

# The Effect of the Psychological Empowerment and Dialectical Behavior Therapy on Infertile Women's Anxiety and Sexual Satisfaction in Pretreatment Phase of In Vitro Fertilization

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ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p><b>Background &amp; aim:</b> Due to the importance of psychological health of infertile women, this study aimed to determine the effectiveness of the psychological empowerment (PE) and dialectical behavior therapy (DBT) on infertile women's anxiety and sexual satisfaction during pretreatment phase of in vitro fertilization (IVF).</p> <p><b>Methods:</b> This clinical trial was conducted in February and March 2020 on 45 infertile women seeking IVF treatment, who referred to Isfahan infertility center. The participants were randomly assigned to three groups (two experimental groups and a control group, each with 15 participants). The experimental groups received psychological empowerment package (11 sessions) and dialectical behavior therapy (8 sessions) and the control group did not receive any intervention. The Depression, Anxiety, and Stress Scale and Sexual Satisfaction Scale-Women, whose reliability and validity were confirmed on Iranian sample were completed in pretest, posttest, and follow-up phases in the three groups. The data were analyzed using the repeated measures ANOVA in SPSS-24 software.</p> <p><b>Results:</b> The results showed that PE had a significant effect on reducing anxiety and increasing sexual satisfaction (<math>P &lt; 0.001</math>). Also, a significant effect of DBT was seen on reducing anxiety (<math>P &lt; 0.05</math>). However, it had no effect on increasing sexual satisfaction (<math>p &gt; 0.05</math>). The difference between the mean scores showed that PE was more effective than DBT in reducing anxiety and increasing sexual satisfaction.</p> <p><b>Conclusion:</b> Using PE improves infertile women's mental health by reducing anxiety and increasing sexual satisfaction so that it is expected to could positively affect the outcome of IVF.</p>
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## Introduction

Infertility affects women's life all over the world (1). The prevalence of infertility in various studies has been reported between 10-15% (2-4), and in Iran is reported to be 20.2% (5). Infertility refers to inability to become pregnant after one year of intercourse without contraception involving a male and female partner (6). Nowadays, in addition to

pharmacological methods, new techniques such as IVF are used for infertility treatment (7). Despite the successful results of IVF, it has psychological consequences such as psychological distress, fear, anxiety, sadness, and depression for infertile women. Psychological consequences of IVF are the most common reasons which couples stop infertility

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treatment associated with this treatment method (8).

In most cases, anxiety (i.e., worrying about a future threat) is the first negative emotional response to infertility problems and IVF in infertile women (9). In a recent study, 76% of infertile women referring to an infertility clinic reported evident symptoms of anxiety (10). In the study conducted by Sezgin et al. (2016), the level of anxiety of fertile and infertile women referring to health care centers was measured and compared; the results showed that anxiety level was significantly higher in infertile women than fertile ones (11). Moreover, diagnosis of infertility and negative psychological and physiological consequences of its treatment lead to sexual dysfunction and subsequent decreased sexual satisfaction (12). Sexual satisfaction means the level of satisfaction that each partner has from his/her sexual intercourse (13). The study conducted during 2000-2010 showed that infertile women suffer from reduced sexual orientation, increased sexual pain, and inability to reach sexual orgasm. Decreased sexual intercourse leads to increasing infertility (14).

Since psychological disorders including anxiety and sexual dissatisfaction of couple's affect infertility and the results of treatment, one of the main needs of current decade is to prevent and treat the psychological disorders caused by infertility. Numerous psychological interventions are used today to reduce the neurological and emotional pressures caused by infertility and treatment of sexual problems, including psychoanalytic interventions (15), mindfulness-based cognition (16), mindfulness-based group counseling (17), and collaborative infertility counseling (18). However, reducing the anxiety and stress caused by infertility is still considered a necessity (11). Also, most of the mentioned therapies focus on a specific and limited approach. However, for treating psychological disorders in infertile women, more effective, desirable, and long-lasting treatment results can be achieved by using broader interventions and their psychological capacities, (19). In this regard, identifying more effective treatment methods to reduce anxiety and increase sexual satisfaction of infertile women is important in the present study.

