

## Comparison of the Acceptance and Commitment Therapy and Compassion-Focused Therapy on Quality of Life and Health-Promoting Behaviors of Mothers with Gestational Diabetes

Parisa Khoraminejad<sup>1</sup>, Javad Khalatbari<sup>2\*</sup>, Mohammad Reza Seirafi<sup>3</sup>

1- Department of Psychology, UAE Branch, Islamic Azad University, Dubai, United Arab Emirates.

2- Associate Professor, Department of Psychology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran.

3- Assistant Professor, Department of Psychology, Karaj Branch, Islamic Azad University, Alborz, Iran.

(\* Corresponding Author: Javad Khalatbari, Iran. Email: [J.khalatbari@toniau.ac.ir](mailto:J.khalatbari@toniau.ac.ir) )

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### Abstract

**Introduction:** Gestational diabetes is the most common metabolic complication of pregnancy, affecting 10%-15% of all pregnancies, depending on diagnostic criteria. This study aimed to compare the effectiveness of acceptance and commitment therapy and compassion-focused therapy on the quality of life and health-promoting behaviors of mothers with gestational diabetes.

**Method:** The research method was a quasi-experimental study with pre-test, post-test, and follow-up. The statistical population of this study was all pregnant women referred to Milad Hospital in Tehran in 2019. 45 participants were randomly selected and placed in three groups of acceptance and commitment therapy, compassion-focused therapy, and control group. The follow-up phase was performed on all three groups three months after the post-test. The research tools included the World Health Organization Quality of Life Scale and the Walker Health-Promoting Lifestyle Questionnaire. The data were analyzed using univariate and multivariate covariance analysis by spss.22.

**Result:** The results showed that acceptance and commitment therapy and compassion-focused therapy had a significant effect on improving the quality of life and health-promoting behaviors in women with gestational diabetes ( $P < 0.001$ ).

**Conclusion:** It can be concluded that acceptance and commitment therapy has a greater impact on the quality of life and health-promoting behaviors of women with gestational diabetes than compassion-focused therapy. It encourages individuals to communicate their experiences fully and without resistance as they move towards their worthy goals and to accept them without judgment.

**Declaration of Interest:** None

**Keywords:** Acceptance and commitment therapy, Compassion-focused therapy, Quality of life, Health-promoting behaviors, Gestational diabetes.

## **Introduction**

**G**estational diabetes is the most common metabolic complication of pregnancy, affecting 10%-15% of all pregnancies, depending on diagnostic criteria. Gestational diabetes is defined as "diabetes in the second or third trimester of pregnancy that was not evident before pregnancy" (1). The prevalence of gestational diabetes is increasing worldwide, including in Iran. In a meta-analysis, the prevalence of gestational diabetes in Iran was estimated to be 3.41% and despite many advances in clinical care, women with diabetes during pregnancy are at high risk of side effects (2). Quality of life is one of the factors that affect these women during pregnancy and in terms of social life and health measures, a large decrease compared to normal pregnant women has been observed in women with diabetes (3). Health-related quality of life indicates a range of physical and social activities as well as mental health and is considered as an important indicator of health (4). Nowadays, evaluating and recording quality of life with a focus on health through the quality-of-life questionnaire in medical interventions has become very important (5). The quality of life of women with gestational diabetes has also been evaluated in related studies. Also, psychotropics with activation of the hypothalamus-pituitary-adrenal can stimulate or worsen glucose levels and cause the progression of diabetes (6). Although the chronic illness is associated with increased depression, anger, and stress, it is almost three times more common in diabetics, which undoubtedly reduces the quality of life, and the prevalence of depression in these patients

is 2 to 3 times higher than in the general population (7).

