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Original Article

Effectiveness of applying problem-solving training on depression in Iranian pregnant women: Randomized clinical trial

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Abstract:

BACKGROUND: Depression during pregnancy is one of the major concerns in mental health, hence using interventional methods for the treatment or reducing the rate of depression is considered a priority for maternal and fetal health. The present study aimed to examine the effectiveness of problem-solving training in reducing depression in pregnant women.

MATERIALS AND METHODS: This randomized clinical trial was conducted on seventy pregnant women referring to Prenatal Care Clinics, Najmiyeh hospital in Tehran, Iran. The participants were randomly allocated divided into experimental and control groups. The experimental group was given routine prenatal care training at the clinic along with problem-solving skills training based on the Identify, Define, Explore, Act, Look back model in five sessions, but the control group only received routine prenatal care training. Data were collected using the Beck's Depression Inventory at the beginning of the study and at the immediately and 1 month after two groups. Data were analyzed using descriptive and analytical statistical tests.

RESULTS: In the experimental group, the mean depression score significantly reduced from 16.06 ± 4.73 before intervention to 12.83 ± 4.10 and 13 ± 4.24 after intervention and at follow-up ($P < 0.05$). While in the control group, the mean depression from 15.34 ± 2.94 before intervention to 14.80 ± 2.76 and 14.86 ± 2.924 after intervention and at follow-up. It was not statistically significant in the control group ($P > 0.05$).

CONCLUSIONS: Problem-solving training can be used as an optional method of reducing depression in pregnant women, and it is recommended that should be implemented by the health-care team.

Keywords:

Depression, pregnant women, problem-solving, randomized clinical trial

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Introduction

Depression is often viewed as a disturbance of emotion, but its behavioral aspects such as social withdrawal are as important.[1] Although depression has been recognized as a clinical syndrome for over 2000 years, as yet no completely satisfactory explanation of its puzzling and paradoxical features has been found.[2] According to the World Health Organization report, depression is the fourth major health problem in the world, and based on the figures announced, 340 million people worldwide suffer from depression and according to estimates, it is expected that the disease will become the second most common disease in the world by 2020.[3] Depression is one of the leading causes of disability worldwide among women,[4] and pregnancy increases the risk of depression[5] as during pregnancy and postnatal mothers experience many

psychological and physiological changes. Most pregnant women experience changes in body signs, their work and activity, as well as in relationships with others and being influenced by different life stresses increase during this period. These changes make women vulnerable in their pregnancy to psychological disorders.[6,7] Approximately 10% to 25% of women experience depression during pregnancy.[8-12] The results of some studies have reported a direct relationship between women's mental health during pregnancy and pregnancy outcomes, especially in the first 3 months after delivery,[13] such that the rate of depression in the second trimester has been reported between 12% and 15%[14,15] and in the third trimester to 14%.[14] In some studies, the frequency is different due to their economic situation, such that the rate has been reported 7%–15% in the developed countries and[16] 19%–25% in the developing countries[17] and even 50% in a study in the third trimester.[18] In Iran, the prevalence of depression in 28.8% of pregnant women[19,20] shows the importance of the issue. In another study, the rate of depression in pregnant women was reported 25%. Factors such as maternal anxiety, life stress, history of depression, lack of social support, unintended pregnancy, Medicaid insurance, domestic violence, lower income, lower education, smoking, single status, and poor relationship quality and life stresses have important roles in depression during pregnancy.[21] Depression during pregnancy is of great importance due to adverse effects on mother, infant, and family.[5,22] The decrease in the number of pregnant women attending prenatal clinic to receive prenatal care,[16] preterm labor,[23] low birth weight,[24] preeclampsia,[25] turning to smoking, drinking, and drug use and as a result sudden infant death syndrome[26] and suicide are among depression complications during pregnancy.[27] Kahn *et al.* have shown that pregnant women with depression or anxiety or both report significantly more physical complaints.[28] Psychological stresses during pregnancy, delivery, and lactation can associate with unpleasant consequences such as abortion, nausea and vomiting, preeclampsia, weight loss, preterm delivery,[29] immune system suppression and thus increased episiotomy infections, neonatal infections, and different degrees of postpartum psychiatric disorders.[30] Furthermore, many studies have reported that the lack of mental health in pregnant women and malnutrition and lack of physical health in children following depression during pregnancy including problems a child might have during and pregnancy such as high heart rate,[31] excessive fetal activity[32] increased physiological reaction,[33] poor relationship between mother and neonatal,[34] malnutrition and episodic diarrhea, susceptibility to acute respiratory infections in childhood, incompatibility with the environment and even antisocial behaviors in older ages,[35] and finally, maternal depression can affect all of family members, thus the person's family members