Psychological empowerment is a new intervention that significantly affects individuals' responses to stressors (20). Empowerment is defined as the opportunity an individual has for autonomy, choice, responsibility, and participation in decision making in organizations. Psychological empowerment refers to an "intrinsic task motivation reflecting a sense of self-control in relation to one's work and an active engagement with one's work role. Psychological empowerment package for infertile women has been developed and validated by Bahrami Kerchi, Manshaee, and Keshti Aray in 2019 [21]. In this treatment package, valid and efficient techniques and techniques have been used to prevent common psychological problems such as depression, anxiety, stress, physical, sexual and social issues related to infertility in infertile women. These techniques help infertile women improve self-confidence and ability to overcome feelings of helplessness, which means mobilizing their inner motivations to promote and maintain mental health. Studies on the effectiveness of this treatment package's indicated its significant effect on depression and stress in infertile women [22, 23]. Regarding the effect of empowerment on other psychological variables, one can refer to the meta-analysis relating the effective role of infertile women's cognitive empowerment strategies on psychological well-being and quality of life (24), the effect of empowerment on anxiety and depression in the youth (25), the effect of psychological empowerment on quality of life in patients with burning (26), the effect of personal empowerment training on reducing symptoms of depression and stress in abused women (27), the effect of psychological empowerment on medical personnel's quality of life (28).

Dialectical Behavior Therapy (DBT) is another new treatment that has been very promising for its effectiveness on psychological disorders. This approach combines the interventions related to cognitive-behavioral therapies that are based on the principles of change with the teachings and techniques of Eastern Zen philosophy. DBT Skills training comprises four modules: core mindfulness, distress tolerance, emotion regulation, and

interpersonal effectiveness (29). Many researches have been conducted on the effectiveness of DBT on psychological variables, including studies on its effectiveness on reducing anxiety and improving the social function of patients with diabetes (30), on reducing anxiety in male adolescents of divorced couples (31), on anxiety and mind rumination of patients with depression (32), on reduction of risky behaviors, depression, anxiety and stress in patients with HIV (33), and on reduction of inclusive anxiety in adolescents (34).

The difference between psychological empowerment therapy and DBT is as follows: DBT focuses on behavioral changes through learning, application, and generalization of specific adaptive skills taught in this treatment. Its ultimate goal is to help a patient to overcome a vicious cycle (35). The main body of psychological empowerment is the promotion of cognitive processes that increase intrinsic motivation in the client and affects the four cognitive domains, namely the feeling of impact, competence, sense of meaning, and the right to choose (36). The psychological empowerment method emphasizes increasing individual capabilities and training behavior change to deal with stressful situations. No literature was available in the search engines to compare these two treatment strategies. Still, the research results on the comparison of DBT with cognitive and behavioral approaches indicate their effectiveness on psychological variables (37-41). Therefore, comparing these two treatment packages (psychological empowerment and DBT) prevent and treat psychological problems from two different perspectives and identify a better therapy for reducing anxiety and enhancing sexual satisfaction among infertile women.

The following research question can be formulated: Do psychological empowerment package and DBT affect the anxiety and sexual satisfaction of infertile women seeking IVF? The present study was performed with aims to determine the effectiveness of the psychological empowerment package and DBT on anxiety and sexual satisfaction of infertile women during pre-IVF.

