



The effect of cognitive-behavioral stress inoculation training on coping skills in female adolescents

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Introduction

Today, stress is recognized as the disease of the century. Studies indicate that, besides individual's age, status, or position, stress generally affects various aspects of mental, social and academic performance of people [1]. Consequences of stress include increased anxiety, depression, suicidal behavior, and poor academic and school performance [2]. Greenberg & Waltoti (1980) suggest that, whether positive or negative, stress causes a reaction in the body and affects cardiovascular, gastrointestinal, and musculoskeletal systems and subsequently, intellectual and cognitive framework in people [3].

Adolescence is referred to as a period of crisis, storm and stress, or renaissance; it is one of

Abstract

This study aimed to investigate the efficacy of cognitive-behavioral stress inoculation training on increasing coping skills in female adolescent students. This quasi-experimental applied study had pretest-posttest and control group. A total of 30 students were selected by two-stage cluster sampling method and randomly divided into trial and control groups. The trial group received 10 sessions of educational intervention, and the control was placed on a waiting list. Data were collected through Endler & Parker coping styles and Cohen's perceived stress questionnaires in pretest-posttest stages, and were analyzed in SPSS-18 software using descriptive statistics and univariate covariance analysis. Study results demonstrated effectiveness of cognitive-behavioral stress inoculation training on students' coping styles. However, this educational approach showed a significant effect on increasing problem-based coping styles, but was ineffective on emotion-based coping styles in students. It can be asserted that stress inoculation programs can be used to strengthen integrated and flexible coping skills in high school students.

Keywords: Adolescent, Coping, Female, Skill, Stress

the most stressful periods in everyone's life. For adolescents, transition from this period is accompanied by difficult events and huge problems; and sometimes they can be excessively damaging and traumatic [4]. Although rapid technological and industrial developments and sudden and broad changes in societies and generations have dramatically increased range of knowledge and capabilities of today's adolescents, compared to the past, they have also equally added to their mental pressures and stress [5]. Adolescents encounter many important life challenges such as developing an identity, formation of personality, independence from family, relationships with peer groups, academic decisions. In this period, individuals have to

play their social roles in peer groups and in relationships with the opposite sex, and learn social skills, meet requirements for attending educational institutions, and decide about their future occupation. Thus, experiencing stress in adolescence is inevitable, and requires skills to cope for an adaptive change in this period. It is necessary to learn cognitive-behavioral strategies appropriate to adolescent's cognitive status for effective and adaptive transition from this period [6]. Lack of adaptive coping skills may be associated with negative outcomes such as greater behavioral problems, low self-esteem, depression, conflict with adolescence, academic failure, and poor social functioning [7]. In this regard [1], it has been shown that training stress inoculation and effective coping strategies can reduce anxiety in students, and subsequently enhance their academic performance.

Stress Inoculation Training (SIT) is recognized as a stress management strategy, in which people are taught cognitive-behavioral coping skills to control behavioral and psychological reactions in stressful situations. Stress inoculation training program has been designed as a rapid short-term intervention to prevent psychological symptoms associated with stress, and its effectiveness and efficacy has been demonstrated in several studies. For instance: studies have shown [8] that stress inoculation approach plays a significant role in adolescents' adjustment, increased coping skills, and academic performance. Hekmatpour studied the relationship between stress and coping styles in students, and found a significant relationship between stress and problem-oriented, emotion-oriented, and avoidance-oriented coping styles. Sultani et al. [10] showed that stress management training has a significant effect on academic achievements of high school girls. Also, Davood Mohammadi et al. [11] observed a relationship between 3 types of problem-solving styles (efficient, inefficient, and asking others) and emotion-management capability in students.

This approach was proposed by Mikenbam in 1986, in which stress is considered to have an

interactive nature. This approach attempts to provide patients with necessary training to reduce and treat stress and its associated problems over 3 training stages, including: 1) conceptualization, 2) skills acquisition and rehearsal, and 3) application and follow through. First, training is given to participants on sources of stress [12]. For instance, the relationship of stress with irrational thinking and possible methods to reduce physical and mental stress, and then coping skills are directed toward specific fostered stressors [The Persian sentence is vague]. For instance, relaxation and cognitive restructuring techniques are used. The final stage involves placement of participants in real or simulated situations to rehearse and apply coping skills [13]. Considering the importance of stress management and its relationship with adolescents' mental health and academic progress, assessment of efficacy of these interventions can be beneficial in arriving at a broad and efficient stress control model. Furthermore, a more effective model can be found for stress prevention and management in people in this age group. Accordingly, the present study aimed to examine the efficacy of this method in relation to increasing adolescent students' coping skills.

