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The Impact of Reality Therapy on Distress Tolerance and Action Flexibility in Adolescents Afflicted with Coagulation Disorders

Elham Ahangaran[1] (MSc), Fariborz Dortaj[2] (PhD), Fatemeh Ghaemi[3] (PhD), Bita Nasrolahi[4] (PhD)

1. Department of Literature, Humanities and Social Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran
2. Department of Educational Psychology, University of Allameh Tabataba'i, Tehran, Iran
3. Ministry of Health, Treatment and Medical Education, Tehran, Iran
4. Department of Psychology, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Corresponding Author:
Fariborz Dortaj,
Department of Educational Psychology,
University of Allameh Tabataba'i,
Tehran,
Iran
E-mail: f_dortaj@yahoo.com

Abstract

Introduction: Adolescents with coagulation disorders, such as hemophilia, often face significant psychological challenges due to the chronic and unpredictable nature of their condition. Enhancing their psychological resilience is essential for improving their quality of life. This study examines the effectiveness of Reality Therapy in increasing distress tolerance and cognitive flexibility among these adolescents.

Method: This semi-experimental study used a pre-test, post-test design with a control group and a three-month follow-up. The statistical population included all adolescents (13-18 years old) with blood coagulation disorders, members of the Iranian Hemophilia Center. A sample of 32 participants was selected using a convenient sampling method, with simple random assignment to experimental (n=16) and control (n=16) groups using the method of assigning random spheres. The intervention consisted of weekly 90-minute sessions over 12 weeks. Outcomes were measured using the Distress Tolerance Questionnaire (DTQ) and the Connor–Davidson Resilience Scale (CD-RISC). Data analysis was performed using SPSS software, version 23.

Results: According to findings, Reality Therapy significantly improved distress tolerance in the experimental group compared to the control group ($p < 0.001$), with an effect size of 0.42. Cognitive flexibility also showed a significant increase ($p < 0.001$) with an effect size of 0.88. These improvements were maintained during the three-month follow-up period. Subscale analysis indicated significant gains in stress regulation, personal competence, trust in personal impulses, and skillfulness in the intervention group.

Conclusion: Reality Therapy effectively enhances distress tolerance and cognitive flexibility in adolescents with coagulation disorders. These findings suggest that Reality Therapy is a valuable therapeutic approach for improving psychological resilience in this population.

Keywords: Adolescents, Coagulation Disorders, Reality Therapy, Distress Tolerance, Cognitive Flexibility

Introduction

One of the pivotal junctures during the adolescent crisis is marked by growth, the development of identity, heightened autonomy, peer influence, psychobiological alterations, and exposure to novel environments and behaviors [1]. Given that the adolescent phase signifies a crucial period for the formation of personal and social personality structures, the emergence of imbalances, leading to susceptibility to mental disorders, can profoundly affect an individual's capacity and ultimately shape their future and destiny. Adolescence is recognized as one of the most delicate and demanding stages in an individual's life [2]. Neglecting the needs of children and adolescents, who constitute

the bedrock of tomorrow's society, will undoubtedly result in irreparable consequences. Additionally, in societies that allocate less attention to this demographic, social issues are prone to exacerbate [3]. Approximately 50% of adolescents with chronic illnesses fail to fully adhere to recommended care guidelines, and among these chronic conditions is coagulation disorders [4].

Coagulation disorders, or coagulopathy, refer to conditions in which blood coagulation is compromised, affecting approximately one percent of the global population [5]. These disorders can be congenital, such as hemophilia and von Willebrand disease, or acquired due to impaired synthesis of plasma coagulation factors or the presence of antibodies that interfere with blood clotting functions [6]. The origins of coagulation disorders are diverse, leading to a range of consequences. Individuals with these disorders often experience persistent joint pain related to arthritis and acute pain from joint bleeding [7]. Notably, age and disease severity contribute minimally to the variability in Health-Related Quality of Life (HRQoL) for patients with coagulation disorders. Recent studies indicate that psychological factors such as coping mechanisms, negative thoughts about pain, and acceptance of the disease may have a more significant impact on HRQoL. For example, a previous study [8] found that effective coping strategies were strongly associated with improved HRQoL in individuals with hemophilia. Similarly, a research [9] highlights that disease acceptance and the ability to manage pain-related thoughts significantly influence overall well-being. Epidemiological studies have also revealed a substantial prevalence of psychological distress among patients with coagulation disorders. For instance, a review [10] reports that approximately 35-45% of patients with hemophilia experience significant psychological distress, which adversely affects their HRQoL. Thus, addressing psychological and coping factors is crucial for improving the overall quality of life for these patients. Negative thoughts about pain emerge as a pivotal factor influencing the quality of life, suggesting that interventions targeting psychological adaptation in hemophiliac patients can be directed toward mitigating negative thoughts about pain [11].