## Materials and Methods

This clinical trial study was performed with pretest-posttest control group research design and 45-day follow-up period. The IRCT code number was IRCT20200319046815N1. The present study was done in 2019 on 45 infertile women seeking IVF by referring to fertility and infertility centers in Isfahan. The complete enumeration sampling technique was used to select the participants. The subjects were randomly assigned to three groups (n=15 in each group). In the next step, the experimental groups (DBT group, psychological empowerment training group) and the control group were identified by simple random sampling (lottery). In most experimental and quasi-experimental studies, a sample size of 15 participants was considered for each experimental and control groups (42, 43). Based on the standard deviation of the anxiety variable obtained from the previous studies as 5.06 (30) at the 95% confidence level (Z value=1.96), the test's power of 0.90 (Z =1.28), and the value of the minimum significant difference between the mean scores of anxiety in the population and the sample (d-value in the formula) as 6.1 of the n value was calculated to be 14.44. Due to the possibility of loss during the study, 15 participants were considered for each group.

$$n = \frac{2\sigma^2(Z_{1-\alpha} + Z_{1-\beta})^2}{d^2}$$

The inclusion criteria were the age range of 30 to 45 years, seeking IVF, not using psychiatric drugs at least two weeks before starting treatment, no severe physical and mental illnesses, no primary infertility, Iranian citizenship, and being married during the study. The exclusion criteria included not attending more than one session in training classes, not receiving IVF treatment, having educational degree in the field of psychology, attending psychology training courses. The ethical code number issued by the research committee of the university's scientific research was IR.IAU.KHUISF.REC.1398.085. Observing ethical considerations and full confidentiality for each subject, and complete freedom and authority to withdraw from the research, giving comprehensive information about the research,

obtaining informed consent, and using the data were consistent with the research objectives. The psychological empowerment therapy group (11 sessions of 90 minutes) and DBT group (eight sessions of 90 minutes) were treated by a psychologist and therapist with a Ph.D. in psychology and with a decade of experience in education and treatment in the field of cognitive and behavioral therapies in Parsa Mehr Private School in Isfahan in two sessions per week in the evening shift in February and March 2020. The training was conducted through lectures and questions and answers along with exercises. An average of 15 participants attended each training session, and they were arranged in a U-shape to facilitate interactions between participants and the instructor. All the subjects actively participated in the training sessions.

Three Demographic Variables Questionnaire; Depression, Anxiety, and Stress Scale-21 Items (DASS-21; Lovibond & Lovibond, 1995); and Sexual Satisfaction Scale for women (SSS-W; Gracy & Lindaberg, 1997) were used in this study.

Depression, Anxiety, and Stress Scale-21 Items (DASS-21; Lovibond & Lovibond, 1995) are three self-assessment scales designed to measure negative emotional states, depression, anxiety, and stress. Each scale has seven questions, and each question uses a Likert scale ranging from 1 (strongly agree) to 3 (strongly disagree). Similarly, a subject's scores on the scales of anxiety, depression, and stress are obtained. In the study of Lovibond & Lovibond (1995) conducted on a large sample of students, the correlation of this scale with Beck's Depression Inventory was 74 and with the Beck Anxiety Inventory (BAI) was 81. Lovibond and Lovibond (1995) used another non-clinical sample to show that the reliability of the DASS-21 using Cronbach's alpha coefficients for all three subscales of depression, anxiety, and stress was 91, 84, and 90, respectively (35). In the present study, the reliability was calculated

as 0.73 via the test-retest method and 0.9 via Cronbach's alpha for the anxiety scale.

Sexual Satisfaction Scale for women (SSS-W; Gracy & Lindaberg, 1997) includes 17 questions scored on a 5-point Likert scale (Always/Most of the time/ Sometimes/ Rarely/ Never). The maximum score obtained is 85, and the minimum is 17. Poor sexual satisfaction is rated on a score ranging from 17 to 51, an average from 52 to 67, and a good score from 68 to 85 (44). WHO confirmed the validity of this questionnaire, and its reliability was also confirmed by evaluators' agreement with correlation coefficient (R) as 0.7 and  $r$  0.83, respectively. Its validity and reliability in Iran were confirmed by Keramat et al. with Cronbach's alpha coefficient of 0.94 (45). In the present study, Cronbach's alpha coefficient of this questionnaire was calculated to be 0.98.