In addition to drug therapy, new psychological therapies, including acceptance and commitment therapy (ACT) and compassion-focused based therapy (CFT) have been developed in recent years to treat psychological disorders and patients with diabetics. The main goal of acceptance and commitment therapy is to create psychological flexibility that enables patients to choose and act on the best practical approach instead of avoiding chaotic thoughts, feelings, and memories (8). The most important effort in this treatment is to try to increase the acceptance of mental perception and reduce reciprocal ineffective witness actions. The patient is taught that any attempt to avoid or suppress any dysfunctional mental perceptions will either have negative effects or lead to their reinforcement; Therefore, they must fully accept this experience without any internal or external reaction to be able to destroy it (9).

Compassion-focused based therapy is another approach that reduces the level of diabetes and increases the quality of life among women with gestational diabetes (10). In this treatment, it is believed that when individuals use cognitive reassessment, emotional tissue may have a functional opposite to cognitive function. Thus, although the content of confrontational thought may be useful, emotional context may play a greater role in psychoticism (11). Compassion-focused therapy was originally developed for people with long-term emotional problems, often with high levels of shame and self-criticism, and has been developed as an individual therapy that seeks to help

people develop their compassion and help others (12).

Compassion can be defined as approaching oneself with kindness and acceptance, especially in the face of personal discontent or frustration (13). According to the results of recent studies on the effectiveness of compassion-based therapy, it can be used as a complementary therapy to enhance the quality of life, mental health, and general mental status of patients with diabetes along with medication. Higher levels of compassion also reduce depressive symptoms and increase mental health, leading to evidence of diabetes in the long run (14). These results emphasize on the importance of psychological parameters, including self-compassion in diabetes management. Therefore, this study intends to investigate whether there is a difference between acceptance and commitment therapy and compassion-focused therapy on the quality of life and health-promoting behaviors of mothers with gestational diabetes.

### **Method**

The research method was a quasi-experimental study with pre-test, post-test, and follow-up. The statistical population of this study were all pregnant women referred to Milad Hospital in Tehran in 2019. 45 participants were randomly selected and placed in three groups of acceptance and commitment therapy,

compassion-focused therapy, and control group. The required sample size was calculated 45 in total based on effect size= 0.40,  $\alpha=0.95$ ,  $1-\beta$  (err prob) = 0.80 test power and 10% loss for each group. Inclusion criteria were at least diploma level education, age range between 25 to 40 years, and informed consent to participate in the study. The exclusion criteria were absence of more than two sessions in each treatment session. Individuals who met the inclusion criteria were identified and randomly divided into experimental and control groups. The ethical considerations were as follows: 1. All people received written information related to the research and participated in it if they wished. 2. The assurance was given to individuals that all information is confidential and used for research purposes. 3. the names and surnames of the participants were not registered to protect their privacy.

Acceptance and commitment group therapy received total of 10 sessions, once per week, each session 90 minutes for two and a half months.

Self-compassion therapy: Sessions were held based on self-compassion therapy. The program of self-compassion training sessions was performed during 8 sessions of 90 minutes (one session per week) for two months for the experimental group.

Table 1. Acceptance and commitment therapy sessions

<b>Sessions</b>	<b>Content</b>
First	Preliminary explanations, problem conceptualization, patient preparation and pre-test implementation, as well as preparing a list of enjoyable activities and its inclusion in the weekly program.
Second and third	Familiarity with ACT therapeutic concepts (psychological flexibility, psychological acceptance, psychological awareness, cognitive separation, self-visualization, personal story, clarification of values and committed action) in six stages

Fourth and fifth	Mindfulness training (emotional and wise awareness), teaching patients about what skills are observed and described and how skills are not judged, and how these skills work.
Sixth and seventh	First, the focus is on increasing psychological awareness and then people are taught how to respond and deal appropriately with their mental experiences and create purpose and social lifestyle and practical commitment to them. Counting the positive and negative points of couples by each other without any judgment or emotional reaction.
Eighth	Distress tolerance training (permanence skills in crises, distraction, self-relief using six senses and mindfulness practice) and reviewing previous sessions
Ninth	Emotion regulation training (goals of emotion regulation training, knowing why emotions are important, emotional recognition, reducing vulnerability and emotional suffering, increasing positive emotions), changing emotions through action contrary to recent affect, practical practice learned, providing feedback by group and therapist.
Tenth	Increasing interpersonal efficiency (maintaining and maintaining the health of relationships, interests, etc.). Teaching important interpersonal skills (describing and expressing, asserting and daring, being openly confident, negotiating and self-esteem). Summing up and executing post-test.