The challenge associated with cognitive emotion regulation and the adoption of maladaptive emotional regulation strategies play a substantial and impactful role in diminishing individuals' mental well-being [12]. Essentially, this characteristic functions as a defense mechanism, allowing individuals to sustain their behavioral and emotional equilibrium in the presence of diverse internal and external psychological stressors. Nevertheless, when an individual possesses low levels of distress tolerance, they may experience a breakdown in behavioral order and coherence when confronted with such pressures [13].

Distress tolerance, as conceptualized by Simons and Gaher [14], refers to an individual's ability to manage negative emotions [15]. Individuals with low distress tolerance exhibit distinct characteristics. Firstly, they perceive emotions as intolerable and struggle to address their discomfort and distress. Secondly, these individuals deny the existence of emotions, experiencing shame and confusion due to a lack of coping mechanisms to effectively manage their emotions. The third crucial characteristic is their extensive efforts to avoid negative emotions and seek immediate relief from such experiences. Low distress tolerance is linked to various mental health disorders, including Post-Traumatic Stress Disorder (PTSD) and depression [16]. Moreover, research suggests that the development of distress tolerance skills can effectively reduce specific target behaviors, particularly risky behaviors and hazardous suicidal tendencies. Previous studies indicate that a deficiency in distress tolerance serves as a risk factor for various psychiatric disorders [17].

The dynamics within a family and its overall functioning play a crucial role in cultivating distress tolerance and minimizing current and future risks associated with navigating life's unexpected events and circumstances; the pivotal element lies in the behavioral flexibility of family members [18]. Behavioral flexibility occupies a significant position within the realms of developmental psychology, family psychology, and mental health [19].

Action flexibility stands out as a factor contributing to individuals' adaptability to anxieties and life threats, closely intertwined with mental health. It is characterized as a process, ability, or adaptive outcome enabling successful navigation of threatening situations. Essentially, cognitive flexibility denotes positive adaptation in response to adverse conditions [20]. This broad concept encompasses the ability to adjust individual cognitive representations and facilitate appropriate adaptation when confronted with mental and psychological challenges of significant magnitude, such as family problems, serious personal health issues, workplace stressors, or financial pressures [21, 22]. The innovation of this research lies in its application of Reality Therapy, a psychological intervention, to a unique population of adolescents with coagulation disorders. While Reality Therapy has been widely studied and applied in various psychological contexts, its specific impact on distress tolerance and cognitive flexibility in adolescents with chronic medical conditions remains underexplored. This study aimed to fill this gap by rigorously testing and demonstrating the efficacy of Reality Therapy in enhancing psychological resilience in this vulnerable group. The main goal of this research was to provide empirical evidence that supports the use of Reality Therapy as a viable therapeutic approach for improving the mental health and well-being of adolescents facing the challenges of coagulation disorders. Ultimately, the purpose is to contribute to the advancement of tailored therapeutic strategies that address both the psychological and medical needs of these adolescents, thereby promoting their overall quality of life and aiding their long-term psychological adjustment.

Method

This study utilized a quasi-experimental research method with a pre-test-post-test design, incorporating both control and experimental groups, and a three-month follow-up period. The research focused on adolescents aged 13 to 18

years with blood coagulation disorders who were registered members of the Iranian Hemophilia Center in Tehran. To determine the sample size, literature suggests that a minimum of 15 participants per group is necessary for cause-and-effect studies. Accordingly, a sample of 32 individuals was selected, with 16 participants allocated to the experimental group and 16 to the control group.

Sampling was conducted through convenience sampling, followed by simple random assignment. After obtaining consent from the Iranian Hemophilia Center's management, eligible adolescents were informed about the study. At an in-person meeting, participants were randomly assigned to either the experimental or control group using a ball-drawing method, where white balls indicated the experimental group and black balls indicated the control group.

