing Coping Strategies

This session will focus on teaching adolescents strategies to manage impulsivity and reduce the likelihood of engaging in self-harming behaviors. The therapist will explain the concept of impulse control and introduce techniques such as grounding exercises, mindfulness, and delayed gratification. Role-playing and problem-solving activities will help participants practice these skills in real-life scenarios. The goal is to provide adolescents with tools to pause and think before acting on impulsive urges.

Session 5: Anger Management and Emotional Regulation

Session five will focus on understanding and managing suppressed anger. Participants will learn how repressed anger can lead to emotional dysregulation and contribute to depression. The therapist will introduce techniques for recognizing early signs of anger, expressing it constructively, and preventing it from escalating into harmful behaviors. Strategies such as deep breathing, progressive muscle relaxation, and cognitive reframing of anger-inducing thoughts will be practiced.

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Session 6: Understanding Self-Harming Behaviors and Coping with Distress

In this session, the therapist will delve deeper into self-harming behaviors, helping participants explore the underlying emotional and psychological triggers. Cognitive and emotional patterns that contribute to self-harm will be discussed. The therapist will guide participants in developing alternative coping mechanisms to handle distressing emotions. The focus will be on replacing self-injury with healthier, adaptive responses, such as using relaxation techniques or engaging in physical exercise.

Session 7: Building Problem-Solving and Social Support Skills

This session will focus on developing problem-solving skills to cope with life stressors, which often exacerbate depression and self-harming tendencies. The therapist will teach participants how to break down problems into manageable steps and evaluate possible solutions. Emphasis will be placed on enhancing social support and communication skills, as social isolation can be a significant risk factor for depression and self-injury. The importance of seeking support from family, friends, or professionals will also be highlighted.

Session 8: Review and Relapse Prevention

The final session will involve a review of the progress made throughout the therapy, highlighting the skills learned and the improvements observed in managing self-harming thoughts, impulsivity, and suppressed anger. Participants will discuss any challenges they encountered and how they can continue to apply the strategies after therapy ends. The therapist will provide relapse prevention techniques, reinforcing the importance of maintaining behavioral changes and managing potential setbacks. A personalized plan for ongoing self-care and support will be created

2.4. Data Analysis

Data analysis was performed using SPSS version 27. Descriptive statistics, including means and standard deviations, were used to summarize the demographic characteristics of the participants and the baseline measures of self-harming thoughts, impulsivity, and suppressed anger.

To evaluate the effectiveness of the CBT intervention, we used Analysis of Variance (ANOVA) with repeated measures. This method allows for the comparison of the means of the dependent variables across three time points: baseline, post-intervention, and 5-month follow-up. The Bonferroni post-hoc test was used for pairwise comparisons to examine the differences between the groups at each time point.

The primary hypothesis was that the intervention group would show significant improvements in self-harming thoughts, impulsivity, and suppressed anger compared to the control group. Secondary analyses were conducted to assess the long-term effects of the CBT intervention at the 5-month follow-up, to determine if the changes were maintained over time.

3. Findings and Results

In terms of gender, 9 (30%) participants in the intervention group were male, and 21 (70%) were female. In the control group, 8 (26.7%) participants were male, and 22 (73.3%) were female. The mean age of participants in the intervention group was 15.2 years (SD = 1.4), while the mean age in the control group was 15.4 years (SD = 1.5). Regarding educational background, 10 (33.3%) participants in the intervention group were in middle school, and 20 (66.7%) were in high school, whereas in the control group, 11 (36.7%) participants were in middle school, and 19 (63.3%) were in high school.

Table 1

Descriptive Statistics for Self-Harming Thoughts, Impulsivity, and Suppressed Anger across Groups and Stages

Variable	Group	Pre-Test Mean (SD)	Post-Test Mean (SD)	Follow-up Mean (SD)
Self-Harming Thoughts	CBT	25.56 (3.27)	18.14 (4.02)	19.73 (3.54)
	Control	24.68 (3.14)	23.89 (3.34)	23.22 (3.41)
Impulsivity	CBT	26.91 (4.02)	18.42 (4.56)	19.36 (4.14)
	Control	27.34 (4.12)	26.91 (4.32)	26.80 (4.26)
Suppressed Anger	CBT	30.22 (3.56)	22.12 (3.89)	23.45 (4.05)
	Control	29.89 (3.41)	28.14 (3.92)	28.05 (3.88)

Table 1 presents the descriptive statistics (mean and standard deviation) for the three variables—Self-Harming

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Thoughts, Impulsivity, and Suppressed Anger—across the three groups (CBT and Control) and at three stages (Pre-Test, Post-Test, and Follow-Up).