After examining the criteria for entering the study and obtaining the informed consent from the infertile women seeking IVF, in the pretreatment phase to participate in the study, the DASS-21 and SSS-W were used as pretests. The psychological empowerment package and DBT groups were then treated by a specialist and experienced therapist in these two areas (with ten years of experience). The control group received no treatment. At the end of the two treatments, all three study groups responded to the DASS-21 and SSS-W. The psychological empowerment package was developed and validated by Bahrami et al. (2019) (21). DBT package, developed by Linehan (2008), was validated (46) by Shamloo, Modarres Gharavi, and Asgharipoor (47). Brief descriptions of psychological empowerment sessions and DBT are presented in Tables 1 and 2, respectively.

After collecting the data, descriptive statistics (including mean and standard deviation) and inferential statistics (including the repeated measures ANOVA and estimation of variables) were used to analyze the data by SPSS 24 software.

**Table 1.** Brief description of psychological empowerment package sessions prepared by Bahrami et al. (2019) (21)

Treatment sessions	A brief description of the sessions
First session	Group acquaintance, the introduction of the bases of psychological empowerment and its applications in individual and group life, training to determine specific capabilities, filling out a capacities questionnaire.
Second session	Treatment of infertility-related depression problems, training some techniques for being happy based on a sense of vitality and enthusiasm, training to recognize negative thoughts and methods to adjust.
Third session	Encouraging the participants to challenge issues while reinforcing meaning and happiness, training and familiarity with positive thinking and its effects on physical and mental health, and encouraging them to do so.
Fourth session	Treatment of infertility-related cognitive problems, practicing to recognize cognitive distortions and accompanying emotions, replacing logical and efficient thoughts with negative ones, analyzing monologues.
Fifth session	Treatment of obsessive-compulsive disorder related to infertility, training the relationship between thoughts and feelings, and implementing the technique to practice positive thoughts, training and implementing techniques to increase self-awareness.
Sixth session	Performing the diaphragmatic breathing technique and relaxation, training through self-immolation, performing meditation techniques.
Seventh session	Treatment of infertility-related stresses, stress management techniques, stress coping techniques through familiarity with effective coping skills (problem-oriented and emotion-oriented) and ineffective coping.
Eight session	Problem-solving familiarization techniques for conflicts and barriers, anger management technique, evaluation and anger exercise, and using alternative options instead of suppressing anger or exploding.
Ninth session	Expression training techniques, barriers to expressive behavior, development of sexual fantasies and effective verbal and non-verbal communication, control of anxiety, strengthening of self-confidence and sexual self-confidence.
Tenth session	Treatment of infertility-related social problems, learning about social support (personal and material resources) and its types, teaching to forgive the others' mistakes.
Eleventh session	Treatment of infertility-related physical problems, awareness of physical stress, training of mental and physical examination, training of visualization of thoughts and emotions of the body, and training of gradual muscle relaxation.

**Table 2.** A brief description of DPT sessions prepared by Linehan (2008) (46)

Sessions	Session descriptions
First session	Group acquaintance, presenting positive sentences, offering content and explain the reasons for learning this skill, recognizing emotions and accepting and controlling them, the correct views on emotions, modeling of mindfulness exercises and the logic of using it in infertile women, practicing, doing homework, and presenting a summary of the session.
Second session	Provide positive sentences, introducing a self-care approach, continue mindfulness skills, introducing mind levels, practicing self-awareness and abdominal breathing, practicing, offering feedback.
Third session	Emphasize mindfulness skills, practice to strength tolerance and the logic of using it, offering feedback, doing homework, presenting a session summary, and practice.
Fourth session	Continue to teach distress tolerance skills, pay attention to the mental levels, reducing vulnerability, practicing, offering feedback, and doing homework.
Fifth session	Practice relaxation and oral presentation, modeling emotion regulation skills and the logic of using it for infertile women, practicing, giving feedback, and doing homework.
Sixth session	Emphasize the use of mindfulness skills, enduring distress in daily meetings and life, continue to train emotion regulation skills, and practice.
Seventh session	Practice relaxation and oral presentation, modeling effective interpersonal skills and the logic of its use for infertile women, introducing the significance of interpersonal relationships and gaining more support in life and practice.
Eighth session	Continue to train effective interpersonal skills, practice them in the session, offer feedback, do homework, prepare a summary of the sessions, and introduce resources to continue the treatment, announcing the time of Treatment-seekers' evaluation results.