Method

This is a quasi-experimental study with pretest-posttest approach, using trial and control groups. Statistical population (N=180) included all female students of high school in Norabad-Mamasani city, Fars province, Iran in 2011-2012. Using cluster sampling method, one area of this town was selected, and from this area, one high school was randomly chosen. Then, perceived stress of all students was measured using perceived stress scale, and students with moderate to high level of perceived stress were thus selected as samples. Next, 30 students were randomly selected by drawing lots as study subjects, who were then randomly divided into equal groups of control and trial. Data were collected using the following tools:

1- Coping Inventory for Stressful Situations (CISS):

This scale was designed by Endler & Parker in 1990 and contains 48 items. Each item is ranked according to 5-option Likert scale. This scale measures three main coping behavior domains, including: problem-oriented, emotion-oriented, and avoidance-oriented, and higher score in any one of these domains means that certain domain is used more by the participant. Endler & Parker reported reliability coefficient of 0.9 for problem-oriented style, 0.85 for emotion-oriented style, and 0.82 for avoidance-oriented style [14]. In Iran, internal consistency of this tool was found by Piri & Shahrarai [15] 0.81 for problem-oriented style, 0.85 for emotion-oriented, and 0.80 for avoidance-oriented style 0.80. Using this scale on students, Razavi, Kazemi & Mohammadi [16] reported Cronbach's alpha of 0.92 for problem-oriented, 0.83 for emotion-oriented, and 0.79 for avoidance-oriented style.

2- Perceived stress scale:

Perceived Stress Scale was designed by Cohen in 1983, and includes three versions of: 4, 10 and 14 items. It is used to measure perceived stress over the past month. The paper and pencil scale and reading and writing literacy suffice to complete this questionnaire. In this study, the 4-item version was used. Scoring is according to 5-option Likert scale, and higher scores indicate higher level of stress experienced by the individual over the past month. Designers reported Cronbach's alpha or internal consistency between 0.74 and 0.86 for this questionnaire. Cohen et al. [17], reported Cronbach's alpha of 0.86 in the U.S., and Ghorbani et al. [18], reported 0.81 in Iran, which indicates favorable internal consistency. To conduct the study, after selecting schools, one of the researchers obtained permission from the school principal and the class teacher for attending the class and implementing the questionnaire and stress inoculation training program. Then, students were briefed about the study objectives, completion of questionnaire, and training program. First, students' stress was assessed using perceived stress scale, and 30

students with the highest level of perceived stress were selected (those with one standard deviation above mean were selected). Following completion of pretests, only the trial group received 10 training sessions (independent variable) with stress inoculation approach, lasting 60 minutes, and the control group received no training. Posttest was conducted in both groups following completion of training sessions. Sessions were conducted in groups using speeches and group discussion, and according to tasks provided in sessions and in educational package between sessions.

The objectives of stress inoculation training sessions were as follows:

Session 1: Introduction, explaining objectives and group rules, stress conceptualization and description, and symptoms and consequences of stress in causing illness and reducing health.

Session 2: Relaxation and stress relief training
Session 3: Relaxation and stress relief training, practical and theoretical definition of stress.

Session 4: Introduction to cognitive concepts, role of thoughts in generating stress, and the relationship of thoughts with emotions and behaviors, introducing automatic negative characteristics, and introducing cognitive errors.

Session 5: Behavioral techniques training, such as: deep breathing, exercising, and mental imaging.

Session 6: Coping with negative thoughts training, with brief review of previous session topics, review of tasks and problem solving, necessary steps to cope with negative thoughts by knowing them, response to negative thoughts and action to test these thoughts.

Session 7: Instructional self-talk training, and role of negative self-talk in creating stress.

Session 8: Focus thinking and distraction techniques.