Table 2. Self-compassion therapy sessions

Sessions	Content
First	Pretest implementation, self-compassion-based logic therapy and self-compassion
Second	Patients are asked to try to identify how they think and behave towards themselves
Third	Using compassion imagery skills and using soothing breathing techniques
Fourth	Using mindfulness techniques for patients
Fifth	In this meeting, the technique of writing a letter of compassion and promoting self-compassion was done by emotional draining.
Sixth	In this meeting, pathology of factors that cause fear and repulsion of patients to their compassion was investigated.
Seventh	Teaching methods to deal with self-compassion factors and using relaxation techniques
Eighth	Summing up the sessions, presenting final suggestions and practicing, and finally the implementation of the post-test and a specific appointment for the implementation of the follow-up test

**Quality of Life Scale:** This scale was created in 1996 by a group of experts from the World Health Organization that measures the general quality of life of individuals. (15). The questionnaire has 26 questions and has four scales including physical health, psychological, social and environmental relationships and living conditions. The Likert scoring range has five options (totally = 5, high = 4, medium = 3, low = 2, not at all satisfied = 1). The tool score is obtained by adding the score of the items; Hence, the score range is

between 13 and 26, and the higher the score, the better the quality of life (15). The World Health Organization has reported the reliability of this instrument in different countries with Cronbach's alpha method more than 0.70 (15). Etemad et al. (16) in Iran also expressed the reliability of the retest test for the subscale as follows; Physical health 0.77; Mental health 0.77; Social Relations 0.75; Environmental health 0.84. Internal validity was calculated using Cronbach's alpha, which in the healthy group of 700 people,

physical health 0.70, mental health 0.73, social relations 0.55 and environmental health 0.84 and in the patient group 367 people physical health 0.72 Mental health was 0.70, social relations was 0.52 and environmental health was 0.72.

**Health Promoting Lifestyle Questionnaire:** The Health Promoting Lifestyle Questionnaire was developed by Walker in 1987. This questionnaire has 54 questions, and its purpose is to measure health-promoting behaviors such as nutrition, exercise, health responsibility, stress management, interpersonal support and self-fulfillment. Its response range was of the Likert type (never = 1; sometimes = 2; often = 3; always = 4). The above questionnaire has six dimensions that questions related to each dimension (nutrition 11-1; exercise = 24-12; health responsibility = 32-25; stress management = 38-33; interpersonal support = 46-39; self-fulfillment = It was 54-47. To get the score for each dimension, the sum of the scores for the questions related to that dimension is added together. The score between 54 and 90: Lifestyle is weak. The score between 90 and 135: Lifestyle is moderate and the score Above 135, the lifestyle is strong, with the Cronbach's

alpha confidence level usually ranging from zero (0) meaning instability, to a positive one (+1) meaning complete reliability, and whatever value is obtained is a positive number one. The closer the questionnaire is, the greater the reliability. Cronbach's alpha for the Walker Health Promoting Lifestyle Questionnaire Nutrition 0.79; Exercise 0.86; Health Responsibility 0.81; Stress Management 0.91; 0 and self-efficacy reported 0.81 In the research of Bahabadi et al. (17) the validity of the questionnaire was confirmed and the reliability of the questionnaire or its reliability was calculated using Cronbach's alpha measurement method.

The research data were analyzed using univariate and multivariate covariance analysis by spss.22.

### Results

Descriptive analysis with mean and standard deviation scores on the quality of life and health-promoting behaviors in the ACT CFT, and control group at pre-test, post-test, and follow-up are shown below..

