ORIGINAL ARTICLE

The Effect of Coping Skills Training on Depression, Anxiety, Stress, and Self-Efficacy in Adolescents with Diabetes: A Randomized Controlled Trial

Mitra Edraki[1], MS; Masoume Rambod[2], PhD; Zahra Molazem[2], PhD

[1]Community Based Psychiatric Care Research Center, Department of Pediatrics, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran;
[2]Community Based Psychiatric Care Research Center, Department of Nursing, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran

Corresponding author:
Masoume Rambod, PhD; Department of Nursing, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Zand St., Nemazee Sq., 7193613119, Shiraz, Iran
Tel: +98 71 36474251; **Fax:** +98 71 36474252; **Email:** rambodma@yahoo.com

ABSTRACT

Background: Diabetes patients are at risk of psychosocial problems. Some interventions might decrease these problems. This study aimed to evaluate the effect of coping skills training on depression, anxiety, stress, and self-efficacy of adolescents with type I diabetes.

Methods: This randomized controlled trial with pre- and post-test design was performed in the diabetes clinic in Shiraz from June to November 2015. This study was conducted on 100 adolescents with type 1 diabetes who were randomly divided into an intervention (receiving coping skills training in groups for eight sessions) and a control group (usual care). Depression, Anxiety, and Stress Scales (42-items, scores=0-42) and General Self-Efficacy questionnaire (17-items, scores=17-85) were used. The variables were measured at baseline and two months after starting the intervention. Data were analyzed using SPSS, version 16 through Chi-square test, independent t–test, and paired t-test. P<0.05 was significant.

Results: After the intervention, the mean scores of depression, anxiety and stress in the intervention group were 5.41±4.58, 6.44±7.01, and 7.46±7.01, and in the control groups they were 19.73±11.80, 18.28±10.51, 21.10±10.94, respectively. Moreover, after the intervention, the mean scores of self-efficacy were 70.82±10.84, and 50.13±15.42 in the intervention and control groups, respectively. The results showed differences between the two groups regarding depression, anxiety, stress, and self-efficacy after starting the intervention (P<0.001).

Conclusion: As coping skills training reduced depression, anxiety, and stress and improved the patients' self-efficacy, the use of this intervention could be a part of community-based nursing practice for adolescents with diabetes and more research for improving evidence-based practice in this regard are warranted.

Trial Registration Number: IRCT201505011369N4

KEYWORDS: Adolescent, Anxiety, Depression, Diabetes mellitus, Self-efficacy

INTRODUCTION

Type 1 diabetes is a chronic disease that begins in childhood.[1] Adolescents with diabetes are faced with severe psychological problems.[2] It was reported that both anxiety disorders and elevated anxiety symptoms were common in patients with diabetes.[3] The prevalence of anxiety symptoms was also high among the adolescents with diabetes. In a study on adolescents and adults with diabetes, the prevalence rate of anxiety symptoms was 29.7%.[4] It was indicated that over 50 percent of adolescents with type 1 diabetes reported general and diabetes-specific stress. These kinds of stress led to higher HbA1c and poorer self-management activates and quality of life.[5]

In addition, diabetes is a risk factor for depression among the youth.[1] It was maintained that 53.6% of patients with type 2 diabetes experienced depression symptoms. Depression can lead to poor medication adherence in adolescents suffering from diabetes.[6, 7] Depressed adolescents with diabetes also had worse glycemic control.[8] One study indicated that approximately 30% of patients with diabetes showed depression and experienced lower levels of diabetes self-efficacy.[9] Self-efficacy is an important component in improving diabetes self-management skills.[10] Adolescents with type 1 diabetes and better self-efficacy reported a higher probability of reaching target diabetes control.[11]

Some of intervention such as coping strategies might decrease depression, anxiety, and stress in adolescents with diabetes. By coping skills training, the researchers can educate the patients regarding coping strategies.[12] Coping skills training is based on Bandura's (1986) social cognitive theory, which hypothesizes that practicing a new behavior, e.g. learning how to cope successfully with a problem, can improve self-efficacy and increase positive behaviors.[13] Therefore, increasing the individuals' self-efficacy might reduce their problems with psychosocial well-being. Researchers showed that coping and stress reactivity were associated with self-management and metabolic control, such as hemoglobin A1C, in adolescents with type 1 diabetes.[14] In fact, the aim of coping skills training is to improve competence and mastery by changing non-constructive coping styles and behaviors into more constructive behaviors.[12]