## Results

As the results indicate, mean age of the participants in the psychological empowerment group was  $39.6 \pm 3.26$ , in the DBT group was  $39.8 \pm 2.77$ , and in the control group was  $40 \pm 1.90$  years. Therefore, no significant difference was

observed among the three groups in terms of mean age ( $P=0.89$ ,  $F=0.112$ ). The results of other demographic variables are presented in Table 3. Table 3 showed that no significant difference between the demographic variables of the three groups ( $p > 0.05$ ).

**Table 3.** Demographic variables of infertile women during pre-IVF in the experimental groups and control group

Variable	Psychological empowerment group (n = 15)	DBT group (n = 15)	Control group (n = 15)	p-value
<b>Age (years)</b>				
Standard Deviation $\pm$ Mean	39.66 $\pm$ 3.26	39.81 $\pm$ 2.77	40 $\pm$ 1.90	0.891
<b>Duration of marriage (years)</b>				
Standard Deviation $\pm$ Mean	7.02 $\pm$ 1.92	6.98 $\pm$ 1.81	7.11 $\pm$ 1.91	0.076
<b>Infertility period (years)</b>				
Standard Deviation $\pm$ Mean	5.52 $\pm$ 1.86	5.15 $\pm$ 1.72	5.68 $\pm$ 1.91	0.304
<b>Level of Education</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>	
Diploma	1 (6.7)	2 (13.3)	2 (13.3)	0.922
Associate diploma	2 (13.3)	2 (13.3)	2 (13.3)	
BSc/BA	9 (60)	9 (60)	6 (40)	
MSc/MA	2 (13.3)	2 (13.3)	4 (26.7)	
PhD	1 (6.7)	0	1 (6.7)	
<b>Occupation</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>	
Housewife	8 (53.3)	8 (53.3)	10 (66.7)	0.446
Employee	2 (13.3)	5 (33.3)	3 (20)	
Self-employee	5 (33.3)	2 (13.3)	2 (13.3)	
<b>Economic status</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>	
Poor	3 (20)	4 (26.7)	3 (20)	0.623
Moderate	10 (66.7)	11 (73.3)	9 (60)	
Good	2 (13.3)	0	3 (20)	
<b>Illness</b>	<b>Number (%)</b>	<b>Number (%)</b>	<b>Number (%)</b>	
No illness	13 (86.7)	12 (80)	13 (86.7)	0.967
Physical illness	1 (6.7)	2 (13.3)	1 (6.7)	
Psychological illness	1 (6.7)	1 (6.7)	1 (6.7)	

Chi-square test was used for education level, occupation, economic status, and illness. Fisher's exact test was used for age, duration of the marriage, and duration of infertility. Significant difference ( $P < 0.05$ ). Descriptive indices of anxiety and sexual satisfaction variables in the pretest, posttest, and follow-up stages in infertile women during pre-IVF are presented in Table 4.

As Table 4 illustrates, the mean scores of anxiety and sexual satisfaction of the control group didn't significantly change in the posttest and follow-up stages compared to the pretest stage. The mean scores of anxiety in psychological empowerment and DBT groups significantly decreased in the posttest and

follow-up stages compared to the pretest stage. This difference is higher in the psychological empowerment group. The mean scores of sexual satisfaction in the psychological empowerment and DBP groups in posttest and follow-up stages significantly increased compared to the pretest stage. This difference is higher in the psychological empowerment group.