Table 3. The mean and standard deviation of quality of life and health-promoting behaviors

Group	Dimension	Index	Pre-test	Post-test	Follow-up
ACT		Mean	24.33	33.60	32.80
		SD	2.69	5.10	5.25
CFT	Nutrition	Mean	25.80	30.87	30.27
		SD	5.70	3.96	4.68
Control		Mean	24.73	25.00	26.40
		SD	5.01	7.44	7.42
ACT		Mean	26.73	31.20	31.00
		SD	4.77	4.21	5.03
CFT	Physical activity	Mean	23.00	27.00	28.67
		SD	4.41	3.53	4.81
Control		Mean	25.00	24.20	24.40
		SD	4.47	7.03	5.77
ACT		Mean	23.67	32.60	32.60
		SD	4.88	3.91	3.44
CFT	Health responsibility	Mean	21.13	28.80	30.07
		SD	3.07	3.30	3.69

Control	Mean	21.40	19.80	21.40
	SD	3.14	5.61	5.42
ACT	Mean	27.67	33.20	33.40
	SD	5.38	3.30	2.50
CFT	Stress management	Mean	25.13	31.00
		SD	2.77	3.40
Control	Mean	26.07	25.80	26.80
	SD	4.89	7.56	7.56
ACT	Mean	25.67	31.20	31.00
	SD	5.05	4.21	4.19
CFT	Interpersonal relationships	Mean	27.13	30.60
		SD	3.81	3.89
Control	Mean	25.27	24.40	25.60
	SD	4.33	6.02	5.88
ACT	Mean	27.40	31.80	31.60
	SD	5.57	6.09	6.09
CFT	Spiritual growth	Mean	27.13	29.47
		SD	4.37	3.91
Control	Mean	26.73	26.60	26.80
	SD	4.06	6.09	6.49
ACT	Mean	17.93	25.53	24.47
	SD	5.25	6.52	6.17
CFT	Quality of life	Mean	16.27	20.87
		SD	3.83	5.34
Control	Mean	15.80	15.40	15.44
	SD	4.65	4.56	4.41

To test the normality of data distribution, this hypothesis is used by the Shapiro-Wilk test and the assumption of zero on the normal distribution of health scores and its dimensions in all groups have been confirmed at all stages ( $P \geq 0.05$ ). The results of the Mbox test also showed that the observed covariance matrices of quantitative variables (i.e. health-promoting lifestyle components) were equal among different independent groups of each factor ( $P \geq 0.05$ ). Also, the results of multivariate tests showed that all multivariate tests were significant which meant the main effect of time factor and interactive effect between time and group on health-promoting lifestyle dimensions.

The presence of an interactive effect indicates that changes in health-promoting lifestyle dimensions have been different for groups during three stages (pre-test, post-test, and follow-up). In other words, the interactive effect of time and group indicates the effectiveness of the intervention. The results of the Mauchly test also showed that the assumption of covariance uniformity or covariance parity with total covariance was established ( $P \geq 0.05$ ). Finally, Levene's test, as another assumption of this analysis, showed that the variance of the research variables was observed in all dimensions of the health-promoting lifestyle variable ( $P \geq 0.05$ ).

Table 4. Multivariate analysis of variance analysis of quality of life and health promoting behaviors

Source		Value	F	Partial Eta Squared	P
Between Group	Pillai's Trace	0.45	3.17	0.45	0.02
	Wilks' Lambda	0.55	3.17	0.45	0.02
	Hotelling's Trace	0.83	3.17	0.45	0.02
	Roy's Largest Root	0.83	3.17	0.45	0.02
Within Groups	Pillai's Trace	0.87	9.29	0.87	0.001
	Wilks' Lambda	0.13	9.29	0.87	0.001
	Hotelling's Trace	6.56	9.29	0.87	0.001
	Roy's Largest Root	6.56	9.29	0.87	0.001
Group*Time	Pillai's Trace	0.50	1.40	0.50	0.26
	Wilks' Lambda	0.50	1.40	0.50	0.26
	Hotelling's Trace	0.99	1.40	0.50	0.26
	Roy's Largest Root	0.99	1.40	0.50	0.26