The inclusion criteria required that participants be officially diagnosed with a blood coagulation disorder (such as hemophilia A, hemophilia B, or von Willebrand disease) by a specialist, be aged between 13 and 18 years, provide written consent from their parents or legal guardians, and be capable of attending therapy sessions regularly. Additionally, participants needed to have a stable medical condition that did not require urgent care or hospitalization. The exclusion criteria included missing more than two consecutive sessions, experiencing severe deterioration in medical condition requiring immediate care, and the use of psychological medications that affect concentration or memory.

Ethical approval for the study was obtained in February 2023. The intervention commenced in late May 2023 and concluded in August 2023, with follow-up assessments conducted in October 2023. The experimental group underwent eight 90-minute sessions of group reality therapy, led by trained therapists at the Iranian Hemophilia Center. Prior to the intervention, an introductory session was held with the experimental group and their parents to collect initial information about family concerns and to explain the therapy process. A summary of the eight sessions and key concepts was provided to parents to encourage adolescent attendance. Following the intervention, a feedback session with parents was conducted to gather insights on adolescents' behaviors and any observed changes.

The control group did not receive the intervention until after the post-test assessments. Both groups completed post-test questionnaires after the intervention, and follow-up effectiveness was evaluated through questionnaires administered three months post-intervention. The study adhered to the CONSORT guidelines to ensure thorough reporting of the methodology and outcomes.

Table 1. Group Counseling Journey: Objectives, Reflections, and Transformative Homework Sessions

Meetings	Objectives of the Meetings	Home works
First Session	Introduction to group members, articulation of group counseling rules, statement of session objectives, establishing good communication for motivating and encouraging active and meaningful participation of members. Description of successful and unsuccessful identities, emphasizing effective and responsible behaviors.	Examining which of the individuals' behaviors has been effective or responsible throughout the week.
Second Session	Review of previous session content and homework assignments for group members. Clear explanation of needs, five fundamental needs, and instruction on relaxation techniques.	Completing the worksheet related to needs and performing relaxation before bedtime.
Third Session	Review of previous session content and homework assignments for group members. Training in behavior modeling and visual imagery (for relaxation).	Filling out the behavior log table and practicing visual imagery techniques during the day.
Fourth Session	Review of previous session content and homework assignments for group members. Effective and useful control and management of emotions.	Completing the emotions worksheet and paying attention to the emotions experienced during the week.
Fifth Session	Review of previous session content and homework assignments for group members. Exploration of desires (wants), training on the ideal world (people, beliefs, things), and emphasis on individual uniqueness.	Completing the ideal world worksheet and considering each person's desires throughout the week.
Sixth Session	Review of previous session content and homework assignments for group members. Examination of overall behavior (actions and referrals) and self-assessment.	Thinking about and writing down actions that the individual has taken so far but have not brought them closer to their desires and have not been effective.
Seventh Session	Review of previous session content and homework assignments for group members. Presentation of other suggested behaviors and new solutions with an emphasis on SWOT analysis (S-Strengths, W-Weaknesses, O-Opportunities, T-Threats).	Writing down previous disruptive behaviors on one side of the sheet and trying to replace them with new reactions on the other side. Each group member should identify their strengths, weaknesses, threats, and opportunities.
Eighth Session	Review of previous session content and homework assignments for group members. Revision and review of all past sessions, assessing the level of commitment required to achieve the desired outcome, and providing recommendations and solutions for concluding the group.	Summary and repetition, and practicing the sessions before.

In this research, the following tools were used to collect data:

Distress Tolerance Questionnaire (DTQ): The distress tolerance scale, developed by Simmons and Gaher in 2005, is a self-report measure consisting of 15 questions categorized into four subscales. Distress tolerance is assessed through questions 5, 3, and 1; absorption by negative emotions with questions 15, 4, and 2; cognitive appraisal of distress with questions 12, 11, 10, 9, 7, and 6; and effortful regulation to alleviate distress with questions 14, 13, and 8. Responses are recorded on a five-point Likert scale, with 'completely agree' assigned a score of 1, 'somewhat agree' 2, 'neither agree nor disagree' 3, 'somewhat disagree' 4, and 'completely disagree' 5. Question 6 is reverse-scored. The overall distress tolerance score is obtained by summing the scores of all questions, while each dimension score is derived by summing the scores of relevant questions. Higher scores on the scale indicate higher distress tolerance. Simons and Gaher reported alpha coefficients for the tolerance, absorption, appraisal, and regulation subscales as 0.72, 0.82, 0.78, and 0.70, respectively, and for the total scale as 0.82. The scale demonstrated good criterion validity and convergent validity. The Cronbach's alpha coefficient was reported as 0.67 for this questionnaire with a validity of 0.79.

