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Investigating the Effect of Stress Inoculation Training on the Emotional Adjustment of Male Junior High School Students: A Quasi-experimental Study

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Abstract

Background: In recent years, psychological pressures and social challenges have significantly impacted students' mental health. To address these issues and enhance psychological resilience, various methods aimed at improving adolescents' emotional adjustment have emerged.

Objectives: The present study aimed to evaluate the effects of stress inoculation training (SIT) on the emotional adjustment of male junior high school students.

Methods: This quasi-experimental clinical trial used a pre/post-test design among 74 male junior high school students (grades 7 - 9) in Neyshabur during 2023 - 2024. Two randomly selected schools were assigned as intervention and control groups. Based on Altman's nomogram, 74 students were recruited, and 70 (35 per group) completed the study. Data were collected using a demographic questionnaire and the 28-item Emotional Adjustment Scale with two subscales: Arousal regulation and hopelessness/positive thinking. The intervention group underwent eight 60-minute SIT sessions across two months. Both groups were assessed at pre-test, post-test, and one-month follow-up. Data were analyzed using SPSS-26.

Results: The SIT significantly improved arousal regulation, hopelessness/positive thinking, and overall emotional adjustment in the intervention group. Specifically, the mean score for disruption of emotional and physiological arousal regulation increased significantly by 1.02 ± 7.83 units immediately after the intervention ($P < 0.001$) and by 0.99 ± 10.46 units one month later. The mean score for hopelessness/positive thinking rose by 1.12 ± 9.54 units post-intervention ($P < 0.001$) and by 1.05 ± 12.91 units after one month. Similarly, emotional adjustment scores increased by 1.95 ± 17.37 units after the intervention ($P < 0.001$) and by 1.81 ± 23.37 units one month later.

Conclusions: The SIT significantly improved emotional and physiological arousal regulation, as well as optimism and emotional adjustment among students, with effects lasting up to one month post-intervention. These results affirm the training's effectiveness in enhancing the emotional well-being of junior high school students.

Keywords: Emotional Adjustment, Emotional Arousal, Hopelessness, Male Students, Stress Inoculation Training

1. Background

Adolescence is one of the most important stages of human development, during which people undergo profound cognitive, social, and physical changes (1). This period, which is between childhood and adulthood, is a time when individuals face numerous crises in their search for identity and social status (2). The high population of adolescents in the world, and especially in Iran where about 11 million of the country's population are adolescents, makes it urgent to identify the challenges and issues of this group of people and

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provide appropriate conditions for their psychological, emotional, and physical development (3, 4). Adolescence is a period that is accompanied by rapid physical and hormonal changes that can create many emotional and behavioral challenges for adolescents. Emotional instability is one of the issues that is particularly problematic in this age group (5). This emotional instability can be exacerbated by various factors such as hormonal changes, social and academic pressures, and the search for identity and status among peers (6). Such factors, without emotional management skills, can lead to problems such as anxiety, depression, and high-risk behaviors (7). Meanwhile, emotional adjustment or balance, which is considered one of the main aspects of personality, plays an important role in reducing these instabilities (8). Emotional adjustment or balance refers to the ability to manage and control feelings and emotions. This characteristic is considered an important component of personality structure in various psychological models, including the Big Five personality model. It also plays a decisive role in mental health and quality of life (9, 10). People with higher emotional adjustment usually perform better in the face of life challenges and feel more satisfied with their lives (11). Conversely, the inability to manage emotions can lead to various psychological, emotional, and social problems (12). Many researchers and psychologists have emphasized the importance of educational and counseling programs to promote emotional adjustment in adolescents (13). One of the effective approaches in this regard is stress inoculation training (SIT), which was first introduced by Donald Meichenbaum in 1985. This method, which is based on the medical inoculation model, helps to strengthen people's "psychological antibodies" or coping skills by exposing them to stressful situations (14). The goal of this method is to help people develop skills that enable them to manage or reduce stress and improve emotional adjustment in challenging situations (15). Stress inoculation typically involves three main stages. The first stage is familiarization with the concept of stress and its effects on the body and mind (16). In this stage, people are introduced to the nature of stress, its symptoms, and its negative effects on life. The second stage is to teach people coping techniques, which include deep breathing techniques, relaxation exercises, positive visualization, and problem-solving techniques. These techniques help people to maintain calmness when faced with stressful situations. The third stage involves practicing and applying the learned techniques in real-life situations, where people can strengthen their skills in dealing with stress through repetition and practice in challenging environments (16, 17). Various studies have shown the positive effects of SIT on reducing anxiety, improving emotional adjustment, and increasing mental health. In one study, Narimisaei et al. found that this type of training had a positive and significant effect on the management of positive/negative emotions in male adolescents (6). Another study conducted by Aghdasi et al. showed that SIT helped to reduce the students' exam anxiety. However, this study failed to show a direct effect of SIT on improving the academic performance of students, which is likely due to the short training period (six sessions) and the inability to comprehensively cover the topics (18). Another study by Reshnoo et al. showed that SIT contributed to the students' academic vitality and enthusiasm. However, although this study was conducted virtually and did not have a follow-up phase, its results confirmed the importance of SIT in improving academic experiences (19).