Results of multivariate analysis of variance shown on table 4. Indicates that there is a significant effect for the factor of the independent variable. This effect reveals that there is a significant difference between at least one component of health promotion behaviors of women with gestational diabetes in the two experimental groups (Wilks Lambda=

0.26,  $p < 0.05$ ). Additionally, it indicates that there is a significant difference between at least one of the components of health promotion behaviors of women with gestational diabetes in three measurement stages ( $p < 0.05$ ). The results of the univariate tests are reported in the context of multivariate mixed analysis of variance.

Table 5. Multivariate analysis of variance for quality of life and health promoting behaviors

Variables	Source	SS	df	MS	F	P	Partial Eta Squared
Nutrition	Time	936.69	1.36	686.65	35.97	0.001	0.56
	Time *Group	431.27	1.18	367.04	16.92	0.001	0.38
	Group	36.10	1.00	36.10	0.92	0.347	0.03
Physical activity	Time	1490.96	1.18	1258.7	57.90	0.001	0.67
	Time *Group	758.69	1.26	604.77	36.84	0.001	0.57
	Group	263.51	1.00	263.51	7.55	0.01	0.21

Health responsibility	Time	417.36	1.38	302.45	19.44	0.001	0.41
	Time *Group	231.27	1.34	172.47	7.00	0.007	0.20
	Group	196.54	1.00	196.54	11.80	0.002	0.30
Stress management	Time	84.20	1.36	61.72	4.23	0.048	0.10
	Time *Group	14.16	1.18	12.05	0.56	0.489	0.02
	Group	80.28	1.00	80.28	4.41	0.045	0.14
Interpersonal relationships	Time	8.02	1.18	6.77	0.31	0.619	0.01
	Time *Group	10.69	1.26	8.52	0.52	0.516	0.02
	Group	2.18	1.00	2.18	0.07	0.794	0.00
Spiritual growth	Time	16.69	1.38	12.09	0.78	0.423	0.03
	Time *Group	17.27	1.34	12.88	0.52	0.526	0.02
	Group	48.40	1.00	48.40	1.10	0.304	0.04
Quality of life	Time	45.78	1.38	33.17	8.19	0.001	0.11
	Time *Group	26.27	1.34	19.60	3.52	0.105	0.09
	Group	94.65	1.00	94.65	5.21	0.045	0.22

The results of Table 5. show that concerning the within-subject factor, the calculated F value for the effect of steps (pre-test, post-test, and follow-up) at the level of 0.05 was significant for the components of nutrition, exercise, health responsibility, and stress management ( $P < 0.05$ ). As a result, there was a significant difference between the mean scores of pre-tests, post-test, and follow-up of the components of nutrition, physical activity, health responsibility, and stress management and quality of life in the three stages of pre-test, post-test, and follow-up. Bonferroni post-hoc test results were calculated to investigate the difference between the means in the treatment stages. Results showed that there was a significant difference between the scores of the

components of health-promoting behaviors in the pre-test with post-test, pre-test with follow-up. Also, there was no significant difference between the components of health-promoting behaviors and quality of life in the posttest compared to the follow-up phase, so that the components of nutrition, physical activity, responsibility for health, and stress management in the follow-up phase were changed.