Session 9: Problem-solving and its practice

Session 10: Practicing skills learnt from previous sessions, and the need to use these skills in stressful situations

Data obtained were analyzed with SPSS-

18 software using descriptive and inferential statistics (univariate covariance analysis). The effect of pretest control variables was removed from posttest scores and two groups were then compared according to remaining scores.

Results

The present study recruited 30 female senior high school students aged 14 to 15 years. Results of student, correlation coefficient and chi-square tests showed no significant difference between trial and control groups in demographic variables of age, socioeconomic level, and birth order. Only pretest was controlled as a confounding variable.

Descriptive statistics of problem-oriented coping skills showed no significant difference between the two groups in pretest. In the posttest stage, mean and standard deviation were 99.2 and 11.55 in the control group, and 98.53 and 12.24 in the trial group, which indicates increased distribution of scores in the control group, due to factor of learning in some participants.

Pretest stage mean and standard deviation were 47.33 ± 12.4 and 44.93 ± 10.4 , respectively in the control and the trial groups for emotion-oriented skill, and 53.8 ± 11.81 and 56.8 ± 14.03 in the posttest stage. These results indicate reduced distribution of scores in the control group, and increased distribution in the trial group, which suggests a gap between scores.

Table 1 presents leven test results based on

equality of variances and other assumptions (linear relationship and normal distribution), together with covariance analysis results in posttest stage, investigating the effectiveness of stress inoculation method on overall coping styles in female students.

Table 1 shows that although the significant level of 0.05 is indicative of rejecting variance equality assumption, it is not difficult to do so because of the equality of samples and variance test rigor (F test), especially when samples are equal [the Persian sentence is vague]. Also, the assumption of homogeneity of regression coefficient slope, and normal distribution according to Kolmogorov-Smirnov test has been established, and F shows linearity assumption of the relationship. Thus, covariance analysis can be used. Table 1 shows that hypothesis zero is rejected, and study hypothesis is thus confirmed, which means there is a significant difference in mean scores between the trial and the control groups. Therefore, it can be concluded that stress inoculation training has an increasing effect on overall coping skills in female students ($P=0.002$). The effect of this therapeutic intervention on coping styles is 0.47, which means 47% of variance of overall remaining score belongs to group membership or the effect of method applied. Statistical power is at favorable level of 0.98, which indicates adequacy of sample size.

Results of covariance analysis, investigating

Table 1 Ancova analysis results in coping styles

Index Variable	K-S-Z Sig		F Sig		Leven Test Sig		F(Regression)Sig		F(Ancova)	Sig
Coping styles	0.87	0.52	10.8	0.008	5.88	0.053	0.11	0.00	12.007	0.002

the effectiveness of stress inoculation approach on problem-oriented and emotion-oriented

coping styles in female students are presented in Tables 2 and 3.

Table 2 Ancova analysis results in problem-oriented coping skills

Index Variable	K-S-Z Sig		F Sig		Leven Test Sig		F(Regression)Sig		F(Ancova)	Sig
Coping styles	0.67	0.57	8.64	0.015	4.76	0.064	0.35	0.00	5.69	0.002

Tables 2 and 3 show that all necessary assumptions have been observed in using covariance analysis in relation to two dependent variables of emotion-oriented (Sig=0.063), and problem-oriented (Sig=0.06) coping styles. These results also confirm the effectiveness of intervention on female students' scores in problem-oriented coping style (Sig=0.002),

but its ineffectiveness on emotion-oriented coping style in posttest stage in the trial group compared to the control (Sig=0.06). The effect of this therapeutic intervention on problem-oriented coping style is 0.38, which means 38% of variance of overall remaining scores belongs to group membership or the effect of method applied.

Table 3 *Ancova analysis results in emotional-oriented coping skills*

Index Variable	K-S-Z	Sig	F	Sig	Leven Test	Sig	F(Regression)	Sig	F(Ancova)	Sig
Coping styles	0.81	0.52	28.30	0.00	2.39	0.060	0.5	0.00	4.53	0.006

Discussion

The present study aimed to investigate the efficacy of stress inoculation cognitive-behavioral training on coping styles in adolescent female students. The results showed the effectiveness of implementing weekly stress inoculation training programs on students' coping styles. These results are in line with those on Nancy Warren's [19] study on the effect of coping with stress training program on reduced stress response and increased coping skills, and also that of Hekmatpour's study [9]. Stress inoculation methods cause psychological and behavioral inoculation in people, so that they learn to influence their own coping capabilities by changing beliefs and self-talk about their performance in stressful situations. Accordingly, this approach prepares individuals and groups to face present and future highly-stressful situations through prior defenses or a set of coping skills, and individuals increase their resistance against stressful situations by building psychological antibodies or coping skills [20]. In this method, students learn to develop their stress coping levels by creating a sense of "already learnt skill" through successful experiences, and develop a defensive outlook, composed of skills and positive expectations that help them in facing stressful situations [12].