2. Objectives

In regard to these studies, we should note that their target group has been mainly female and college students, with less attention being paid to male adolescents. On the other hand, due to the virtual implementation of training sessions in some studies, the results may have been affected by limitations of using IT technology. Since many schools of psychology emphasize the impact of life experiences during adolescence on personality formation and mental health, addressing issues such as emotional adjustment during this sensitive period is very important. Weakness in emotional adjustment can lead to increased stress and psychological problems such as anxiety, depression, and even high-risk behaviors. Therefore, developing educational programs to strengthen these skills is a practical solution to deal with these problems and improve the mental health of adolescents. Therefore, the present study aimed to investigate the effect of SIT on the emotional adjustment of male junior high school students.

3. Methods

This quasi-experimental study employed a pre-test/post-test design. Two schools were randomly selected from the list of eligible junior high schools in Neyshabur. However, full individual randomization within schools was not feasible due to timetable conflicts and administrative restrictions identified by school authorities. Therefore, a quasi-experimental allocation at the school level was adopted. The statistical population of this study included all male high school students in the city of Neyshabur during the academic year 2023 - 2024. Inclusion criteria were: Age range of 12 to 16 years, willingness to participate in the stress inoculation program, no concurrent use of other psychological and psychotherapy services, no psychiatric disorder, and no use of psychiatric medications (based on self-report). Exclusion criteria included: Dissatisfaction with continuing to participate in the study, absence from more than two training sessions, and inability to complete educational programs and assignments. The required sample size was calculated to be 74 participants (37 in each group) based on Altman's nomogram, considering a test power of 0.80 and a standard deviation of emotional adjustment derived from a similar study conducted by Borhani et al. (20). The estimated number already accounted for potential attrition. During the study, two participants from each group were lost to non-attendance, resulting in a final analyzed sample of 70 students (35 per group). To select the sample, two junior high schools were randomly selected from the high schools of Neyshabur city, one of which was assigned as the control group and the other as the intervention group. Data collection tools included a demographic questionnaire and an Emotional Adjustment Scale. The demographic questionnaire covered information such as age, class, history of physical and mental illnesses, medication use, use of psychological services and counseling, economic status, household size, and education level of family. The Emotional Adjustment Scale by Rubio et al. (2007) was used in this study to assess emotional adjustment. This scale consists of 28 questions in two subscales and is scored based on a six-point Likert scale ranging from strongly agree (score 1) to strongly disagree (score 6). This tool measures an individual's tendency to regulate and maintain emotion in the face of stressful situations. Items 21, 25, and 28 in this scale are scored in reverse. This scale also covers several dimensions including disruption of emotional and physiological arousal regulation (questions 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 17, 21) and hopelessness/positive thinking (questions 6, 12, 14, 15, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28). Scores on this scale range from 28 to 168, with higher scores indicating stronger emotional adjustment (21). According to the study of Rubio et al., the correlation of this scale with the Eysenck Personality Inventory (EPQ-A N) and the emotional adjustment subscale of the Big Five Personality Questionnaire (BFQ) is 0.86 and 0.77, respectively. The Cronbach's alpha coefficient for this scale has also been reported at 0.87 (21). The psychometric properties of this scale have been investigated in Iran by Shokri et al. and the internal consistency coefficients of 0.84 and 0.91 have been calculated for its various subscales (22). After making necessary arrangements with the selected high schools, the emotional adjustment scale was first distributed among all students. Those students who obtained the lowest scores (indicating low emotional adjustment) were selected to participate in the study, so that a total of 70 students (including 35 from each school at seventh, eighth, and ninth grades) were selected. In the next stage, the SIT was implemented for the intervention group by the researcher during 8 (60-minute) training sessions over a period of 2 months (Table 1). The training sessions were held at schools outside the students' main education time. Each session included exercises and assignments related to the topic of that session. The training consisted of three phases: The conceptualization phase, acquisition and rehearsal phase, and the application and follow-through phase. The control group did not receive any intervention, but after the study, the content of training sessions was made available to the students in the control group. In order to evaluate the effect of training, students in both groups were asked to complete the emotional adjustment scale immediately after the end of the intervention and one month later. This enabled us to compare and evaluate the effect of SIT on the emotional management of students over a longer period of time. The reason for the one-month follow-up was to examine whether the changes made in the students' emotional adjustment after the training were in effect a month later. It also helped to examine the long-term impact of the intervention and the ability of students to