Connor–Davidson Resilience Scale (CD-RISC): The Connor–Davidson Resilience Scale, developed by Connor and Davidson (23), comprises 25 items that are rated on a Likert scale ranging from zero (completely incorrect) to four (completely correct). The scale is designed to assess coping abilities with stress and threats and provides a total score (24). The reliability of this scale using the Cronbach's alpha coefficient, yielded a value of 0.85. In another study by Gholami and Kakavand (25), the reliability of the scale was also investigated, resulting in a Cronbach's alpha of 0.84, indicating good reliability.

The research hypothesis proposed that reality therapy exerts a significant influence on distress tolerance and its subscales, along with cognitive flexibility and its corresponding subscales in adolescents with blood clotting disorders. The presentation begins with descriptive information pertaining to the research variables, followed by the assumptions guiding the use of mixed analysis of variance. Subsequently, to examine the research hypothesis, mixed analysis of variance is implemented, and the outcomes concerning the acceptance or rejection of the hypotheses are reported.

Results

Table 3 presents descriptive indicators of distress tolerance and action flexibility for both the experimental and control groups across the pre-test, post-test, and follow-up stages.

Considering the establishment of Levine's default for homogeneity of variances and the attainment of a significance level (sig) of less than 0.05 in the sphericity test, the assumption of sphericity is rejected. As a result, alternative tests such as Greenhouse-Geisser or Huynh-Feldt were utilized to assess the effectiveness hypotheses of the intervention.

In the Greenhouse-Geisser test, the obtained P value was 0.0001, indicating statistical significance. Consequently, the hypothesis is accepted, suggesting that the developed therapeutic training program has a significant impact on the distress tolerance of adolescents with coagulation disorders. Furthermore, the calculated effect size was 0.42, indicating that 42% of the variations in distress tolerance and its enhancement in the experimental group can be attributed to the implemented therapeutic training program. Moreover, the developed therapeutic training program demonstrates effectiveness on the components of distress tolerance in adolescents with coagulation disorders, as evidenced by an effect size of 0.70. This signifies that 70% of the changes in distress tolerance components and their improvement in the experimental group are attributable to the implemented therapeutic training program.

The results of the follow-up test reveal a noteworthy difference in the mean distress tolerance between the pre-test and post-test. Furthermore, a significant difference was observed in the mean distress tolerance between the pre-test and follow-up. However, no significant difference was identified between the mean distress tolerance in the post-test and follow-up, suggesting the stability of the intervention effect over time. In terms of the mean absorption of negative emotions predicting cognitive appraisal of stress in the pre-test, post-test, and follow-up stages, no significant difference was observed. Nonetheless, a significant difference was noted in the mean effort regulation for stress relief between the pre-test and post-test. However, there was no significant differences between the mean scores in the pre-test and follow-up, indicating a lack of stability in the intervention effect over time.

Table 2. Demographic Characteristics of the Participants

Variables	Treatment group (n=16)	Control Group (n=16)
Gender		
Girl	2 (12.5 %)	2 (12.5 %)
Boy	14 (87.5 %)	14 (87.5 %)
Age		
13-15	10 (62.5 %)	8 (50 %)
16-18	6 (37.5 %)	8 (50 %)
Blood Coagulation Disorders		
Hemophilia A	10 (62.5 %)	9 (56.5 %)
Hemophilia B	4 (25 %)	6 (37.5 %)
Von Willebrand	2 (12.5 %)	1 (6.2 %)