Based on the review of the literature, coping skills training program led to lower glycosylated hemoglobin and better self-efficacy. Moreover, it resulted in improvement of coping with diabetes, better diabetes self-efficacy, fewer depressive symptoms, and less parental control on school-aged children.[1] Proactive coping interventions improved all psychological (proactive coping and self-efficacy) and behavioral variables (self-care, diet, and physical activity) in the initial phase and maintained these improvements over 12 months in patients with diabetes.[15] The studies published up to now have focused on the effect of coping skills training on children, adults, or their families. In addition, these studies have examined the effect of coping skills training on other chronic diseases, such as chronic obstructive pulmonary disease[16] and HIV/AIDS.[17] However, only a limited number of studies have focused on the effect of coping skills training on the quality of life, stress, and coping self-efficacy in adolescents with type 1 diabetes.[18] The review of literature also revealed no studies assessing the effect of coping skills training on depression, anxiety, and stress among adolescents with type 1 diabetes. Therefore, the present study aimed to evaluate the effect of coping skills training on depression, anxiety, stress, and self-efficacy among adolescents with type 1 diabetes.

MATERIALS AND METHODS

This randomized, controlled trial with pre-test and post-test design was conducted from June to November 2015. The study was conducted in diabetes clinic in Imam Reza Institute affiliated to Shiraz University of Medical Sciences (SUMS), Shiraz, Iran. In the diabetes

clinic, the patients were visited by a pediatric endocrinologist and two expert nurses in diabetes.

The target population included adolescents with diabetes. The inclusion criteria of this study were affliction with type 1 diabetes, age 12-18 years old, passage of at least three months from diabetes diagnosis,[19] no parental death and divorce, and oriented and alert individuals. On the other hand, the exclusion criteria of the study were having received training within the previous six months or current participation in any coping strategies programs, and having history of taking anti-depressant and anxiety medication. Moreover, the subjects who had other chronic diseases beside the diabetes were excluded.

In order to determine an appropriate sample size, a pilot study was performed on 20 adolescents with diabetes (10 in each group). In this pilot study, the $(\mu_1-\mu_2)$ and d were obtained as 4.7 and 10 for Depression, Anxiety Stress Scales (DASS) and 6.4 and 10 for (GSE) questionnaire. For smaller effect sizes, we needed to enhance the sample size. Therefore, based on the following formula and considering α=0.05, b=0.90, $(\mu_1-\mu_2)$=4.7 and d=10, a 81-patient sample size was

determined. Then, it was raised to 100 (50 subjects in each group).

$$n = \frac{[(Z\alpha_{/2} + Z_\beta)^2 \times 2\delta^2]}{(\mu_1 - \mu_2)^2}$$

The study participants were selected through convenience and purposeful sampling when they referred to the diabetes clinic (secondary care). Then, they were allocated to the intervention and control groups using block randomization with a random sequence of 2 or 4 block sizes.

Initially, 120 adolescents with diabetes were enrolled into the study. However, 15 patients did not have the inclusion criteria, 4 subjects declined to participate, and one patient was not willing to participate in the study. Therefore, the study was performed on 100 subjects divided into intervention and control groups. It should be mentioned that all the 100 subjects finished the study even the adolescents who had attended the entrance exam (Figure 1).