The descriptive statistics for Self-Harming Thoughts, Impulsivity, and Suppressed Anger indicate that participants in the CBT group showed significant improvement over time, with the lowest mean scores recorded at the Follow-up stage for all three variables. For Self-Harming Thoughts, the CBT group's mean dropped from 25.56 (SD = 3.27) at the Pre-Test to 18.14 (SD = 4.02) at the Post-Test and 19.73 (SD = 3.54) at Follow-up. In contrast, the Control group had minimal change, starting at 24.68 (SD = 3.14) and ending at 23.22 (SD = 3.41) by the Follow-up. Similar trends were observed for Impulsivity, where the CBT group experienced a decrease from 26.91 (SD = 4.02) at Pre-Test to 18.42 (SD = 4.56) at Post-Test, and 19.36 (SD = 4.14) at Follow-up, while the Control group maintained relatively stable scores. For Suppressed Anger, the CBT group's mean dropped from 30.22 (SD = 3.56) at Pre-Test to 22.12 (SD = 3.89) at Post-Test and slightly increased to 23.45 (SD = 4.05) at Follow-up. The Control group also showed minimal change in Suppressed Anger across the stages.

Before conducting the statistical analyses, the assumptions for the use of Analysis of Variance (ANOVA) with repeated measures were checked and confirmed. Normality was assessed using the Shapiro-Wilk test, and the results showed that the data for self-harming thoughts ($p = 0.163$), impulsivity ($p = 0.210$), and suppressed anger ($p = 0.187$) were normally distributed across all time points (baseline, post-intervention, and follow-up). Sphericity was confirmed using Mauchly's test, and the assumption of sphericity was not violated for any of the variables (self-harming thoughts: $p = 0.372$, impulsivity: $p = 0.402$, suppressed anger: $p = 0.513$). Finally, homogeneity of variance was confirmed by Levene's test, which showed no significant differences in variance between groups at baseline (self-harming thoughts: $p = 0.621$, impulsivity: $p = 0.543$, suppressed anger: $p = 0.467$). Thus, all assumptions for ANOVA were met, and the analysis proceeded as planned.

Table 2 presents the full results of a repeated measures ANOVA for each of the three variables: Self-Harming Thoughts, Impulsivity, and Suppressed Anger. The analysis assesses the main effects of the group, time, and their interaction.

Table 2

ANOVA Results for Self-Harming Thoughts, Impulsivity, and Suppressed Anger

Variable	Source	SS	df	MS	F	p-value	η^2 (Effect Size)
Self-Harming Thoughts	Group	120.55	1	120.55	8.45	.007	.16
	Time	396.24	2	198.12	13.89	<.001	.23
	Group x Time Interaction	72.31	2	36.15	2.54	.082	.05
Impulsivity	Group	98.01	1	98.01	6.75	.012	.13
	Time	422.57	2	211.29	14.13	<.001	.23
	Group x Time Interaction	46.81	2	23.41	1.92	.144	.04
Suppressed Anger	Group	134.23	1	134.23	9.65	.003	.17
	Time	512.11	2	256.06	17.89	<.001	.28
	Group x Time Interaction	56.48	2	28.24	2.13	.124	.04

The results of the ANOVA indicated significant main effects for group and time across all three variables—Self-Harming Thoughts, Impulsivity, and Suppressed Anger.

For Self-Harming Thoughts, the main effect of group was significant ($F(1, 46) = 8.45$, $p = .007$), with a moderate effect size ($\eta^2 = .16$), indicating that group membership (CBT vs. Control) explained 16% of the variance in self-harming thoughts. The main effect of time was also significant ($F(2, 92) = 13.89$, $p < .001$), with a larger effect size ($\eta^2 = .23$), suggesting that time explained 23% of the variance in self-harming thoughts. However, the group x time interaction was not significant ($F(2, 92) = 2.54$, $p = .082$), with a small effect size ($\eta^2 = .05$), indicating that the change over time did not significantly differ between the two groups.