Table 3. Descriptive Indices of Implicit Emotional Expression

Variable	Group	Levels	Average	SD
Tolerance	Treatment	Pre	7.87	3.32
		Post	10.06	3.80
		Follow-up	9.75	3.73
	Control	Pre	9.06	3.49
		Post	9.68	3.60
		Follow-up	9.43	3.50
Attraction	Treatment	Pre	7.75	3.17
		Post	9.62	3.66
		Follow-up	9.43	3.32
	Control	Pre	8.56	4.16
		Post	9.12	4.75
		Follow-up	9.25	4.80
Assessment	Treatment	Pre	18.68	6.15
		Post	20.43	5.01
		Follow-up	20.56	5.21
	Control	Pre	18.31	5.58
		Post	18.43	5.77
		Follow-up	18.50	5.72
Tuning	Treatment	Pre	7.75	3.83
		Post	9.87	4.16
		Follow-up	9.68	3.80
	Control	Pre	8.31	3.21
		Post	8.56	3.14
		Follow-up	8.56	3.03
Tolerate distress	Treatment	Pre	42.06	12.75
		Post	50.00	12.08
		Follow-up	49.43	11.59
	Control	Pre	44.25	12.56
		Post	45.81	13.51
		Follow-up	45.75	13.14
Personal competence/strength	Treatment	Pre	30.12	7.25
		Post	33.50	6.39
		Follow-up	32.81	6.63
	Control	Pre	27.50	6.19
		Post	27.93	6.66
		Follow-up	27.31	6.11
Trust your personal instincts	Treatment	Pre	25.06	4.91
		Post	28.06	5.72
		Follow-up	27.68	5.74
	Control	Pre	22.56	3.91
		Post	22.25	4.83
		Follow-up	22.31	5.01
Tolerance of negative emotions	Treatment	Pre	16.25	2.95
		Post	17.87	2.57
		Follow-up	17.68	2.41
	Control	Pre	15.81	2.68
		Post	16.06	3.27
		Follow-up	15.31	3.21
Inhibition	Treatment	Pre	11.12	2.52
		Post	12.18	2.28
		Follow-up	12.43	1.99
	Control	Pre	11.18	2.66
		Post	11.43	2.94
		Follow-up	11.25	2.88
Spirituality	Treatment	Pre	7.56	1.82
		Post	8.18	1.97
		Follow-up	8.43	1.96
	Control	Pre	7.81	1.32
		Post	8.00	1.21
		Follow-up	7.93	1.61
Action flexibility	Treatment	Pre	90.12	15.34
		Post	99.81	15.77
		Follow-up	99.06	15.71
	Control	Pre	84.87	11.97
		Post	85.68	13.60
		Follow-up	84.12	13.50

In the Greenhouse-Geisser test, the obtained P was 0.0001, indicating statistical significance. Therefore, the seventh hypothesis is accepted, suggesting the effectiveness of the developed reality therapy educational program on the cognitive flexibility of adolescents with coagulation disorders. Additionally, the calculated effect size was 0.42, suggesting that 42% of the variations in cognitive flexibility and its improvement in the experimental group can be attributed to the implemented reality therapy educational program. Furthermore, the developed Reality Therapy educational program demonstrates effectiveness on the components of cognitive flexibility in adolescents with coagulation disorders, as evidenced by an effect size of 0.88. This signifies that 88% of the changes in cognitive flexibility components and their improvement in the experimental group are attributable to the implemented reality therapy educational program.

The follow-up test results reveal a significant difference in mean cognitive flexibility across the pre-test, post-test, and follow-up stages. Specifically, the analysis for action flexibility indicates a significant effect of time, with an F-value of 21.518 and a p-value of less than 0.001 ($p < 0.001$), suggesting that approximately 41.8% of the variance in cognitive flexibility is attributable to the intervention over time, as reflected in the Eta squared (η^2) value of 0.41.

Significant differences were also observed in the mean scores of the components, competence/personal strength, and skills between the pre-test and post-test, as well as across all three stages (pre-test, post-test, and follow-up). The analysis for components of action flexibility shows a highly significant effect of time, with an F-value of 230.38, a p-value of less than 0.001 ($p < 0.001$), and an Eta squared (η^2) of 0.88, indicating that 88.5% of the variance is explained by the time factor.

However, no significant differences were observed in the mean scores of trust on personal instinct, tolerance of negative emotions, and spirituality across the pre-test, post-test, and follow-up stages.

Table 4. Test of Within-subject Effects

	Source of changes	Index	Sum of squares	df	Mean square	F	P	Eta squared
Tolerate distress	Time	Sphericity Assumed	451.75	2	225.87	21.51	0.0001	0.41
		Greenhouse-Geisser	451.75	1.13	397.42	21.51	0.0001	0.41
		Huynh-Feldt	451.75	1.19	379.33	21.51	0.0001	0.41
		Lower-bound	451.75	1.00	451.75	21.51	0.0001	0.41
	Error	Sphericity Assumed	629.83	60	10.49			
		Greenhouse-Geisser	629.83	34.10	18.47			
		Huynh-Feldt	629.83	35.72	17.62			
		Lower-bound	629.83	30.00	20.99			
Components of distress tolerance	Time	Sphericity Assumed	7524.94	11	684.08	71.84	0.0001	0.70
		Greenhouse-Geisser	7524.94	2.35	3195.23	71.84	0.0001	0.70
		Huynh-Feldt	7524.94	2.65	2835.63	71.84	0.0001	0.70
		Lower-bound	7524.94	1.00	7524.94	71.84	0.0001	0.70
	Error	Sphericity Assumed	3142.19	330	9.52			
		Greenhouse-Geisser	3142.19	70.65	44.47			
		Huynh-Feldt	3142.19	79.61	39.46			
		Lower-bound	3142.19	30.00	104.74			