According to the results of Table 5., the interaction of stage factors and F group calculated for the effect of stages (pre-test, post-test, and follow-up) between the two groups based on ACT and CFT at the level of 0.05 is significant for the components of nutrition, exercise and health responsibility and quality of life ( $P < 0.05$ ). As a result, there was a significant



difference between the mean scores of pre-test, post-test, and follow-up of components of nutrition, exercise, and health responsibility in the two groups. Interactive graph of adjusted mean scores of nutrition and stress management components scores in the two groups based on ACT and CFT in the different stages of pre-test, post-test, and follow-up. Moreover, the results of Table 5 for intergroup factor F were calculated at 0.05 level for exercise, responsibility for health, and stress management is significant. ( $P < 0.05$ ). As a result, there was a significant difference between the overall mean scores of physical activities, responsibility for health, and stress management in the two groups ACT and CFT therapy. Also, the modified averages show that the increase in these three components was higher in the ACT group than in the CFT group.

### ***Discussion***

In explaining the effectiveness of ACT on improving health-promoting behaviors according to Viskovich & Pakenham (16), it can be said that in ACT, individuals learn to accept emotions without avoiding them, focusing on the disturbing content of their thoughts and committing to their goal based action plan. Increased emotional awareness and acceptance in people with diabetes makes them more valuable to themselves and increase their health-promoting behaviors such as compliance with medications (i.e., insulin), do more physical activity, and measuring their daily blood sugar, which together improve metabolism. Also, the clarification of values and the internalization of the committed practice that takes place during the group's acceptance and commitment therapies give the group members

sufficient motivation to continue and adhere to the treatment. In this study, because of sufficient motivation among diabetes patients about their health-promoting behaviors through contact with the present moment and self as context, acceptance and commitment therapy could increase health-promoting behaviors.

CFT in the experimental group had a significant effect on psychological health, social health, responsibility for health, and stress management in women with gestational diabetes compared to the control group. Consistent with this finding, (17) a study showed that after receiving eight sessions of CFT, this treatment has the effect of reducing depression and controlling blood sugar in diabetic patients.

Also, in explaining the effectiveness of CFT on improving health-promoting behaviors based on Borgermans et.al, it can be said that CFT has an essential role in the mental health of people with chronic disease (18), and people with learning and performing skills (19). Those associated with it can acquire happiness and well-being and improve them. CFT can lead to adaptive experiences, activities such as learning, or alternative behaviors. Besides, it has appropriate coping resources that help people to cope well with adverse life events (20). Because in this way, people learn to be kind to themselves, to feel shared with others, to be aware of their living conditions, and to face issues and problems with an unbiased attitude.

On the one hand, in explaining the non-difference between the effectiveness of ACT and CFT on the components of health-promoting behaviors in patients with diabetes that people usually experience unpleasant experiences and events. They respond painfully through

avoidance efforts or extreme control. In such circumstances, the mind tells us that we must control the situation better and that we should not have unpleasant thoughts and feelings. If this type of attitude is harsh and critical, it conflicts with health and both acceptance and commitment and CFT through mindfulness and acceptance problems. So, both methods have strong theoretical underpinnings and many commonalities that use the principle of mindfulness, acceptance of problems, and non-judgment to treat.

Acceptance and commitment therapy has had a more significant impact on improving exercise scores, health responsibility, and stress management in women with gestational diabetes than CFT. Further explaining the effectiveness of ACT on improving the components of health-promoting behaviors can be explained by its greater adaptation to the status of women with diabetes. According to theorists of acceptance and commitment therapy, an important factor in causing and sustaining psychological trauma and thereby increasing maladaptive emotion regulation is empirical avoidance (21), which means exaggerated negative evaluation of internal experiences (such as thoughts, feelings, and emotions) and It is their unwillingness to experience that leads to trying to control or escape them and can interfere with one's performance. People who have more empirical avoidance experience positive emotional experiences and less mental health and feel their lives are meaningless. But the goal of acceptance and commitment therapy is to reduce experiential avoidance and increase psychological flexibility by accepting unavoidable and distressing unpleasant

emotions, fostering awareness to counteract excessive conflict with cognition, and identifying personal values related to behavioral goals. It encourages individuals to communicate their experiences fully and without resistance as they move toward their worthy goals and to accept them without judgment. This increases the motivation for change and encourages the individual to strive to achieve the worthwhile goals of their lives, leading to improved emotion regulation, especially in their cognitive domain. Having psychological flexibility and acceptance can improve a person's mental health and individual wellbeing (22,23) in a variety of areas and help them promote meaningful aspects of life and enhance health-promoting activities. Therefore, once one can accept the existing and initial emotional state with all his or her ability, there is no longer a need to move quickly to achieve the optimal emotional state. Thus, one can better use higher-level methods, including positive thinking strategies and acceptance of suffering (as human suffering is the normal state of affairs for human adults) (24-25). Self-blame is created when one is not aware of events and rejects them (26-27).