Table 1. Stress Inoculation Training Sessions

Sessions	Content
1	Introduction and familiarization, explanation of group goals and rules, and conceptualization and description of stress, its symptoms and its consequences
2	Relaxation and stress relief training
3	Guided imagery training
4	Training on how to deal with negative thoughts and the role of thoughts in creating stress
5	Training on guided self-talk and the role of negative self-talk in creating stress
6	Training on thought concentration and attention redirection techniques
7	Training on problem solving and anger management skills
8	Practice of skills learned in previous sessions and the need to apply them when dealing with stressful situations, summarizing the material and conclusion

continuously use the learned skills. To prevent potential control group contamination, all post-test and follow-up assessments were completed and data sets locked before any SIT training materials were provided to the control group.

Data were analyzed using SPSS-26 software with descriptive statistics and analytical tests. The ANOVA test was used to compare the mean values in the case of normal data distribution, and the Kruskal-Wallis test was used in the case of abnormal data distribution. The chi-square test was also used to analyze the qualitative data. Before conducting the main analyses, all demographic variables (age, grade level, father's education, income level, and household size) were compared between groups. All showed no significant baseline difference except household size ($P = 0.042$). Therefore, to control for its potential confounding effect, a repeated measures ANCOVA was performed with household size entered as a covariate.

4. Results

The findings showed no significant difference between the two groups in terms of the mean age of participants ($P = 0.054$), their father's education ($P = 0.867$), their educational level ($P = 0.116$), and their income level ($P = 0.728$). However, there was a significant difference between them in terms of the household variable ($P = 0.042$) (Table 2).

Among all demographic variables, only household size differed significantly between groups ($P = 0.042$). To account for this difference, all outcome analyses were rerun using a repeated measures ANCOVA with household size as a covariate. After this adjustment, all main and interaction effects of SIT remained statistically significant (e.g., time × group: $F[2, 134] = 65.608$, $P < 0.0001$), confirming the robustness of the findings. As shown in Table 3, there was no statistically significant difference between the two groups in terms of the mean score of disruption of emotional and physiological arousal regulation before the intervention ($P = 0.145$), but a statistically significant difference was observed between the two groups in this regard immediately after and one month after the intervention ($P < 0.001$). After the intervention, the mean score of disruption of emotional and physiological arousal regulation was higher in the intervention group compared to the control group. The results also showed no statistically significant difference between the two groups in terms of the mean score of hopelessness/positive thinking before the intervention ($P = 0.243$). However, a statistically significant difference was observed between the two groups in this regard immediately after and one month after the intervention ($P < 0.001$). After the intervention, the mean score of hopelessness/positive thinking was higher in the intervention group compared to the control group. We also found no statistically significant difference between the two groups in terms of the mean score of emotional adjustment before the intervention ($P = 0.137$), but a statistically significant difference was observed between the two groups in this regard immediately after and one month after the intervention ($P < 0.001$).