Table 5. Comparison of Groups

						Confidence Interval 95%	
	Time		Mean difference	Standard error	P	Lower bank	Upper bank
Tolerate distress	1	2	-4.75	1.01	0.0001	-7.31	-2.18
	1	3	-4.43	0.92	0.0001	-6.78	-2.09
	2	3	.31	0.30	0.938	-0.45	1.08
Tolerance	1	2	-1.40	0.25	0.000	-2.36	-0.45
	1	3	-1.12	0.25	0.007	-2.07	-0.17
	2	3	0.28	0.12	1.000	-0.17	0.74
Attraction	1	2	-1.21	0.33	0.061	-2.46	0.02
	1	3	-1.18	0.31	0.051	-2.37	0.001
	2	3	0.03	0.16	1.000	-0.58	0.65
Assessment	1	2	-0.93	0.50	1.000	-2.84	0.97
	1	3	-1.03	0.43	1.000	-2.66	0.60
	2	3	-0.09	0.23	1.000	-0.98	0.80
Tuning	1	2	-1.18	0.31	0.046	-2.36	-0.01
	1	3	-1.09	0.31	0.108	-2.27	0.09
	2	3	0.09	0.13	1.000	-0.42	0.61

Table 6. A Test of Within-subject Effects

	Source of changes	Indicator	Sum of squares	df	Mean square	F	P	Eta squared
Action flexibility	Time	Sphericity Assumed	451.75	2	225.87	21.51	0.0001	0.41
		Greenhouse-Geisser	451.75	1.13	397.42	21.51	0.0001	0.41
		Huynh-Feldt	451.75	1.19	379.33	21.51	0.0001	0.41
		Lower-bound	451.75	1.00	451.75	21.51	0.0001	0.41
	Error	Sphericity Assumed	629.83	60	10.49			
		Greenhouse-Geisser	629.83	34.10	18.47			
		Huynh-Feldt	629.83	35.72	17.62			
		Lower-bound	629.83	30.00	20.99			
Components of action flexibility	Time	Sphericity Assumed	31645.71	14	2260.40	230.38	0.0001	0.88
		Greenhouse-Geisser	31645.71	2.16	14608.52	230.38	0.0001	0.88
		Huynh-Feldt	31645.71	2.41	13084.06	230.38	0.0001	0.88
		Lower-bound	31645.71	1.00	31645.71	230.38	0.0001	0.88
	Error	Sphericity Assumed	4120.87	420	9.81			
		Greenhouse-Geisser	4120.87	64.98	63.41			
		Huynh-Feldt	4120.87	72.55	56.79			
		Lower-bound	4120.87	30.00	137.36			

Table 7. Comparison of Groups

	Time		Mean difference	Standard error	P	Confidence interval 95% Lower bank	Upper bank
Action flexibility	1	2	-5.25	0.79	0.0001	-7.25	-3.24
	1	3	-4.09	0.66	0.0001	-5.78	-2.40
	2	3	1.15	0.40	0.022	0.13	2.17
Merit	1	2	-1.90	0.42	0.010	-3.56	-0.24
	1	3	-1.25	0.31	0.040	-2.47	-0.02
	2	3	0.65	0.24	1.000	-0.30	1.61
Trust personal instincts	1	2	-1.34	0.46	0.743	-3.16	0.47
	1	3	-1.18	0.41	0.824	-2.82	0.44
	2	3	0.15	0.17	1.000	-0.52	0.83
Tolerance of negative emotions	1	2	-0.93	0.31	0.543	-2.15	0.28
	1	3	-0.46	0.29	1.000	-1.64	0.70
	2	3	0.46	0.18	1.000	-0.24	1.17
Inhibition in people	1	2	-0.65	0.14	0.009	-1.22	-0.09
	1	3	-0.68	0.16	0.027	-1.33	-0.03
	2	3	-0.03	0.11	1.000	-0.49	0.43
Spirituality in people	1	2	-0.40	0.18	1.000	-1.12	0.31
	1	3	-0.50	0.20	1.000	-1.31	0.31
	2	3	-0.09	0.10	1.000	-0.49	0.30

Discussion

The results suggest that the Reality Therapy educational program is effective in improving distress tolerance among adolescents with coagulation disorders. This improvement includes the ability to tolerate stress, absorb negative emotions, engage in cognitive appraisal of stress, and regulate efforts for stress relief.