The intervention group similar to another study[20] participated in a coping skills training program that consisted of eight sessions held twice a week (4 weeks). Similar to another study, each session lasted for 90 minutes.[20] The intervention was held in the afternoon from 14 to 18 in order to prevent the program
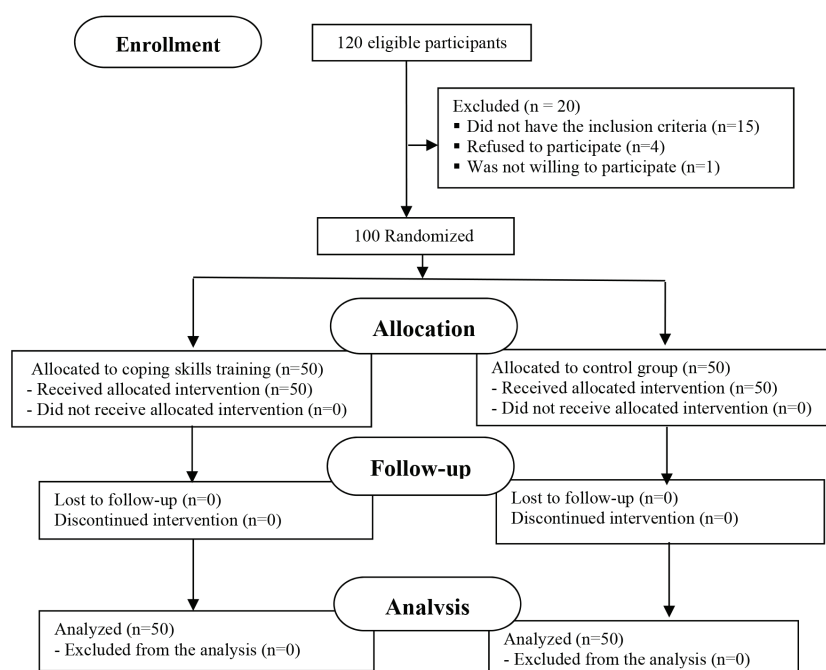

Figure 1: The flow diagram of the adolescents with diabetes through each stage of the study

from interfering with adolescent school classes. The sessions were held in groups of 4-6 participants.

Coping skills training was performed through lectures (using power points), question and answers, group discussions, and role-plays. The intervention was performed by a pediatric nurse with MS degree (the first author) with 20 years of experience in the field of diabetes.

The contents of coping skills training were designed based on Grey et al.'s study[12] by the authors. Then, the authors and 6 faculty members (one pediatric endocrinologist, 3 MS or PhD nurses, and 2 psychologists) approved the contents and implication of the intervention. The contents of the intervention

Table 1: The contents of coping skills training in each session

Session, no session name	Content of the interventions	Teaching method technique
1. Introduction	In the first session, the interventionist introduced herself to the participants and then, the subjects introduced themselves. After that, they were provided with the content of coping skills training.	Discussion
2. Recognizing the disease	In this session, the adolescents were provided with information about diabetes and its etiology, symptom, and treatment.	Lecture, discussion, questioning strategies
3. Principles of self-care	In this session, the participants were taught about the effect of the disease on adolescents and self-care (nutrition, physical activity, prevention of infection, vaccination, drug, etc.).	Lecture, questioning strategies, and discussion
4. Stress management	In this session, the subjects expressed their feelings (anxiety and depression) about diabetes and its symptoms and complications. They were also provided with information about psychosomatic symptoms of stress, factors which increase stress, strategies to decrease stress, and techniques for increasing self-esteem. Moreover, the importance of relaxation techniques in decreasing stress and improving coping was discussed in this session. In addition, the interventionist trained the subjects to do breathing techniques twice a day (9 A.M. and 5 P.M.).	Discussion, questioning strategies, problem solving
5. Communication skills training":	In this session, the interventionist described communication skills training, including social skills training and assertiveness training. In social skills training, the interventionist taught the patients how to manage a social condition, allowed them to watch a role-play of a suitable model, had the subjects perform their own role-plays, gave feedbacks to the patients' role-plays, provided the patients with real-life practice, and did group follow-up. In assertiveness training, direct, honest, and appropriate communication was allowed.	Role play, discussion
6. Cognitive-behavioral modification	In this session, the interventionist emphasized understanding one's own thoughts and feelings and modifying self-dialogue towards more positive messaging. Therefore, the patients were taught to reflect on their thinking and respond to situations, solved the social problem, and used their thoughts to help follow through with the decision they made previously	Discussion, questioning strategies, problem solving
7. Problem solving	In this session, the interventionist explained the concept of problem, problem solving, problem-solving stages, and significance of problem solving in managing and coping with stress. In this session, six problem solving steps, including identification of the problem, determination of goals, creation of alternative solutions, assessment of consequences, selection of the solution, and evaluation of the outcomes, were explained	Discussion, questioning strategies, problem solving
8. Final	In this session, the coping skills training and the interventionist were evaluated. Moreover, the interventionist answered the adolescents' questions.	Discussion, questioning strategies

are shown in Table 1.

The participants of the control group received the routine care of the clinic without any interventions. These subjects did not receive any information about coping skills training during the study period. After the study, however, power points of coping skills training and eight steps of the program were described for the control group.