To control the effect of the confounding variable (household size) and to examine the trend of changes in the mean score of disruption of emotional and physiological arousal regulation, hopelessness/positive thinking, and emotional adjustment on three occasions, a repeated measures analysis of variance was performed. The results showed that the mean changes in the score of disruption of emotional and

Table 2. Comparison of Demographic Characteristics Between the Intervention and Control Groups [a]

Variables	Control	Intervention	Statistic	P-Value
Father's education [b]			1.452	0.867
Illiterate	3 (8.6)	5 (14.3)		
Under diploma	10 (28.6)	10 (28.6)		
Diploma	14 (40)	10 (28.6)		
Bachelor's degree	6 (17.1)	8 (22.9)		
Master's degree	2 (5.7)	2 (5.7)		
Education level (grade) [b]			4.30	0.116
Seventh	10 (28.6)	15 (42.9)		
Eighth	10 (28.6)	13 (37.1)		
Ninth	15 (42.9)	7 (20)		
Income level [b]			0.850	0.728
Low	9 (25.7)	10 (28.6)		
Average	18 (51.4)	20 (57.1)		
High	8 (22.9)	5 (14.3)		
Age (y) [c]	14.14 ± 0.845	13.74 ± 0.817	-1.926	0.054
Household [c]	4.03 ± 0.854	3.57 ± 0.979	-2.037	0.042

[a] Values are expressed as No. (%) or mean ± SD.

[b] Chi-square test.

[c] Mann-Whitney U test.

physiological arousal regulation were significant in all samples (P = 0.004), and the adjusted mean changes in the score of disruption of emotional and physiological arousal regulation between the two groups were statistically significant (P < 0.001). The interaction effect of time and group (P < 0.001) was also significant, showing a significant difference in time changes between the two groups. The results also showed that the mean changes in the score of hopelessness/positive thinking were significant in all samples (P = 0.004), and the adjusted mean changes in the score of hopelessness/positive thinking between the groups were statistically significant (P < 0.001). The interaction effect of time and group (P < 0.001) was also significant, showing a significant difference in the time changes between the two groups. Moreover, the results showed that the mean changes in the score of emotional adjustment were significant in all samples (P = 0.001), showing a significant difference between the two groups in terms of the adjusted mean score of changes in emotional adjustment (P < 0.001). The interaction effect of time and group (P < 0.001) was also significant, showing a significant difference in the time changes between the two groups (Table 4).

To examine time changes more precisely, we used the Bonferroni paired comparison test. In the intervention group, the mean score of disruption of emotional and physiological arousal regulation significantly increased by 1.02 ± 7.83 units after the intervention compared to before the intervention. A significant increase of 0.99 ± 10.46 units was also observed in the mean score of disruption of emotional and physiological arousal regulation one month later in the intervention group (P < 0.001). Additionally, a significant increase of 0.67 ± 2.63 units (P = 0.001) was observed in this score one month after the intervention compared to immediately after the intervention. In the control group, the changes were not significant. For the mean score of hopelessness/positive thinking in the intervention group, a significant increase of 1.12 ± 9.54 units and 1.05 ± 12.91 units was observed after the intervention (P < 0.001) and one month later (P < 0.001), respectively. Also, one month after the intervention, a significant increase of 0.64 ± 3.37 units (P < 0.001) in the score of hopelessness/positive thinking was observed in the intervention group compared to the post-intervention. In the control group, the mean score of hopelessness/positive thinking was 0.60 ± 1.77 after the intervention (P = 0.018) and 0.49 ± 1.77 (P = 0.003) one