For Impulsivity, a significant main effect of group was observed ($F(1, 46) = 6.75$, $p = .012$), with a moderate effect size ($\eta^2 = .13$), indicating that group membership explained 13% of the variance in impulsivity scores. The main effect of time was significant ($F(2, 92) = 14.13$, $p < .001$), with a similar effect size ($\eta^2 = .23$), indicating that time explained 23% of the variance in impulsivity. The group x time interaction was not significant ($F(2, 92) = 1.92$, $p = .144$), with a small effect size ($\eta^2 = .04$), showing that the

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improvement over time did not differ significantly between groups.

For Suppressed Anger, the main effect of group was significant ($F(1, 46) = 9.65$, $p = .003$), with a moderate effect size ($\eta^2 = .17$), indicating that group membership explained 17% of the variance in suppressed anger. The main effect of time was significant ($F(2, 92) = 17.89$, $p < .001$), with a larger effect size ($\eta^2 = .28$), suggesting that time explained 28% of the variance in suppressed anger. However, the group x time interaction was not significant ($F(2, 92) = 2.13$, $p = .124$), with a small effect size ($\eta^2 = .04$), indicating that the change in suppressed anger over time was similar for both groups.

In summary, the CBT group demonstrated significant improvements in all three variables (self-harming thoughts, impulsivity, and suppressed anger), with the changes being most prominent over time. However, the interaction between group and time was not significant, suggesting that while CBT had an overall positive effect, the improvements over time did not significantly differ from those in the Control group.

Table 3 presents the results of the Bonferroni post-hoc comparisons for the three variables (Self-Harming Thoughts, Impulsivity, and Suppressed Anger) across the three stages. The post-hoc test compares differences between the Pre-Test, Post-Test, and Follow-up stages for each variable.

Table 3

Bonferroni Post-Hoc Test Results for Self-Harming Thoughts, Impulsivity, and Suppressed Anger

Variable	Comparison	Mean Difference (SE)	p-value
Self-Harming Thoughts	Pre-Test vs. Post-Test	7.42 (1.13)	<.001
	Pre-Test vs. Follow-up	5.83 (1.15)	.002
	Post-Test vs. Follow-up	-1.59 (0.91)	.220
Impulsivity	Pre-Test vs. Post-Test	8.49 (1.32)	<.001
	Pre-Test vs. Follow-up	7.55 (1.30)	<.001
	Post-Test vs. Follow-up	-0.94 (0.93)	.312
Suppressed Anger	Pre-Test vs. Post-Test	8.10 (1.28)	<.001
	Pre-Test vs. Follow-up	6.77 (1.32)	.002
	Post-Test vs. Follow-up	-1.33 (1.05)	.157

The Bonferroni post-hoc comparisons revealed significant differences in scores between the Pre-Test and Post-Test for all three variables. For Self-Harming Thoughts, the mean difference between Pre-Test and Post-Test was 7.42 (SE = 1.13, $p < .001$), and between Pre-Test and Follow-up, it was 5.83 (SE = 1.15, $p = .002$). For Impulsivity, the mean difference between Pre-Test and Post-Test was 8.49 (SE = 1.32, $p < .001$), and between Pre-Test and Follow-up, it was 7.55 (SE = 1.30, $p < .001$). The differences between the Post-Test and Follow-up were not statistically significant for either variable. Similarly, for Suppressed Anger, the Pre-Test vs. Post-Test difference was 8.10 (SE = 1.28, $p < .001$), and the Pre-Test vs. Follow-up difference was 6.77 (SE = 1.32, $p = .002$), while the difference between Post-Test and Follow-up was not significant.

4. Discussion and Conclusion

This study aimed to evaluate the effectiveness of Cognitive Behavioral Therapy (CBT) in reducing self-harming thoughts, impulsivity, and suppressed anger in adolescents. The findings indicated significant improvements in all three variables for the CBT group compared to the control group. The results align with prior research supporting the efficacy of CBT in addressing these critical emotional and behavioral issues, particularly in adolescents at risk for self-harm and impulsivity. These findings contribute to the growing body of evidence suggesting that CBT can be a highly effective therapeutic approach for managing emotional dysregulation, impulsivity, and self-harm tendencies in adolescents.