It should be noted that in the routine care, after being visited by a pediatric endocrinologist, the patients were referred to a diabetes nurse. Then, the nurse set the insulin regimen and diabetes diet based on the patients' blood glucose levels and hemoglobin A1C.

The data were collected at baseline and one month after the intervention (2 months after the beginning of the study). The outcome measures of the study consisted of demographic information, depression, anxiety, stress, and self-efficacy. The demographic data consisted of gender, age, number of hospital admissions, and duration of disease diagnosis.

DASS, which was originally developed by Lovibond and Lovibond in 1995, was used to measure the negative emotional states of depression, anxiety, and stress. This self-report scale included 42 items (depression, anxiety, and stress each contained 14 items). The subjects were asked to rate the extent to which they had experienced each item during the past week on a 4-point scale with the following options: "did not apply to me at all (score=0), applied to me to some degree, or some of the time (score=1), applied to me to a considerable degree, or a good part of time (score=2), and applied to me very much, or most of the time (score=3)".[21, 22] The final score of the three scales ranged from 0 to 42, with higher scores representing greater depression, anxiety, and stress. Scores of depression,

anxiety, and stress for each of the respondents are presented in Table 2.[22]

DASS is a self-report symptom-based scale. It is transparent and easy to respond. The validity and reliability of DASS have been well confirmed by Lovibond and Lovibond.[22] Internal consistencies (Cronbach's alpha) for depression, anxiety, and stress scales of DASS in the normative sample were 0.91, 0.84, and 0.90, respectively.[21] In another study, also, the Cronbach's alpha values were reported to be above 0.82 for the three subscales and it was 0.94 for the whole scales of DASS. The test-retest reliability of DASS was also satisfactory (0.90). Szabo approved the construct validity of DASS.[23] The face and content validity of Persian version of DASS were approved by 10 faculty members in SUMS. In this study, Cronbach's alpha coefficients were respectively 0.95, 0.93, and 0.94 for depression, anxiety, and stress scales and 0.98 for the total scale. The test-retest reliability of the Persian version of DASS, which was assessed by Pearson correlation coefficient, was also confirmed (r=0.92).[24]

GSE questionnaire was developed by Sherer et al. in 1982. This questionnaire was developed to measure "a general set of expectations that the individual carries into new situations". This self-administered questionnaire contained 17 items responded using a 5-point Likert scale ranging from strongly disagree (score=1) to strongly agree (score=5). The final score of GSE ranged from 17 to 85, with higher scores indicating higher self-efficacy.[25] The Persian version of GSE has been used in other studies in Iran. Moreover, the internal consistency of the Persian version of GSE was reported as 0.78.[26] In this study, the internal consistency reliability coefficient (Cronbach's α) and test-retest reliability of

Table 2: The scores of depression, anxiety, and stress for each participant

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

GSE, as assessed by Pearson correlation coefficient, were 0.91 and 0.93, respectively.

Following eligibility assessment, the patients were familiarized with the study and those who agreed to participate received a consent form to sign. Then, the researcher's assistant who was a nurse collected the data by face-to-face interviews.

In this study, the assistant who collected the data and the statistician who analyzed the data were blind to the study groups. It should be noted that the patients in the intervention group were asked not to explain the program to other adolescents.

The patients' parents or guardian signed written informed consents. Besides, the participants and their parents or guardians received verbal and written information about the study objectives, design, and duration. They were also reassured about their right to withdraw from the study. The confidentiality and anonymity of the patients' information were considered, as well.

The data were analyzed using the SPSS statistical software (Version 16). Data analysis was done using Chi-square test, independent t–test, and paired t-test. P-values<0.05 were considered as statistically significant. The study was approved by the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran (CT-86-7217).

Results

Within the study period, no harms occurred and unintended effects were maintained in each group. Also, no problems, costs, and side effects related to participation in this study were reported during the study. Moreover, no one suffered from any harms through the intervention and one-month follow-up. This study also caused no harms in the context of the diabetes clinic and the participants' families.

The mean age of the subjects in the intervention and control groups was 14.36±1.71 and 14.06±1.99 years old, respectively (P=0.19). In addition, 52% of the subjects in the intervention group and 50% of those in the control group were female (P=0.15). The mean number of hospital admissions was 1.82±0.77 and 1.68±0.79 in the intervention and control groups, respectively (P=0.15). Besides, the mean duration of disease diagnosis was 5.30±3.44 and 5.77±3.51 years in the intervention and the control group, respectively (P=0.24). The results revealed no statistically significant differences between the two groups regarding age, gender, number of hospital admissions, and duration of disease diagnosis. Therefore, the two groups were homogeneous.