Table 3. Comparison of the Mean Score and Standard Deviation of Disruption of Emotional and Physiological Arousal Regulation, Hopelessness/Positive Thinking, and Emotional Adjustment Between the Two Control and Intervention Groups [a]

Variables	Control	Intervention	Independent *t*-test	
			Statistic	Significance
Disruption of emotional and physiological arousal regulation				
Before the intervention	30.6 ± 3.76	28.8 ± 6.17	-1.473	0.145
Immediately after the intervention	29.34 ± 3.61	36.62 ± 7.39	5.236	0.0001
One month after the intervention	30.34 ± 3.58	39.25 ± 6.18	7.384	0.0001
Hopelessness/positive thinking				
Before the intervention	30.0 ± 3.74	35.62 ± 5.78	-1.178	0.243
Immediately after the intervention	38.77 ± 4.47	45.17 ± 7.64	4.273	0.0001
One month after the intervention	40.54 ± 3.06	48.54 ± 6.47	6.609	0.0001
Emotional adjustment				
Before the intervention	67.6 ± 6.41	62.42 ± 10.68	-1.506	0.137
Immediately after the intervention	68.11 ± 5.83	81.8 ± 13.84	5.387	0.0001
One month after the intervention	70.88 ± 4.53	87.8 ± 11.55	8.061	0.0001

[a] Values are expressed as mean ± SD.

Table 4. Comparison of Mean Changes and Standard Deviations of Emotional/Physiological Arousal Regulation, Hopelessness/Positive Thinking, and Emotional Adjustment Between the Intervention and Control Groups (with Partial η^2 Values)

Variables	Mean ± SD (1)	Mean ± SD (2)	Mean ± SD (3)	Adjusted Mean ± SD	Analysis of Variance with Repeated Measures		
					Intragroup	Intergroup	Time×Group
Emotional /physical arousal					F = 6.468; P = 0.004; Partial η^2 = 0.008	F = 20.129; P <0.001; Partial η^2 = 0.231	F = 58.313; P<0.001; Partial η^2 = 0.465
Intervention	6.17 ± 28.8	7.39 ± 36.62	6.18 ± 39.25	35.092 ± 0.807			
Control	3.76 ± 30.6	3.61 ± 29.34	3.58 ± 30.34	0.807 ± 29.899			
Hopelessness/ positive thinking					F = 6.573; P = 0.004; Partial η^2 = 0.089	F = 17.774; P<0.001; Partial η^2 = 0.210	F = 38.027; P<0.001; Partial η^2 = 0.362
Intervention	5.78 ± 35.62	7.64 ± 45.17	6.47 ± 48.54	0.797 ± 43.351			
Control	3.74 ± 37	4.47 ± 38.77	3.06 ± 40.54	0.797 ± 38.534			
Emotional adjustment					F = 9.054; P = 0.001; Partial η^2 = 0.119	F = 24.413; P<0.001; Partial η^2 = 0.267	F = 65.608; P<0.001; Partial η^2 = 0.495
Intervention	10.68 ± 64.42	13.84 ± 81.8	11.55 ± 87.8	1.413 ± 78.443			
Control	6.41 ± 67.6	5.83 ± 68.11	4.53 ± 70.88	1.413 ± 68.433			

month later. In terms of the mean score of emotional adjustment in the intervention group, a significant increase of 1.95 ± 17.37 units (P < 0.001) and 1.81 ± 23.37 units (P < 0.001) was observed immediately after the intervention and one month later. Also, one month after the intervention, a significant increase of 1.03 ± 6 units (P < 0.001) was observed in this score in the intervention group compared to the post-intervention. In the control group, the changes in this score were not significant, but a significant increase of 0.84 ± 3.29 units (P = 0.001)

Table 5. Results of Pairwise Comparison of the Mean and Standard Deviation of Disruption of Emotional and Physiological Arousal Regulation, Hopelessness/Positive Thinking, and Emotional Adjustment in Temporal Changes by Groups