The Shapiro-Wilk Test results showed that the assumption of normality of anxiety scores at the significance level of 0.26 and sexual satisfaction at the significance level of 0.13 was confirmed. The results of Levene's test showed that the null hypothesis, i.e., the equality of variances of the three groups in the variability of anxiety in the pretest, posttest, and follow-up

stages were confirmed at significance levels of 0.65, 0.78, and 0.65, respectively, and in the sexual satisfaction variable in the stages at

significance levels of 0.87, 0.10 and 0.22, respectively.

**Table 4.** Descriptive indices of anxiety and sexual satisfaction variables in the pretest, posttest, and follow-up stages in infertile women during pre-IVF for the experimental groups and the control group

Variables	Psychological empowerment (N=15)	DBT (N=15)	Control (N=15)
<b>Anxiety</b>			
Pretest	29.13±4.32	30.20±4.31	30.00±4.88
Posttest	23.00±4.14	26.93±4.25	29.86±4.61
Follow-up	22.66±3.63	26.93±4.14	29.86±4.73
<b>Sexual satisfaction</b>			
Pretest	37.00±8.09	38.06±7.21	39.00±7.58
Posttest	40.33±8.82	39.13±7.05	39.66±6.42
Follow-up	40.80±8.52	39.66±7.09	39.66±6.83

The Box's M test results showed that the assumption of homogeneity of variance-covariance matrices of three groups in the dependent variables was confirmed at the significance level of 0.05 for anxiety and at the significance level 0.12 for sexual satisfaction. The results of Mauchly's test of sphericity for investigating the same variance differences

among the participants showed that according to the significance level (P <0.05), Mauchly's assumption of sphericity for the dependent variables was rejected. As a result, the Greenhouse test was used to investigate the research's questions. The results of two-way analysis of variance with repeated measures are presented in 5.

**Table 5.** Repeated measures ANOVA results in anxiety and sexual satisfaction of infertile women during pre-IVF

Variable	Effects	Sum of squares	Df	Mean of Squares	F-value	Sig.	Eta-squared	Test power
<b>Anxiety</b>	<b>Group</b>	568.311	2	284.156	5.242	0.009	0.200	0.80
	Test	313.91	1.50	208.43	117.60	0.001	0.73	1.000
	Test Interaction with the group	190.71	3.01	63.31	35.74	0.001	0.63	1.000
	Error	112.04	63.25	1.77				
	Effects	125.473	2	62.737	5.56	0.007	0.214	0.829
<b>Sexual satisfaction</b>	<b>Group</b>	105.79	1.10	95.49	26.11	0.001	0.38	0.99
	Test Interaction with the group	47.40	2.21	21.39	5.85	0.004	0.22	0.87
	Error	170.13	46.53	3.65				

Repeated measures ANOVA (p<0.05 as a significant difference)

The results of Table 5 showed that group effect, time effect, and group and time interaction are significant for the variables of anxiety and sexual satisfaction (p <0.01). The group effect showed a significant difference between the experimental and control groups in the variables of anxiety and sexual satisfaction (p <0.01). The effect of time showed a significant difference between pretest, posttest, and follow-up in anxiety and sexual satisfaction scores (p <0.01). In the anxiety variable, the value of eta

squared for the effect of time was 0.73, and the test power was 1.000. This result showed that 73% of the difference between pretest, posttest, and follow-up in anxiety scores related to actions was related to an independent variable (one of the psychological empowerment methods or DBT) approved with the power of 100%. In the variable of sexual satisfaction, Eta's value for the effect of time was 0.38, and the test power was 0.99. This result showed that 38% of the difference between pretest, posttest, and follow-up in sexual satisfaction scores was

related to independent variables (psychological empowerment or DBT methods). It was confirmed with the power of 99%. The interaction of test with the group showed a

significant difference between pretest, posttest, and follow-up in anxiety and sexual satisfaction scores in the experimental and control groups ( $p < 0.01$ ).