Before the intervention, the intervention and control groups showed moderate and severe depression, respectively. Moreover, both groups showed severe anxiety and moderate stress. In fact, no statistically significant differences were found between the intervention and control groups regarding the mean scores of depression (P=0.29), anxiety (P=0.43), and stress (P=0.34) before the intervention (Table 3).

Two months after the beginning of the intervention, the mean scores of depression, anxiety, and stress in the intervention were at the normal range. On the other hand, the control group showed severe depression, anxiety and moderate stress. The results of independent sample t-test indicated a significant difference between the intervention and the control groups regarding the mean scores of depression, anxiety, and stress (P<0.001); the mean scores of depression, anxiety, and stress decreased in the intervention group compared to the control group (Table 3). Thus, the first hypothesis was confirmed.

Before the intervention, the mean scores of self-efficacy were 47.76±15.57 and 49.49±16.08 in the intervention and control groups, respectively. The results showed no significant difference between the intervention and control groups in this regard before the intervention (t=-0.50, P=0.61). Two months after the beginning of the intervention, however, the mean scores of self-efficacy were 70.82±10.84 and 50.13±15.42 in the intervention and control groups, respectively

Table 3: Comparison of the mean scores of depression, anxiety, stress, and self-efficacy in the intervention and control groups

Variables	Before the intervention Mean±SD	Two months after starting the intervention Mean±SD	Mean difference±SD	*P value (within)
Depression				
Intervention	18.15±14.13	5.41±4.58	-12.56±15.18	<0.001
Control	21.16±13.62	19.73±11.80	-1.53± 8.80	0.23
**P value(Between)	0.29	<0.001	<0.001	
Anxiety				
Intervention	17.78±12.66	6.44±7.01	-11.34±13.78	<0.001
Control	19.67±11.24	18.28±10.51	-1.14± 8.44	0.35
**P value(Between)	0.43	<0.001	<0.001	
Stress				
Intervention	20.66±13.62	7.46±7.01	-13.44±14.49	<0.001
Control	23.14±11.96	21.10±10.94	-1.91± 9.55	0.17
**P value(Between)	0.34	<0.001	<0.001	
Self-efficacy				
Intervention	47.76±15.57	70.82±10.84	22.47±16.23	<0.001
Control	49.49±16.08	50.13±15.42	1.52±12.94	0.43
**P value (Between)	0.61	<0.001	<0.001	

*Paired t-test; **Independent samples t-test

and the difference was statistically significant (t=7.15, P<0.001) (Table 3). Therefore, the results supported the second hypothesis that coping skills training improved the self-efficacy in the adolescents with type 1 diabetes.

Discussion

This study demonstrated that coping skills training decreased depression, anxiety and stress among the adolescents with type 1 diabetes. Review of the literature revealed no studies reporting these findings. Therefore, the results were compared to those of somewhat similar studies. In a study on school-aged children with type 1 diabetes, coping skills training significantly improved the psychosocial adaptation.[27] It was also indicated that stress skill training reduced depression, anxiety and stress in drug addicts.[28] Mothers of adolescents with type 1 diabetes who used primary control coping, such as problem solving, and secondary control coping, such as acceptance strategies, reported lower symptoms of anxiety and depression.[29] Moreover, another study demonstrated that

problem-focused coping strategy-training program improved the families' perception towards their children and, subsequently, promoted mental health of mothers with children suffering from Down syndrome.[30] Using more primary control coping strategies, such as problem solving and emotional expression, also improved the quality of life, metabolic control[31] and decreased depressive symptoms[32] in adolescents with diabetes. In fact, coping mediates the impact of diabetes-related stress on depressive symptoms.[32] Overall, in coping skill training, patients learn to use problem-focused coping strategies more and it might reduce their psychological problems.