Variables and Time	Control			Intervention		
	Mean ± SD	P-Value	Cohen's d	Mean ± SD	P-Value	Cohen's d
Physical/mental arousal						
Before intervention						
After intervention	0.504 ± 0.053	1.257	2.49	1.019 ± -7.829	0.0001	7.68
One month later	0.436 ± 0.999	0.257	0.589	0.991 ± -10.457	0.0001	10.55
After intervention						
One month later	0.402 ± 0.054	-1	2.48	0.669 ± -2.629	0.001	3.92
Hopelessness/positive thinking						
Before intervention						
After intervention	0.603 ± 0.018	-1.771	2.94	1.120 ± -9.543	0.0001	8.52
One month later	0.589 ± 0.0001	-3.543	6.01	1.054 ± -12.914	0.0001	12.25
After intervention						
One month later	0.487 ± 0.003	-1.771	3.63	0.644 ± -3.371	0.0001	5.23
Emotional adjustment						
Before intervention						
After intervention	0.738 ± 0.999	-0.514	0.69	1.95 ± -17.371	0.0001	8.90
One month later	0.842 ± 0.001	-3.286	3.90	1.81 ± -23.371	0.0001	12.91
After intervention						
One month later	0.549 ± 0.0001	-2.771	5.04	1.03 ± -6	0.0001	5.82

and 0.55 ± 2.77 units ($P < 0.001$) was observed compared to post-intervention and one month later, respectively (Table 5).

5. Discussion

The present study was conducted to investigate the effect of SIT on the emotional adjustment of male junior high school students. The results showed that before the intervention, the mean score of disruption of emotional and physiological arousal regulation was not significantly different between the two groups, but after the intervention, a significant difference was observed in these variables between the two groups. These findings indicate that SIT has been able to reduce emotional and physical arousal of students by strengthening their emotion and stress management skills. In particular, this method helped students to better manage their emotional and physical reactions by creating a better awareness about the sources of stress, teaching them effective coping skills, and encouraging them to undertake ongoing practice (16). The results of this study are consistent with previous research. For instance, Ahmadi et al. showed reduced anxiety and increased resilience after such training (23). Similar studies in pregnant women and people with mental health problems have also shown improved mental health and quality of life following similar training (13, 24). The findings of Bersamin and Adib-Rad et al. also confirm the positive effect of these trainings on the anxiety of students before competition (25, 26). Currently, there is limited evidence directly contrasting these findings, and available studies generally report consistent results. In terms of the mean score of disruption of emotional and physiological arousal regulation one month after the intervention, we found a statistically significant difference between the two groups, indicating a continued effect of intervention over time. The SIT has helped students learn effective coping strategies by identifying sources of stress and using them in real-life situations (27). The results of the present study are consistent with other studies conducted in this area. For example, Sterling et al. showed that combining SIT with exercise training significantly reduced pain-related disability in patients with neck disorders compared to exercise training alone. They also showed that these effects were sustained for up to 12 months (28). One reason for the persistence of these effects can be attributed to this type of training, which focuses mainly on developing practical skills for stress management and emotion