are at risk of depression. Sometimes, depression can even cause problems in couple's relationship.[36]

Untreated depression in women during pregnancy will be risky for mother and child. Studies in this area suggest that depression symptoms during pregnancy are the strongest predictor for postpartum depression.[16,28,37,38] Pakenham *et al*. also reported that severe depression in primiparous women in the third trimester of pregnancy is positively associated with severe stressful life events, threat assessment, wishful thinking, and poor positive reappraisal coping style.[39] Identification and treatment of women with depression during pregnancy will not only help alleviate depression in this period but also reduce rates of postpartum depression. Depression in pregnant women can be treated by medication and psychological treatments.[27] Nonmedical treatments and behavioral therapy are more recommended for mild and moderate depressions.[40,41] Since the toxic side effects of medications on mother and the fetus and passage of antidepressants through the placental barrier and their secretion in breast milk, medications are used cautiously.[42] Such cases have led to the development of nonpharmacological and psychological interventions.[43] For behavioral therapy interventions, some researchers compared the effectiveness of problem-solving approach with other methods. In one of these studies, Mynors *et al*. (2000) compared the effect of problem-solving therapy with pharmacological treatment and combination of these two methods in reducing depression symptoms. The researchers assigned participants into three groups of problem-solving therapy, and pharmacological treatment and combination of problem-solving therapy and pharmacological treatment and their research were performed with a follow-up period of 6, 12, and 52 weeks after treatment. Their results showed that the problem-solving therapy group enjoyed a greater reduction in depression symptoms compared to pharmacological treatment group. The combined treatment group did not show greater reduction in depression symptoms compared to problem-solving group.[44] One of the interventions used to treat depression is problem-solving training approach. This type of treatment is a form of short-term psychological intervention[45] and can be used alone or in combination with other treatments.[43] The problem-solving training includes five steps: (1) attitude, this step suggests that before you attempt to solve a problem, you should adopt a positive, optimistic attitude toward the problem and your own ability to cope with it; (2) defining your problem and setting realistic goals; (3) being creative and generating alternative solutions; (4) predicting the consequences and developing a solution plan; (5) trying out your solution plan and determining if it works.[46] Training and practice of problem-solving skills lead people to define problems, generate different

solutions, decide to choose the best solution, and thereby, implement their problem-solving strategies.[47]

Many studies such as Vasilevskaia, Mynors-Wallis *et al*., and Areán *et al*. have shown that problem-solving approach is effective in reducing depression[27,44,48] and also due to the importance of maternal mental health and the effects, it has on the child's and family's health and given that in many studies, due to the potential effects of this complication on maternal and fetal health, necessity of screening and examining psychological symptoms, especially depression routinely have been emphasized in pregnant women.[40,49] The promotion of health and maintaining the mental health of pregnant women is an important factor in the stability of the family and community. Now, we are faced with the essential aim and question of whether cognitive skill training, such as problem-solving, is effective on reducing depression in pregnancy?

Materials and Methods

Study design and participants

This randomized controlled trial was conducted in 2012 on pregnant women attending Prenatal Care Clinics of Najmiyeh Hospital in the city of Tehran, Iran. Sampling began after the acquisition permission from the Ethics Committee of Research and Technology Deputy of Baqiyatallah University of Medical Sciences under the number 93124.