The research results indicate the effectiveness of reality therapy in enhancing distress tolerance among adolescents with coagulation disorders. These findings align with several studies demonstrating the benefits of therapeutic interventions on distress tolerance and psychological well-being. For example, a study [26 found that Cognitive-Behavioral Therapy (CBT) significantly improved distress tolerance and emotional regulation in adolescents with chronic health conditions, suggesting that therapeutic approaches targeting cognitive and emotional processes can be beneficial. Similarly, a research [27] demonstrated that Acceptance and Commitment Therapy (ACT) enhanced distress tolerance and psychological flexibility in adolescents with chronic pain, highlighting the role of acceptance strategies in managing distress. Furthermore, a study [28] reported that mindfulness-based interventions improved distress

tolerance and quality of life in adolescents with chronic illnesses, which supports the idea that therapeutic strategies focusing on mindfulness and self-regulation can be effective. Lastly, a review [29] discussed various therapies, including Reality Therapy, noting their positive impact on distress tolerance and overall psychological well-being in youth with chronic conditions. These studies collectively support the effectiveness of reality therapy in enhancing distress tolerance by aligning with findings from therapeutic approaches that address emotional and cognitive aspects of distress. To explain these findings, it can be argued that a crucial technique of Reality Therapy involves explicitly stating values and committing to actions. This practice helps individuals break free from negative thought and emotion loops, such as anxiety, stress, despair, and depression, which can exacerbate the severity of problems. Challenging dysfunctional beliefs by the therapist serves as a mechanism to modify these beliefs, replacing them with more rational ones and ultimately contributing to distress tolerance in adolescents. Given that distress tolerance is defined as an individual's ability to cope with negative emotions [15], individuals with low distress tolerance perceive emotions as intolerable and struggle to address their distress. Furthermore, these individuals may not accept the existence of emotions, experiencing shame and embarrassment due to their emotional presence because they lack coping abilities. Another significant characteristic of individuals with low distress tolerance is their extensive efforts to prevent negative emotions and seek immediate relief from experienced negative emotions. Low distress tolerance is associated with various mental health disorders, such as PTSD and depression [16]. Reality Therapy provides essential benefits, including accepting responsibility in personal life and strengthening the spirit to engage in purposeful behaviors for achieving goals and aspirations. Establishing connections with group members and fulfilling basic needs such as friendship and a sense of freedom in group sessions lead to important outcomes, including a sense of self-control, personal life satisfaction, and accepting responsibility for behavior. These positive experiences contribute to the reduction of negative self-talk, anxiety, and depression, leading to a decrease in distress and an increase in distress tolerance.

The research findings suggest that the Reality Therapy educational program is effective in improving cognitive flexibility among adolescents with coagulation disorders. This improvement encompasses various components such as competence/personal strength, trust on personal instinct, tolerance of negative emotions, skills in individuals, and spirituality.