regulation that help individuals to apply these skills in different situations (29). In contrast to our findings, Harper reported no significant effects of SIT among elderly participants (mean age ≈ 70 years). However, Myers and Harper's intervention consisted of only four unstructured sessions delivered to individuals with considerable health and mobility limitations. In the present study, adolescents (12 - 16 years) received eight structured sessions consistent with Meichenbaum's three-phase model in a school context. Developmental characteristics such as greater neuroplasticity, higher learning capacity, and more opportunities for daily skill practice may explain the stronger effects of SIT observed in our sample (30). Possible inconsistencies can be attributed to the diseases, aging, loneliness, and separation from family, which might have affected the results of the above study. Our results showed that initially, the mean score of hopelessness/positive thinking was similar in the two groups, but after the intervention and a month later, significant changes in this score were observed so that students in the intervention group obtained higher scores than the control group. Our findings also indicated the positive effect of SIT on reducing hopelessness and positive thinking by helping individuals to learn more effective coping skills and manage stress and life problems by identifying and changing negative and unrealistic thoughts. As a result, students in the present study were able to face challenges more realistically and gain a greater sense of control and understanding over their emotions (16). Studies have shown that similar psychological interventions can improve mental health and reduce the sense of hopelessness (31). Psychological exercises have also been found to be effective in improving positive attitudes and reducing hopelessness (32). Marchetti et al. in a study showed the effect of these interventions on reducing hopelessness (33), while Leontopoulou pointed out an increase in the positive thinking of individuals in their study (34). No studies were found to undermine our results, which emphasize the importance of psychological interventions in improving mental health and reducing the sense of hopelessness. The effectiveness of SIT on the sense of hopelessness and positive thinking can be attributed to this method of training, which focuses on improving coping skills and changing negative thought patterns. Inoculation training helps individuals to better cope with stress and life challenges by strengthening their capabilities through techniques such as changing negative thoughts and using stress management skills. This process leads to a decrease in hopelessness and an increase in positive thinking. As shown in previous studies, similar psychological interventions have also been able to increase positive thinking and hope in individuals, leading to improved mental health in them (27, 35). The results of the present study showed that one month after the intervention, the mean scores of study variables increased significantly, indicating the continuous effect of intervention over time. These findings are similar to studies that confirm the effect of psychological interventions on improving emotional health and reducing hopelessness (36). In the control group, an increase in the score of hopelessness and positive thinking was observed after the intervention, but these changes were not significant one month later. This indicates that the control group did not experience the effects of intervention over time, which could be due to other environmental or psychological factors. Wilms et al. and Vojt et al. have also pointed out that the use of appropriate intervention can improve emotional health (37, 38). Our results showed that, after the SIT, the intervention group experienced a significant reduction in emotional adjustment, and these changes were sustained one month later. This is because SIT helps people to learn effective coping skills to manage their stress and emotions, which improve their emotional adjustment. These findings are consistent with the results of similar studies. For instance, Moltrecht et al. showed that psychological interventions can help to reduce emotional adjustment (39). Another study also confirmed the effect of coping skills training on improving emotional adjustment (40). These interventions strengthen coping skills and emotion regulation, enabling individuals to deal with stress and challenges in healthier ways and better manage negative emotions (39). The results of the present study showed that the mean score of emotional adjustment in the intervention group increased significantly after the intervention and these changes were sustained a month later. In contrast, no significant changes were observed in the control group in this regard after the intervention, but a significant increase in the mean score of emotional adjustment was observed one month later. These changes may be related to environmental

factors or new experiences of students in the control group. These results are consistent with the findings of other studies. For instance, Plumb Vilardaga et al. showed that psychological interventions can reduce emotional adjustment (41). Waters and Charles Higgins also showed the positive effect of educational interventions on reducing emotional tensions (42). Overall, these results indicate that educational interventions and coping skills can have positive effects on improving the emotional adjustment and reducing emotional adjustment of individuals. These findings emphasize the importance of psychological interventions and coping skills training such as stress inoculation in improving the emotional and mental health of students. To minimize potential bias arising from baseline differences, household size — identified as the only significantly different demographic variable between groups ($P = 0.042$) — was statistically controlled in the repeated measures ANCOVA. This adjustment confirmed that all main and interaction effects of the SIT remained significant, strengthening the internal validity of the findings and ensuring that the observed changes were not attributable to demographic confounding. Selecting samples from a specific geographical area and being limited to male students are among this study's limitations, which may reduce generalizability to other genders or regions. Gender and sociocultural factors can influence emotional expression and coping styles, affecting adolescents' responses to SIT (12, 43, 44). Using a self-report measure may also affect result accuracy; therefore, future studies should employ random sampling in more diverse contexts and longer follow-up periods to enhance generalizability.

Footnotes

Authors' Contribution: All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by E. J. and P. M. The first draft of the manuscript was written by S. R., I. T., and M. R. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflict of Interests Statement: The authors declare no conflict of interests.

Data Availability: The data of this study is available upon reasonable request from the corresponding author.

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