The researcher visited pregnant women in the prenatal care clinics and reviewed 289 pregnant women conveniently selected in terms of eligibility criteria. Once the women expressed willingness, they then underwent Beck's Depression Inventory (BDI) score testing and those with a score of 11 or higher were enrolled in the study and completed the sociodemographic questionnaire. Sample size was calculated through Altman tomogram $\alpha = 0.05$, and the power of the study $(1-\beta)$ was set at 90% $\beta = 0.1$, the final sample size was calculated as 70 considering a 10% possible dropout. An investigator who had not been involved in the delivery of the intervention prepared the randomization assignments. To do this, the researcher prepared a list of numbers from 1 to 70, and then, samples were allocated into two equal groups by a random number table. Afterward, 70 eligible pregnant women were randomly divided into experimental and control groups, each with 35 women. Inclusion criteria included pregnant women with uncomplicated pregnancy, not having participated in other similar studies; willingness to participate in the study; entering the third trimester of pregnancy based on last menstrual period; and having mild-to-severe depression (score of 11 or higher) according to the BDI. Exclusion criteria included pregnant women at the risk of preterm labor; history of depression and hospitalization with any other mental illness; history of infertility, participation in classes for problem-solving training; unwillingness to continuing to participate in the study, being absent in more than two sessions of training course; having underlying medical condition (such as diabetes, thyroid, and placenta previa); and other serious medical and emotional problems during the third trimester of pregnancy.

Instruments

Data collection tools in this study were demographic characteristics questionnaire including age, occupation, education, number of children, number of pregnancies, prenatal knowledge of fetal sex, and type of previous delivery. The self-reported BDI was also used to measure depression in this study. BDI consists of 21 items and depression intensity is measured on a scale from 0 to 3. Beck *et al*. obtained test–retest reliability coefficient of 0.93 within a week in 1996.[50] Several studies have been performed on the validity of the BDI[51] which show that the scale is considered acceptable for Iranian samples.[52]

Intervention

The experimental group was given routine prenatal care trainings at clinic along with problem-solving skills training based on IDEAL model (Identify, Define, Explore, Act, Look back), but the control group only received routine prenatal care trainings. The experimental group was trained the steps of problem-solving approach in group or in person for a period of 5 weeks in 5 sessions each 1.5 h. To complete the training, the participants of this group were also given an educational pamphlet. All participants in the experimental and the control groups answered the BDI three times, before of the study (pretest), after the last training session, (posttest or immediately), and a 4 week after the last educational session of the experimental group (follow-up).

Ethical considerations

The ethics committee of the acquisition permission from the Ethics Committee of research and technology deputy of Baqiyatallah University of Medical Sciences (no: 93124). In this study, to observe ethical considerations, the objects of the study were explained to the participants, informed consent was obtained from them, and the right to withdraw from the research was considered for each participant and they were assured that the questionnaire results will not be posted in their files. It should be noted that after performing the follow-up testing, the educational pamphlet was given to the control group, as well. This study is registered at the Iranian registry of clinical trials (registration number IRCT201306258290N4).

Data analysis

The data were analyzed by SPSS version 16 software (SPSS Inc., Chicago, IL, USA). Before the initiation of the analysis, normality of the quantitative data was confirmed using Kolmogorov–Smirnov test. The verification of homogeneity for general characteristics of the participants was analyzed using the Chi-square test, Fisher's exact test, and an independent *t*-test. Independent *t*-test was used for comparison of the mean score depression between experimental and control groups. Repeated-measures ANOVA was also used to compare the statistical difference in the mean depression scores at the three measurement time points and to assess the reciprocal effect of the type of intervention and time on the level of depression. $P < 0.05$ was considered statistically significant for all tests.