The current study revealed that coping skills training improved the self-efficacy of the adolescents with diabetes, which was consistent with the findings of another study. Their study aimed to assess the long-term treatment effects of coping skills training in school-aged children (8-12 years old) with type 1 diabetes and their parents and showed better diabetes self-efficacy in the intervention group.[1] Similarly, another study on adolescents with diabetes between 12.5

and 20 years of age indicated that the subjects had better general self-efficacy 6 months after coping skills training.[33] Coping skills training may enhance the ability of adolescents with diabetes to cope with their daily issues and to be more effective in achieving the therapeutic goals, especially when this intervention is accompanied by ongoing follow-up care. Furthermore, training such patients regarding problem solving helps them think of new, less differentiating behaviors that allow them to adhere to a diabetes diet.[34] In fact, effective coping skills were mediated on the association between self-efficacy and problem solving.[35]

We added such information to the fact that coping skills training might decrease depression, anxiety and stress among the adolescents with type 1 diabetes. Therefore, it was one of the strengths of this study. The other strength of this study was the sufficient number of participants.

This study had some limitations, the first of which being the short follow-up period after the intervention; we assessed the patients two months after the beginning of the intervention. Thus, another longitudinal study is suggested to be conducted. In this study, evaluation of the effectiveness of the intervention depended on subjective psychological measurements; therefore, lack of objective assessments was the second limitation of our study. As the patients were not blinded, knowledge of the intervention group might have impacted their behaviors and answers to the outcome measures. In general, the participants who are aware that they are receiving or not receiving the therapy are more likely to provide biased assessments of the effectiveness of the intervention compared to the blinded participants. Thus, it can be considered as the third limitation of this study. The forth limitation of the study was that the subjects were recruited from one diabetes center in Shiraz. Hence, in order to generalize the results, performance of similar studies in other parts of our country and the world are warranted.

CONCLUSION

The findings of this study indicated that coping skills training significantly decreased depression, anxiety, and stress and improved self-efficacy among the adolescents with type 1 diabetes. These findings have a very important implication for practice to reduce psychological problems and improve self-efficacy in adolescents with diabetes. Yet, more studies for improving evidence-based practice in this regard are warranted.

ACKNOWLEDGEMENT

Conflict of Interest: None declared.

REFERENCES

1 Grey M, Whittemore R, Jaser S, et al. Effects of coping skills training in school-age children with type 1 diabetes. Res Nurs Health. 2009;32:405-18.

2 Ashraff S, Siddiqui MA, Carline TE. The psychosocial impact of diabetes in adolescents: a review. Oman Med J. 2013;28:159-62.

3 Smith KJ, Deschenes SS, Schmitz N. Investigating the longitudinal association between diabetes and anxiety: a systematic review and meta-analysis. Diabet Med. 2018;35:677-93.

4 Knychala MA, Jorge ML, Muniz CK, et al. High-risk alcohol use and anxiety and depression symptoms in adolescents and adults with type 1 diabetes mellitus:

a cross-sectional study. Diabetol Metab Syndr. 2015;7:24.

5   Rechenberg K, Whittemore R, Holland M, Grey M. General and diabetes-specific stress in adolescents with type 1 diabetes. Diabetes Res Clin Pract. 2017;130:1–8.

6   Kongkaew C, Jampachaisri K, Chaturongkul CA, Scholfield CN. Depression and adherence to treatment in diabetic children and adolescents: a systematic review and meta-analysis of observational studies. Eur J Pediatr. 2014;173:203-12.

7   Dirmaier J, Watzke B, Koch U, et al. Diabetes in primary care: prospective associations between depression, nonadherence and glycemic control. Psychother Psychosom. 2010;79:172-8.

8   McGrady ME, Laffel L, Drotar D, et al. Depressive symptoms and glycemic control in adolescents with type 1 diabetes: mediational role of blood glucose monitoring. Diabetes Care. 2009;32:804-6.

9   Bowser DM, Utz S, Glick D, et al. The relationship between diabetes mellitus, depression, and missed appointments in a low-income uninsured population. Diabetes Educ. 2009;35:966-77.

10 King DK, Glasgow RE, Toobert DJ, et al. Self-efficacy, problem solving, and social-environmental support are associated with diabetes self-management behaviors. Diabetes Care. 2010;33:751-3.

11 Chih AH, Jan CF, Shu SG, Lue BH. Self-efficacy affects blood sugar control among adolescents with type I diabetes mellitus. J Formos Med Assoc. 2010;109:503-10.

12 Grey M, Jaser SS, Whittemore R, et al. Coping skills training for parents of children with type 1 diabetes: 12-month outcomes. Nurs Res. 2011;60:173-81.