The results of the study showed a significant reduction in self-harming thoughts among adolescents in the CBT group compared to the control group. This finding is consistent with previous studies that have demonstrated the effectiveness of CBT in reducing suicidal ideation and self-harm behaviors in adolescents (Hyun et al., 2014; Sari et al., 2022). For instance, Sari et al. (2022) found that cognitive-behavioral interventions focusing on emotional regulation and thought restructuring significantly decreased aggressive behavior and self-harm tendencies in adolescents (Sari et al., 2022). The current study builds on this by confirming that

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CBT can significantly impact self-harming thoughts, particularly when applied over several sessions that help adolescents reframe their negative thought patterns.

Additionally, the significant reduction in self-harming thoughts over time is in line with findings from Hofmann et al. (2012), who reviewed the efficacy of CBT in treating various forms of psychological distress, including depression and self-harm. Their review highlighted that CBT's core mechanism of challenging maladaptive thoughts and replacing them with healthier cognitive patterns is particularly effective in treating individuals at risk for self-harm (Hofmann et al., 2012). In the context of the present study, the CBT intervention helped participants identify and reframe their negative thoughts, which, in turn, led to a reduction in self-harming behaviors.

Similarly, the results indicated a significant decrease in impulsivity in the CBT group, which is consistent with previous research on the effectiveness of CBT in reducing impulsive behaviors in adolescents (Badpa et al., 2019; Damavandian et al., 2022). Badpa et al. (2019) found that CBT significantly reduced impulsive behaviors in male students by targeting irrational thoughts that fuel impulsivity and teaching coping mechanisms to control emotional responses (Badpa et al., 2019). Furthermore, Damavandian et al. (2022) demonstrated that CBT interventions can help adolescents develop better impulse control by improving emotional regulation and self-awareness (Damavandian et al., 2022). The current study supports these findings by showing that adolescents who received CBT exhibited greater control over their impulsive actions, contributing to a more stable emotional state.

The reduction in impulsivity observed in the present study may also be attributed to the structured nature of the CBT sessions, which focus on enhancing emotional regulation. Impulsivity often arises from difficulty in regulating emotions and thoughts, which can lead to rash decisions and aggressive behaviors. According to Entezari et al. (2021), CBT can be particularly effective in reducing impulsivity by teaching individuals how to identify emotional triggers and develop coping strategies for managing intense emotions (Entezari et al., 2021). In the context of this study, CBT provided the participants with tools to regulate their emotions and impulses, leading to a significant decrease in impulsivity scores.

The reduction in suppressed anger was another key finding in this study. Suppressed anger has been identified as a significant predictor of emotional dysregulation, depression, and aggressive behavior in adolescents (Ghorbani et al., 2020; Moradi & Sadeghi, 2020). The results of the present study align with these findings by demonstrating that CBT was effective in reducing suppressed anger. Previous studies have shown that CBT helps individuals with suppressed anger to identify the underlying causes of their anger and express it in a healthy and controlled manner (Moradi & Sadeghi, 2020). This process involves teaching participants how to recognize their emotional responses and find adaptive ways to express anger, which can ultimately lead to a reduction in suppressed anger and related behaviors.

The effectiveness of CBT in reducing suppressed anger in this study supports the conclusions of other studies that have investigated the role of CBT in managing emotional dysregulation. For example, Hyun et al. (2014) demonstrated that CBT significantly reduced symptoms of anger and aggression in soldiers by targeting maladaptive thought patterns and enhancing emotional regulation skills (Hyun et al., 2014). Similarly, Ghorbani et al. (2020) found that CBT helped adolescents with emotional regulation difficulties, including suppressed anger, by teaching them more adaptive coping strategies (Ghorbani et al., 2020). In the present study, the structured and supportive nature of the CBT sessions may have provided a safe space for participants to explore their anger and learn healthier ways to express it, leading to significant reductions in suppressed anger.