**Table 6.** Bonferroni test to compare the experimental groups and the control group in anxiety and sexual satisfaction

Compared groups	Mean Difference	Standard error deviation	Sig.
<b>Anxiety</b>			
Comparison of the psychological empowerment package group with the control group	-4.97	1.552	0.003
Comparison of DBT with the control group	-3.88	1.552	0.048
Comparison of the psychological empowerment package group with DBT	-1.09	1.552	0.043
<b>Sexual satisfaction</b>			
Comparison of the psychological empowerment package group with the control group	2.68	1.879	0.044
Comparison of DBT with the control group	0.56	1.879	0.515
Comparison of the psychological empowerment package group with DBT	1.92	1.879	0.039

As shown in Table 6, the psychological empowerment package and DBT significantly affected the anxiety in the experimental group compared to the control group ( $p < 0.05$ ). There was a significant difference between the psychological empowerment package and DBT ( $p < 0.05$ ). The difference between the mean scores indicated that the psychological empowerment package had a higher effect on the anxiety variable than DBT. The psychological empowerment package had a significant effect on the sexual satisfaction in the experimental group compared to the control group ( $p < 0.005$ ). However, DBT in the posttest and follow-up stages didn't significantly affect the sexual satisfaction in the experimental group compared to the control group ( $p > 0.05$ ). There was a significant difference between the psychological empowerment package and DBT groups ( $p < 0.05$ ).

## Discussion

From the results of the present study showed that psychosocial empowerment and DBT reduced infertile women's anxiety during pre-IVF. Psychological empowerment also increased the sexual satisfaction of women during pre-IVF. The difference in the mean scores of anxiety in the test stages showed that psychological empowerment in reducing anxiety scores was

more effective than DBT. However, there was a significant difference between the two psychological empowerment and DBT interventions. Therefore, psychological empowerment compared to DBT is an effective way to increase sexual satisfaction in infertile women. Since the psychological empowerment package is a novelty for infertile women, no research has been conducted on the subject, especially on their anxiety and sexual satisfaction. The results of the present study are consistent with those of Taibi et al. (2018), who conducted a study on the effectiveness of cognitive empowerment strategies on psychological well-being in infertile women and increasing their quality of life (24); Travis et al. (2019) who investigated the effect of empowerment on reducing anxiety and depression in the youth (25), Mohaddes et al. (2019) who evaluated the effect of psychological empowerment on quality of life in burn patients (26), Esmeralda et al. (2019) who studied the effectiveness of individual empowerment training on reducing depression symptoms and stress in abused women (27), and Cougot et al. (2019) who examined the effectiveness of psycho-cognitive empowerment on the medical personnel's quality of life (28).

The effectiveness of psychological empowerment package on reduction of pregnancy anxiety in IVF pretreatment can be explained by the fact that psychological empowerment package makes infertile women know their strengths by training special abilities. Awareness of strengths is one factor that empowers women and creates internal motivations, improve self-confidence, sense of ability, and adequacy. They feel empowered and can cope with feelings of helplessness, enhance their performance in stressful life situations, and reduce anxiety and psychological consequences (36). In psychological empowerment sessions, diaphragmatic breathing techniques and relaxation training through self-immolation and meditation techniques were used to deal with physiological side effects of anxiety. Since psychological performance is associated with physiological performance, reduction in anxiety's physiological symptoms can decrease psychological symptoms and subsequently improve psychological performance (17). In psychological empowerment sessions, by teaching physical stress awareness, practicing mental-physical examination increases the seekers' self-awareness about physical and mental stress. Moreover, practicing imagery of thoughts, emotions, and body senses and training to replace negative thoughts and emotions with positive ones can reduce anxiety and stress. These techniques can create optimism and hope for IVF treatment outcomes.