13 Bandura A. Social foundations of thought and action: A social cognitive theory. 1st ed. USA: Prentice Hall; 1986.

14 Jaser SS, Faulkner MS, Whittemore R, et al. Coping, self-management, and adaptation in adolescents with type 1

diabetes. Ann Behav Med. 2012;43:311-9.

15 Kroese FM, Adriaanse MA, Vinkers CD, et al. The effectiveness of a proactive coping intervention targeting self-management in diabetes patients. Psychol Health. 2013;29:110-25.

16 Blumenthal JA, Emery CF, Smith PJ, et al. The effects of a telehealth coping skills intervention on outcomes in chronic obstructive pulmonary disease: primary results from the INSPIRE-II study. Psychosom Med. 2014;76:581-92.

17 Sikkema KJ, Ranby KW, Meade CS, et al. Reductions in traumatic stress following a coping intervention were mediated by decreases in avoidant coping for people living with HIV/AIDS and childhood sexual abuse. J Consult Clin Psychol. 2013;81:274-83.

18 Whittemore R, Jaser SS, Jeon S, et al. An internet coping skills training program for youth with type 1 diabetes: six-month outcomes. Nurs Res. 2012;61:395-404.

19 Niraula K, Kohrt BA, Flora MS, et al. Prevalence of depression and associated risk factors among persons with type-2 diabetes mellitus without a prior psychiatric history: a cross-sectional study in clinical settings in urban Nepal. BMC Psychiatry. 2013;13:309.

20 Dehestani M, Tarkhan M, Abbasi M, Aghili ZS. Efficacy of Integrating Stress Coping Skills Training with Detoxification on Social Adjustment of Addicted Women. Addict Health. 2012;4:127–32.

21 Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther. 1995;33:335-43.

22 Lovibond SH, Lovibond PF. Manual for the Depression, anexiety, Stress Scales. 2nd ed. Australia: Psychology Foundation of Australia; 1996.

23 Szabo M. The short version of the Depression Anxiety Stress Scales (DASS-21): factor structure in a young adolescent

sample. J Adolesc. 2010;33:1-8.

24 Edraki M, Rambod M. Psychological predictors of resilience in parents of insulin-dependent children and adolescents. Int J Community Based Nurs Midwifery. 2018;16:239-49.

25 Sherer M, Adams CH. Construct validation of self-efficacy scale. Psychol Rep. 1983;53:899-902.

26 Edraki M, Kamali M, Beheshtipour N, et al. The effect of educational program on the quality of life and self-efficacy of the mothers of the infants with congenital heart disease: a randomized controlled trial. Int J Community Based Nurs Midwifery. 2014;2:51-9.

27 Ambrosino JM, Fennie K, Whittemore R, et al. Short-term effects of coping skills training in school-age children with type 1 diabetes. Pediatr Diabetes. 2008;9:74-82.

28 Habibi Z, Tourani S, Sadeghi H, Abolghasemi A. Effectiveness of stress management skill training on the depression, anxiety and stress levels in drug addicts after drug withdrawal. Int J High Risk Behav Addict. 2013;2:82-6.

29 Jaser SS, Linsky R, Grey M. Coping and psychological distress in mothers of adolescents with type 1 diabetes. Matern Child Health J. 2014;18:101-8.

30 Pourmohamadreza-Tajrishi M, Azadfallah P, Hemmati Garakani S, Bakhshi E. The effect of problem-focused coping strategy training on psychological symptoms of mothers of children with down syndrome. Iran J Public Health. 2015;44:254-62.

31 Jaser SS, White LE. Coping and resilience in adolescents with type 1 diabetes. Child Care Health Dev. 2011;37:335-42.

32 Jaser SS, Patel N, Xu M, et al. Stress and coping predicts adjustment and glycemic control in adolescents with type 1 diabetes. Ann Behav Med. 2017;51:30–8.

33 Grey M, Boland EA, Davidson M, et al. Coping skills training for youths with diabetes on intensive therapy. Appl Nurs Res. 1999;12:3-12.

34 Grey M, Boland EA, Davidson M, et al. Coping skills training for youth with diabetes mellitus has long-lasting effects on metabolic control and quality of life. J Pediatr. 2000;137:107-13.

35 Parto M, Besharat MA. The direct and indirect effects of self- efficacy and problem solving on mental health in adolescents: Assessing the role of coping strategies as mediating mechanism. Procedia-Social and Behavioral Sciences. 2011;30:639–43.