Results

At the first, 289 pregnant women were eligible to participate in the study. Before randomly allocate, seven participants were withdrawn all remaining 282 participants willingness to participate in the study and attended all educational sessions. Hence, based on the sample size calculated, seventy pregnant women were randomly assigned in the experimental group ($n = 35$) and the control group ($n = 35$) [Figure 1].

The mean age of all participants was $27.03 \pm 4/33$ years, the majority (75.7%) of them was employed, all were literate, and nearly half of the women had diploma or higher education 61.4% were primigravid women. Chi-square and independent *t*-tests showed no statistically significant differences in demographic and obstetric characteristics between the two groups ($P > 0.05$) [Table 1].

The outcomes of measures are reported in Table 2. The result of independent *t*-test in intergroup comparison indicated that there is no statistically significant difference ($P = 0.45$) in the mean scores depression between the intervention group 16.06 (4.73) and control group 15.34 (2.94), in preintervention step.

In postintervention step, after intervention, mean score depression was statistically significant difference in the two groups ($P = 0.02$) in terms of the aforementioned
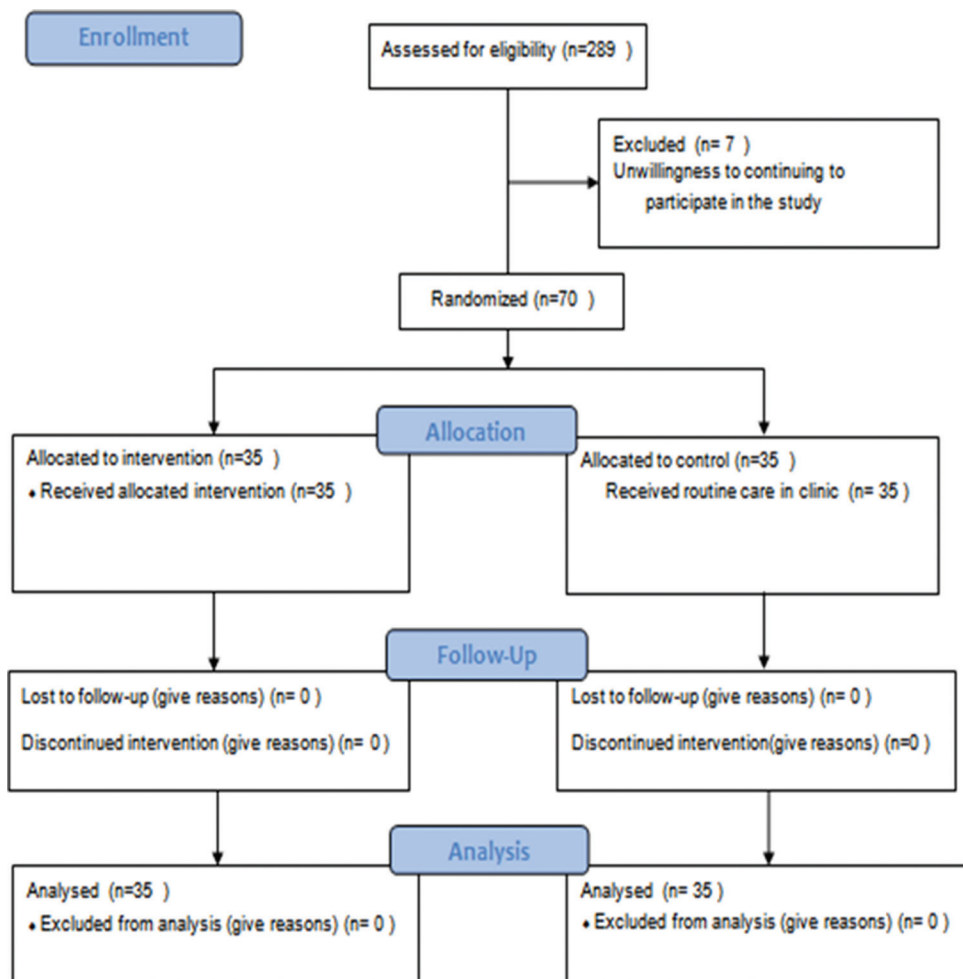

Figure 1: The process of the study according to consort flow diagram

variable in intervention group 12.83 ± 4.10 and that of the control group 14.80 ± 2.76. Finally, after 1 month (following step), the results of mean score depression were statistically significant difference in the two groups ($P = 0.03$). In terms of the aforementioned variable in intervention group 13 ± 4.24 and that of the control group 14.86 ± 2.92.