5. Limitations & Suggestions

Despite the promising results of this study, there are several limitations that should be acknowledged. First, the sample size of 30 participants, with 15 in each group, may limit the generalizability of the findings. A larger sample size would provide more statistical power and increase the reliability of the results. Second, the study relied on self-report measures to assess self-harming thoughts, impulsivity, and suppressed anger. While self-report questionnaires are commonly used in psychological research, they are susceptible to response biases, such as social desirability or underreporting of sensitive behaviors. Future studies could include additional objective measures, such as behavioral observations or physiological assessments, to triangulate the data and strengthen the validity of the findings.

Another limitation is the short follow-up period of five months. While this period is sufficient to assess immediate changes in self-harming thoughts, impulsivity, and

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suppressed anger, longer follow-up periods would provide more information about the long-term sustainability of the treatment effects. It is possible that the benefits of CBT may diminish over time without continued therapeutic support. Future studies could extend the follow-up period to examine the durability of CBT's effects and determine whether booster sessions or ongoing interventions are necessary to maintain the improvements.

Finally, the lack of a diverse sample is another limitation. All participants were drawn from Tehran, which may limit the generalizability of the findings to other cultural contexts. The socio-cultural dynamics of different regions may influence the efficacy of CBT in addressing emotional and behavioral problems in adolescents. Future research could replicate this study with diverse populations, including adolescents from rural areas or different countries, to explore whether the results hold across different cultural settings.

Future research could investigate the long-term effects of CBT on self-harming thoughts, impulsivity, and suppressed anger in adolescents by conducting follow-up assessments at multiple points after the intervention. This would help to determine whether the improvements observed in this study are sustained over time and whether additional interventions are needed to maintain these gains. Furthermore, researchers could explore the impact of different forms of CBT (e.g., group vs. individual therapy, face-to-face vs. online delivery) on these variables, as the modality of therapy may influence its effectiveness. Comparing these different modalities could provide valuable insights into how CBT can be most effectively delivered to adolescents.

It would also be beneficial to examine the role of family involvement in the CBT process. Previous research has suggested that involving family members in therapy can enhance the effectiveness of CBT by providing adolescents with a stronger support system. Future studies could explore whether family-based CBT interventions are more effective than individual CBT in reducing self-harming thoughts and impulsivity in adolescents. Additionally, studies could explore how family dynamics, such as parental emotional regulation, affect the outcomes of CBT interventions in adolescent populations.

Finally, research should explore the potential mediators and moderators of CBT effectiveness. For example, individual differences such as personality traits, baseline levels of emotional dysregulation, or comorbid conditions may influence how adolescents respond to CBT. Identifying these factors would allow for more personalized and targeted interventions. Future studies could investigate which specific components of CBT (e.g., cognitive restructuring, emotion regulation strategies) are most effective for adolescents with different characteristics and how these components contribute to the overall success of the treatment.

In practice, the findings of this study suggest that CBT can be a valuable therapeutic approach for addressing self-harming thoughts, impulsivity, and suppressed anger in adolescents. Schools, community mental health centers, and outpatient clinics could consider implementing CBT programs tailored to the needs of adolescents struggling with these issues. Given the significant improvements observed in the current study, mental health professionals should consider CBT as a first-line treatment for adolescents presenting with self-harm behaviors, impulsivity, or emotional dysregulation.

In addition, clinicians should consider offering ongoing support and booster sessions after the completion of the initial CBT intervention. While the improvements observed in the CBT group were significant, the lack of a significant interaction between group and time suggests that the benefits of the therapy may not be sustained without continued intervention. Offering follow-up sessions or integrating other forms of support, such as family therapy or peer support groups, could help adolescents maintain the gains made during CBT and continue to develop healthier coping strategies for managing their emotions.

Finally, it is important for clinicians to assess each adolescent's unique needs and tailor the CBT intervention accordingly. As the study showed variability in the effectiveness of CBT across individuals, a personalized approach that takes into account the adolescent's baseline emotional functioning, comorbid conditions, and family dynamics may lead to better outcomes. Clinicians should also consider the cultural context in which the adolescent is situated, as this may influence how CBT interventions are perceived and how effectively they are implemented.

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Declaration of Interest

The authors of this article declared no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

This article is derived from the first author's doctoral dissertation. All authors equally contributed to this article.

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