Other results showed that stress inoculation approach is effective in increasing students' problem-oriented coping skills, which agrees with the results of studies by Owla [21], Kampass et al. [22], and Kaffi [5] to show

that students that use problem-oriented styles in dealing with stress enjoy greater psychological health, and Mikenbam and Gest quoting Donald and Mobini [12] on the importance of stress management training, focused on client-therapist cooperation, discovering environmental stressors, and problem-solving training in adolescents, and Keri and Bartley [23] on stress control using thought termination (stop thinking) technique. Stress inoculation training shows adolescent students how stress affects them, and teaches them to perceive stressful situations as problems they can solve. This makes them have greater control over the environment around them, and to regard stressful situations less threatening. Moreover, encouraging students to use these techniques in their daily life leads to positive feedbacks, which reduces their avoidance from situations, and consequently, their learning pool does not reduce. This means that people with stress inoculation style focus on the problem itself when facing a problem, and plan how to solve it; they see the problem within their control. Thinking about the problem, and seeing it in control reduces stress, and low stress level leads to focusing on solving the problem.

Results on the effect of stress inoculation approach on increasing emotion-oriented skills in students showed rejection of this hypothesis. Sandler & Tinj [24] point out that although problem-oriented coping is generally associated with better psychological outcomes and avoidance-oriented or emotion-

oriented coping styles are poorly associated with mental health outcomes, nevertheless this is not always true. Their study also showed that although distraction is not a direct or problem-oriented or problem change coping style, it is an adaptive strategy in many situations. [Persian sentence is vague] Studying the effect of cognitive-behavioral therapies with relaxation and stress management on reducing emotional distress, Jeron [25] showed people that experience greater anxiety and stress use emotion-oriented rather than task-oriented strategies. This means that emotion-oriented coping strategies perform better in stressful events and stresses that are beyond our control and capabilities. It seems, since adolescents are not adequately trained in coping and problem-solving skills, and also, adolescents are capable of complex thinking, but are not adequately experienced to use such capabilities yet, use of interventions such as relaxation and positive self-talk can be effective in conditions with little effect on individual's performance [Persian sentence is vague]. Because of critical age of puberty, impulsiveness, and egocentrism, adolescents are less likely to think to find appropriate solutions, when faced with stressful situations. Perhaps, because they are more concerned about attracting attention, and thus they try to deal with stress by using irrational strategies. Therefore, they tend to use emotion-oriented strategies. For instance, a student that scores poorly in exam may focus on a deviated evaluation technique to reduce his stress. If the problem is not solved, one way to control stress is re-evaluation. To this end, the individual compares his position to others, and may conclude that his situation was not so bad after all [21]. However, besides study results, according to Sharidan & Radmacher theory, as quoted by Kaveh [26], emotion-oriented and problem-oriented coping styles are often used together, but conditions such as stressful situations, people's age, intelligence quotient, previous experiences can all influence use of either of these approaches. Lack of comparison of efficacy of stress inoculation training programs between sexes,

lack of attention to students' mental and intelligence profiles and screening for mental disorders can influence the efficacy of intervention programs, and is a limitation in this study.

Conclusion

It can be inferred from the present study results that training programs in the form of stress management approaches for adolescents, can be beneficial and effective in enhancing primary preventions and creating preventive coping skills. Thus, considering the importance of educational-interventional programs, it is recommended that future studies move toward design and development, localization, and updating stress management programs for adolescents.

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Contributions

Study design: ZS, AK, HS

Data collection and analysis: ZS, AK, HS, NGH

Manuscript preparation: ZS, AK, HS

Conflict of interest

"The authors declare that they have no competing interests."

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