In repeated-measures ANOVA, Mauchly's Test of Sphericity was not statistically significant ($P = 0.19$) and repeated-measures ANOVA showed no statistically significant difference in the mean depression in the control group at the three measurement time points ($P > 0.05$). However, the same test showed a statistically significant difference in the experimental group ($P < 0.001$) [Table 2] [Figure 2].

Discussion

Mother's mental health is an important issue during pregnancy and postpartum and depression is one of the determinants of mental health. Postpartum depression is not only problematic for the mother but also adversely affects the entire family. Depression symptoms during pregnancy are the strongest predictor for postpartum depression, so that Bunevicius *et al.* who examined the psychological risk factors for depression during pregnancy concluded that unintended and unplanned pregnancy and neurotic disorders are predictors of depression during pregnancy[53] and given that

postpartum depression has moderate-to-severe effects on mother–infant interaction,[54] and control and mitigation of this behavioral disorder are certainly very important during pregnancy.

Therefore, the current study was conducted with the aim to examine the effect of problem-solving skill training on depression in pregnant women. The results of the research show that the mean depression score before and after problem-solving skill training significantly reduced in the intervention group. In line with this study, there are other studies on the frequency and factors associated with depression in pregnant women and also using coping strategies, and there are few studies on behavioral intervention to reduce depression in pregnant women. For instance, Faisal-Cury *et al.* reported depression during pregnancy 21.1% and found that the frequency is associated with the amount of using problem-solving strategy.[55] Vasilevskaia considers social problem solving as moderator of certain stressors during pregnancy and depression symptoms during pregnancy and states that negative life events are predictors of depression.[27] Therefore, creating social problem-solving ability can be an important variable that regulates the relationship between stressor and depression. Kaaya *et al.* also found the effect of group counseling for problem-solving approach in reducing major depression in pregnant women with HIV positive.[56] On the other hand, Silverstein *et al.* in their comparative study reported that problem-solving

Table 1: Sociodemographic characteristics of participants by the study group

Characteristics Variable	Experimental (*n*=35)	Control (*n*=35)	*P*
Age (year), mean±SD	27.80±4.57	26.26±3.99	0.40*
Number of pregnancy, *n* (%)			
1	21 (60.00)	22 (62.9)	0.96**
2	10 (28.6)	9 (25.7)	
≤3	4 (11.4)	4 (11.4)	
Working status, *n* (%)			
Employed	26 (74.3)	27 (77.1)	0.51**
Unemployed	9 (24.7)	8 (22.9)	
Educational level, *n* (%)			
High school	2 (5.7)	4 (11.4)	0.61**
Diploma	16 (45.7)	17 (48.6)	
University	17 (48.6)	14 (40)	

*Independent-sample *t*-test, **Chi-square test. SD=Standard deviation
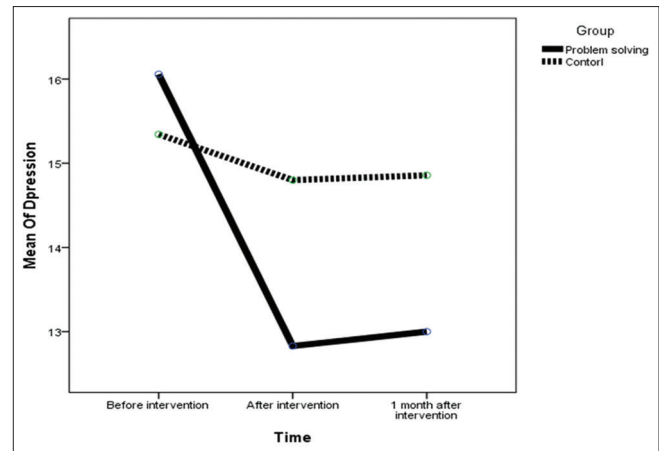
Figure 2: The mean score depression at different times before and after intervention in each group