Due to limitations as a result of Corona Virus pandemic, the follow-up course was held virtually. The presence of two therapists in the present study is another limitation of this study that can cause methodological problems. In future research, it is recommended that researchers review and compare the effectiveness of acceptance and commitment therapy and compassion focused therapy on other patients with diabetes by gender. Due to gender differences in most characteristics, the

results seem to be different, and if the results are different, different programs can be designed and presented for each group (men and women). It is suggested that researchers use 6-month or more follow-ups to evaluate and ensure the long-term effectiveness of their therapies.

### Conclusion

It can be concluded that acceptance and commitment therapy have a greater impact on the quality of life and health-promoting behaviors of women with gestational diabetes than compassion-focused therapy. It encourages individuals to communicate their experiences fully and without resistance as they move toward their worthy goals and to accept them without judgment.

### References

1. Domanski G, Lange AE, Ittermann T, Allenberg H, Spoo RA, Zygmunt M, et al. Evaluation of neonatal and maternal morbidity in mothers with gestational diabetes: a population-based study. *BMC Pregnancy Childbirth*. 2018;18(1):367.
2. Jafari-Shobeiri M, Ghojzadeh M, Azami-Aghdash S, Naghavi-Behzad M, Piri R, Pourali-Akbar Y, et al. Prevalence and risk factors of gestational diabetes in Iran: A systematic review and meta-analysis. *Iranian Journal of Public Health*. 2015;44: 1036–44.
3. Kubo A, Ferrara A, Brown SD, Ehrlich SF, Tsai AL, Quesenberry CP, et al. Perceived psychosocial stress and gestational weight gain among women with gestational diabetes. *PLoS One*. 2017;12(3).
4. Kc K, Shakya S, Zhang H. Gestational diabetes mellitus and macrosomia: A literature review. Vol. 66, *Annals of Nutrition and Metabolism*. 2015: 14–20.
5. Hinkle SN, Buck Louis GM, Rawal S, Zhu Y, Albert PS, Zhang C. A longitudinal study of depression and gestational diabetes in pregnancy and the postpartum period. *Diabetologia*. 2016;59(12):2594–602.
6. Lydon K, Dunne FP, Owens L, Avalos G, Sarma KM, O'Connor C, et al. Psychological stress associated with diabetes during pregnancy: a pilot study. *Ir Med J*. 2012;105(5):26–8.
7. Sauder KA, Starling AP, Shapiro AL, Kaar JL, Ringham BM, Glueck DH, et al. Diet, Physical activity and mental health status are associated with dysglycaemia in pregnancy: The Healthy Start Study. *Diabet Med*. 2016;33(5):663–7.
8. Horsch A, Kang JS, Vial Y, Ehlert U, Borghini A, Marques-Vidal P, et al. Stress exposure and psychological stress responses are related to glucose concentrations during pregnancy. *Br J Health Psychol*. 2016;21(3):712–29.
9. Mahmoodi Z, Gharachourlo M, Akbari Kamrani M, Tehranizadeh M, Kabir K. The effect of a health literacy approach to counselling on the lifestyle of women with gestational diabetes: A clinical trial. *F1000Research* [Internet]. 2018;7:282.
10. Badon SE, Enquobahrie DA, Wartko PD, Miller RS, Qiu C, Gelaye B, et al. Healthy Lifestyle during Early Pregnancy and Risk of Gestational Diabetes Mellitus. *Am J Epidemiol*. 2017;186(3):326–33.
11. Zhang CQ, Leeming E, Smith P, Chung PK, Hagger MS, Hayes SC. Acceptance and commitment therapy for health behavior change: A contextually-driven approach. *Frontiers in Psychology*. 2018;8.
12. Gedik Z. Self-compassion and health-promoting lifestyle behaviors in college students. *Psychol Heal Med*. 2019;24(1):108–14.
13. Terry ML, Leary MR, Mehta S, Henderson K. Self-Compassionate Reactions to Health Threats. *Personal Soc Psychol Bull*. 2013;39(7):911–26.
14. Friis AM, Consedine NS, Johnson MH. Does kindness matter? Diabetes, depression, and self-compassion: A selective review and research agenda. *Diabetes Spectrum*. 2015;28: 252–7.
15. World Health Organization. WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December 1996. World Health Organization; 1996.
16. Etemad K, Heidari A, Setoodeh A, Shayeganrad A, Akhlaghi A, Azizi M, et al. Health-related quality of life of parents of children with phenylketonuria in Tehran Province, Islamic Republic of Iran. *East*