The effectiveness of psychological empowerment package on increasing the sexual satisfaction of infertile women during pre-IVF can be explained by the fact that one of the factors affecting sexual satisfaction is the quality of marital relationships (48). Pre-IVF can disrupt a couple's relationship. In psychological empowerment sessions, training problem-solving, conflict resolution, anger management techniques, and using alternatives instead of suppressing anger or exploding can improve couples' relationships and subsequently increase sexual satisfaction. Moreover, by training stress management and anxiety techniques, the negative emotions of may reduce. Therefore, this intervention can lead to the improvement of their sexual performance and sexual satisfaction. Besides, training

expressive techniques, barriers to expressive behavior, developing sexual fantasies, and establishing effective verbal and nonverbal communication strengthen self-confidence and sexual self-esteem, and ultimately sexual satisfaction.

The results of the present study, the effectiveness of DBT on the anxiety of infertile women during pre-IVF, are consistent with the results of Nourizadeh and Alizadeh (2018) that reported the effectiveness of DBT on reducing anxiety and improving the social performance of patients with diabetes (30), Goodini et al. (2019) that evaluated the effectiveness of dialectical behavioral therapy on reducing anxiety in male adolescent and children of divorce (31), Taheri Daghiyani et al. (2019) that examined the effectiveness of DBT on lowering anxiety and intellectual rumination of patients with depression (32), Brlier et al. (2018) that assessed the effectiveness of DBT on reducing cerebral atherosclerosis, depression, anxiety and stress in patients with AIDS (33), and Bahrami Moghadam et al. (2018) that reported the effectiveness of DBT on reducing Generalized Anxiety Disorder (GAD) in adolescents (34). The effectiveness of DBT on reducing anxiety in infertile women during pre-IVF can be explained. In DBT sessions, training mindfulness, stress tolerance, as well as the logic of using them as components of accepting this treatment, and training emotional regulation skills and interpersonal skills as components of changing this treatment result in a stress reduction, increase the ability to resolve interpersonal conflicts, acceptance of emotions by focusing on the present time, and reforming emotion-based misconceptions, and a decrease in anxiety in the treatment-seekers (40).

The ineffectiveness of DBT on increasing sexual satisfaction of infertile women during pre-IVF can be explained in this study. Less DBT sessions (8 sessions) compared to psychological empowerment sessions (11 sessions) could be one reason for non-effectiveness of this treatment on increasing sexual satisfaction during pre-IVF. As the number of treatment sessions increases, treatment-seekers can benefit from more psychological training techniques and exercises related to these techniques. As a result, they benefit from

significant treatment outcomes. Also, due to the particular focus of DBT on resolving interpersonal conflicts, the husbands' presence in treatment sessions can effectively improve the resolution of interpersonal disputes. This strategy can be a facilitator for increasing sexual satisfaction in infertile women during pre-IVF.

The first limitation of the present study is related to the sample of infertile women during pre-IVF. In this regard, it is not possible to generalize the results to all infertile women, and the study needs to be repeated until the final results are obtained in this group. In the process of measurement, this method may provide superficial information mixed with socially desirable. Given the above, it is suggested that the of psychological empowerment therapy and DBT be performed on infertile women who are not during pre-IVF. The interviewing technique to obtain more in-depth information and a self-answer questionnaire can be examined in future studies.

## Conclusion

The psychological empowerment Package is a good intervention to reduce anxiety and increase the sexual satisfaction of infertile women during pre-IVF stage. It increases the treatment seekers' self-awareness, recognizes their strengths and weaknesses, and mobilizes their motivations. DBT is also a good treatment method to reduce anxiety in infertile women during pre-IVF stage. In these treatment sessions, the therapist reduced anxiety in the infertile women during pre-IVF via mindfulness and acceptance of emotions to facilitate their mental health by reducing anxiety and increasing the sexual satisfaction and positive effect on the outcome of IVF.

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## Conflicts of interest

Authors declared no conflicts of interest.

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