Table 2: Comparative of measurements of means scores depression between and within groups

Variable	Mean±SD		*P*
	Experimental group	Control group	Independent *t*-test
Before intervention	16.06±4.73	15.34±2.94	0.45
After intervention	12.83±4.10	14.80±2.76	0.02
1 month after intervention	13±4.24	14.86±2.92	0.03
P (repeated-measures ANOVA)	*F*=72.50, *P*=0.001		

SD=Standard deviation

training was effective in reducing depression in mothers with low income who had premature infants compared to the control group.[57] In Iran, many studies have reported the frequency of depression during pregnancy 21/3%–45/7%,[58-63] but no study has been reported on problem-solving training intervention and its effect on depression in pregnant women. Meanwhile, in many other studies including Lotfinia *et al.* (2009) and Kahrazi *et al.* (2003), the effectiveness of problem-solving skills training in reducing depression has been emphasized but in other study populations including the students of schools and universities.[64,65]

Arean *et al.* (2010) also compared the effect of problem-solving therapy with supportive treatment among people with depression. The results of the study with a follow-up period of 3, 6, 9, and 12 weeks showed that although both methods of problem-solving therapy and supportive treatment were effective in reducing depression intensity, the problem-solving therapy was more effective than supportive treatment.[48] According to results presented by researchers, it can be concluded that using problem-solving training is more effective for treating depressive disorders in primary care compared to similar interventions.

The findings of the current research also indicated that training problem-solving skills are significantly effective in reducing depression in pregnant women in the third trimester, and the mean difference of depression scores in the experimental and control groups at posttest and the significance level of this difference also confirms this matter. In this regard, Nezu and Nezu found that using five-step problem-solving model is a moderator of the relationship between stress and depression.[66] Hadidi *et al.* (2015) argue that detection of risk factors and coping strategies and also depression symptoms in patients can prevent the recurrence of depression,[67] and long-term effects of using this method have been emphasized in many patients including patients with breast cancer, hemodialysis patients, and patients with cancer.[68]

Due to the above findings and the effectiveness of training problem-solving skills in reducing depression and considering studies of Barrio and Burt, Evans *et al.*, Kahn *et al.*, and Heron *et al.* showing that depression during pregnancy is a predictor of postpartum depression.[16,28,37,38]

Conclusions

Based on the results, the hypothesis of the current study is confirmed, i. e., using problem-solving training is effective in reducing depression in pregnant women. Regarding the high prevalence of postpartum depression, this skill can also be effective in preventing

this disorder. In addition, it helps women to better resolve interpersonal problems with their spouse, children, and others and increase their decision-making power and quality of life for women.

Due to the frequency of psychological disorders during pregnancy such as depression and the consequences on the health of mother and fetus and infant and even child, at first, it is recommended that pregnant women be screened for depression similar to other prenatal cares, and then, the cases diagnosed be followed up and treated in accordance with the degree of depression. Therefore, it is recommended routinely to use a screening tool suitable for assessing the mental all health of pregnant women. Then, according to the result, it is recommended that short-term courses for problem-solving should be implemented in prenatal education programs by the care team including midwives and nurses. Using problem-solving approach is recommended as an effective method in reducing depression in pregnant women. For this purpose, using a short-term and low-cost training by care team, midwives, and nurses in health centers can reduce the incidence or rate of depression in pregnant women, and as a result, their health level and the health of families can be improved. In addition, it is suggested that problem-solving training can be used as an instrument in treatment approaches to postpartum depression symptoms.

Conflicts of interest
There are no conflicts of interest.

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