- Mediterr Heal J. 2020;26(3):331–9.
17. Bahabadi FJ, Estebarsari F, Rohani C, Kandi ZRK, Sefidkar R, Mostafaei D. Predictors of health-promoting lifestyle in pregnant women based on pender's health promotion model. *Int J Womens Health*. 2020;12:71–7.
  18. Khayatan S, Aghaei A, Abedi M, Golparvar M. Effectiveness of Compassion-Acceptance and Commitment Combined Therapy with Cognitive-Behavioral Therapy on Interpersonal Forgiveness in Female Patients with Type II Diabetes. *Iranian Journal of Diabetes and Obesity*. 2018;10(4):194-203.
  19. Borgermans L, Marchal Y, Busetto L, Kalseth J, Kasteng F, Suija K, et al. How to Improve Integrated Care for People with Chronic Conditions: Key Findings from EU FP-7 Project INTEGRATE and Beyond. *Int J Integr Care*. 2017;17(4).
  20. Cooper R, Frearson J. Adapting compassion focused therapy for an adult with a learning disability—A case study. *Br J Learn Disabil*. 2017;45(2):142–50.
  21. Gilbert P, Basran J. Imagining One's Compassionate Self and Coping with Life Difficulties. *Ec Psychol Psychiatry*. 2018;12(7):971–8.
  22. Amirian K, Mami S, et al. Effectiveness of Group Psychotherapy Based on Acceptance and Commitment Therapy on Difficultes Emotion Regulation and Distress Tolerance in Substance Abusers. *J Educ Community Heal*. 2018;5(2):53–61.
  23. Lucas JJ, Moore KA. Psychological flexibility: Positive implications for mental health and life satisfaction. *Health Promot Int*. 2020;35(2):312–20.
  24. Ramaci T, Bellini D, Presti G, Santisi G. Psychological Flexibility and Mindfulness as Predictors of Individual Outcomes in Hospital Health Workers. *Front Psychol [Internet]*. 2019;10(6).
  25. Hasani J, Moradi A, Ebadi SA. Ecological Model of Adaptation with Diabetes type 2: Development and Study of Empiric Fitness. *International Journal of Applied Behavioral Sciences*. 2020;6(2):35-51.
  26. Tavan SH, Taher M, Nouhi S, Rajab A. Comparison of the Effectiveness of Training based on Positive Psychology and Motivational Interviewing on Emotional Distress in Patients with Type 2 Diabetes. *International Journal of Applied Behavioral Sciences*. 2020;7(3):25-35.
  27. Farahi S, Khalatbari J. Effectiveness of acceptance and commitment therapy on the life expectancy, resilience and death anxiety in women with cancer. *International Journal of Applied Behavioral Sciences*. 2019;6(3):9-19.