The research results indicate the effectiveness of Reality Therapy in enhancing cognitive flexibility among adolescents with coagulation disorders. This finding is consistent with the outcomes of several studies that highlight the benefits of therapeutic interventions on cognitive flexibility. For instance, a study [30] demonstrated that CBT improved cognitive flexibility and executive function in adolescents with anxiety disorders, suggesting that cognitive-focused therapies can positively impact cognitive processes. Similarly, another study [31] revealed that Mindfulness-Based Cognitive Therapy (MBCT) enhanced cognitive flexibility and reduced rumination in adolescents with depression, emphasizing the role of mindfulness in improving cognitive flexibility. Moreover, a study [27] reported that ACT effectively increased cognitive flexibility and psychological flexibility in adolescents with chronic pain, supporting the notion that therapeutic approaches targeting cognitive and emotional aspects can be beneficial. Finally, a review [32] discussed various therapeutic modalities, including Reality Therapy, noting their positive impact on cognitive flexibility and overall mental health in youth with chronic conditions. These studies collectively support the effectiveness of reality therapy in enhancing cognitive flexibility, aligning with findings from other therapeutic approaches that address cognitive and emotional processes. To elucidate these findings, it can be asserted that Reality Therapy acknowledges the need for survival as a fundamental component of human needs. It posits that, to effectively cope with problems, individuals require responsibility and the capacity to change conditions based on will and choice [33]. In the framework of this psychotherapeutic approach, the individual is not viewed as passive and hopeless about the outcome of the disease, and the result is not perceived as a predetermined program. Instead, the individual actively strives to create favorable conditions for their situation, demonstrating proactiveness. The more proactive an adolescent is in dealing with the disease, the more they distance themselves from irresponsibility and assume responsibility. Essentially, they recognize that the initiative lies in their hands and not in the hands of the illness they are contending with. Consequently, when individuals with an illness perceive themselves as the determinants of their destiny, their cognitive flexibility increases in the face of the disease. Cognitive flexibility, a comprehensive concept, refers to the ability to adapt cognitive representations and appropriately adjust to an individual's cognitive representations when confronting psychological and emotional adversities. These adversities may stem from various sources such as family problems, serious health issues, workplace stress, or financial pressures, significantly impacting mental well-being [34] . On the other hand, Reality Therapy places a strong emphasis on internal control, guiding individuals to understand that they have the ability to exert control over their lives. It helps them break free from the influence of external forces and teaches that all controls must originate from within. The approach highlights the importance of individuals attributing successes to themselves, fostering the belief that their thoughts, behaviors, and emotions are under their own control (35). When facing personal challenges, including illness, individuals often contend with additional external forces beyond their immediate control. It can be argued that higher levels of cognitive flexibility contribute to an individual's enhanced coping and tolerance in dealing with such challenges. Cognitive flexibility emerges as a

factor that aids in better adaptation to anxieties and life threats, closely intertwined with mental health. The Reality Therapy approach asserts that individuals have the power to choose their behaviors and are responsible for their lives, actions, feelings, and thoughts. This philosophy assists individuals in controlling their behavior, making better choices in their lives, and instills a belief in their ability to succeed in various situations. The approach encourages individuals to have confidence in their success across different scenarios, promoting self-belief and confidence in their internal abilities and potentials through methods and programs for behavioral change and incremental successes. Ultimately, this process leads individuals towards greater self-belief, confidence in their abilities, and the realization of their inner potential, facilitating significant positive changes. In the context of illness, adolescents, through reality therapy, develop increased cognitive flexibility. This study had several limitations that may impact its results and generalizability. The small sample size of 32 adolescents with blood coagulation disorders in Tehran limits the statistical power and robustness of the findings. The variation in disorder types (e.g., hemophilia A, hemophilia B, von Willebrand's disease) introduces complexity in analyzing the results due to differences in psychological challenges. Uncontrolled extraneous variables, such as adherence to therapy and individual resilience, could also have influenced outcomes. The three-month follow-up period may be insufficient to assess the long-term effects of Reality Therapy. Additionally, reliance on self-report measures introduces potential biases, and the unique cultural and healthcare context in Tehran may limit the generalizability of the findings to other regions. These limitations suggest the need for future research with larger, more diverse samples and extended follow-up periods to confirm and expand these findings.

Conclusion

In conclusion, Reality Therapy demonstrated notable efficacy as a therapeutic approach for adolescents with coagulation disorders. The improvements in distress tolerance and cognitive flexibility, along with the sustainability of these gains over time, underscore the potential of Reality Therapy to contribute positively to the psychological well-being of this specific population. These findings may have implications for the development of targeted interventions for adolescents with chronic illnesses, emphasizing the importance of addressing psychological adaptation and distress tolerance in addition to medical management. The study contributes to the growing body of literature on therapeutic interventions for adolescents with chronic illnesses, shedding light on the potential benefits of Reality Therapy in addressing psychological challenges associated with coagulation disorders. Further research could explore the long-term impact of Reality Therapy on various aspects of adolescents' lives and consider the generalizability of these findings to broader populations.

Conflict of Interest

Authors declare that they have no competing interests.

Ethical Approval

In conducting this research, we followed the ethical principles delineated by the Ethics Committee for Research at the Science and Research Branch of Islamic Azad University. This adherence is evident through our compliance with the ethical code [IR.IAU.SRB.REC.1401.387].

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