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ORIGINAL PAPER

The Effect of Counselling on Depression and Anxiety of Women with Unplanned Pregnancy: A Randomized Controlled Trial

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Abstract
This randomized controlled trial was conducted on 80 Iranian pregnant women with unplanned pregnancy. The participants were randomly assigned to two groups of intervention and control. The intervention group received one to three sessions of individual counseling and six sessions of group counseling each week in six consecutive weeks, and the control group received routine care. The Edinburgh Postnatal Depression Scale and the Spielberger State-Trait Anxiety Inventory were completed by the participants before and 4 weeks after the intervention. There was no significant difference between groups in terms of socio-demographic characteristics, and the baseline depression and anxiety scores ($P > 0.05$). The depression and anxiety scales were completed before and 4 weeks after the intervention. The mean scores of depression, state anxiety, and trait anxiety were significantly lower in the counseling group than in the control group 4 weeks after the end of intervention. It is recommended that counseling should be provided for women with unplanned pregnancy.

Keywords Maternal–Fetal Relations · Unintended Pregnancy · Depressions · Anxiety · Counseling

Introduction

Unplanned pregnancy refers to cases in which the mother does not intend to be pregnant (unwanted) or intends to become pregnant in the future (mistimed) (Brown and Eisenberg 1995). About half of the pregnancies in the world and about one third of pregnancies ending in childbirth are unplanned (Orr et al. 2000). In Iran, 30.6% of pregnancies are unplanned (Moosazadeh et al. 2014). Some of the factors associated with an unplanned pregnancy include sexual intercourse at a young age, poor sexual skill during the first intercourse, smoking and drug use, low educational level (Wellings et al. 2013), and poverty (Hellerstedt et al. 1998).

Women's desire to become pregnant is closely associated with health-related behaviors and the outcomes of childbirth (Dye et al. 1997). In other words, unplanned pregnancy is a determining factor in receiving inadequate perinatal care or postponing the first prenatal visit (Watkins 1968). These women use less folic acid than women with planned pregnancies and are more likely to be smokers (Cheng et al. 2009). Even after giving birth, some mothers cannot breastfeed successfully (Gipson et al. 2008). On the other hand, children born after unplanned pregnancies are more likely to have developmental, educational, and psychological problems (Baydar 1995). In addition, women with unplanned pregnancy are 2.5 times more exposed to depression (Faisal-Cury et al. 2017) and anxiety (Karmaliani et al. 2009). In general, 40–45% and 20% of women with an unplanned pregnancy experience anxiety and depressive symptoms, respectively (Major et al. 2009). These psychological disorders during perinatal and postnatal periods have a negative effect on women's compliance during the transition to parenthood (Figueiredo et al. 2008).

About 15% of the general population suffer major depressive disorders. People with major depressive disorders are

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also affected mentally, emotionally, and physically. In addition, depression disrupts family and social relationships as well as occupation. On the other hand, depression also exacerbates or worsens other physical illnesses. Suicide is the worst outcome of untreated major depressive disorders (Panel 1994). Pregnancy increases the incidence of depression in women, especially in those who are more exposed to psychological stress, such as women with unplanned pregnancy who are more at risk for depression during pregnancy. Clinically, depression during pregnancy increases the risk of complications, such as abortion, preeclampsia, and preterm labor, and also makes it difficult to carry out routine activities. In other words, depression during pregnancy results in not performing or postponing prenatal care, inadequate nutrition, smoking, and consumption of alcohol or other harmful substances during pregnancy. On the other hand, there is a significant relationship between depression and severe nausea and vomiting (hyperemesis gravidarum). Pregnant women under such conditions are more likely to request a leave of absence in comparison with other pregnant women without depression. Moreover, the rate of cesarean section on maternal request and epidural anesthesia in this group of pregnant women is higher (Gentile 2017).

Anxiety is the most common disorder among mental illnesses (DuPont et al. 1996). Mood disorder or anxiety occurs often due to specific stressors, and anxiety alone is a chronic stressor (Alder et al. 2007). Anxiety disorder refers to an excessive and pervasive concern about unimportant issues, job security, financial affairs, the health of beloved ones, and the upcoming events. The spectrum of anxiety in this mental illness can vary from non-pathological to uncontrolled (Antony and Stein 2008). Anxiety during pregnancy is common (Heron et al. 2004) and is associated with low birth weight for gestational age, preterm labor (Cardwell 2013), and preeclampsia (Wagner 2004). On the other hand, mother's anxiety can lead to higher levels of catecholamines in her body and reduce the transfer of oxygen and nutrients to the fetus (Copper et al. 1996). Anxiety during pregnancy shortens telomeres, which reduces the life span of the children of these mothers (Entringer et al. 2013). Moreover, anxiety in this period is associated with the behavioral and emotional problems of children in adulthood (Van den Bergh and Marcoen 2004), and these children suffer from higher levels of anxiety and fear than other children (Bergman et al. 2008). In general, if a woman has more than 15% anxiety in her lifetime, her child will develop behavioral, emotional and developmental problems twice as this rate at the age of 4 to 7 (O'connor et al. 2003).

Counseling help raise people's awareness and emotional and perceptual acceptance (Corney and Jenkins 2005). Adaptation to a particular critical situation, such as pregnancy and childbirth as stressful events in every woman's life, is an application of counseling (Sadock and Sadock 2011). Although obstetrics pays more attention to natural and abnormal physiological changes to achieve successful pregnancy outcomes, very little attention is paid to the psychological changes of pregnant mothers (Bellieni et al. 2007). Patient-centered counseling which is performed carefully using communication skills promotes the therapeutic relationships between the therapist and the patient, leading to better results (Cushing and Metcalfe 2007). According to a study, prenatal education is effective on mothers' adaptation to psychological needs during pregnancy; this is based on a series of classes that inform mothers about the stages of fetal development, and help them respond to perinatal stimuli (Bellieni et al. 2007).

Since 35% of pregnancies are unplanned (Borrero et al. 2017), and women with unplanned pregnancies experience high levels of anxiety and depression (Karmaliani et al. 2009), it seems that these women need more supportive interventions (Figueiredo and Costa 2009). The evidence shows that lack of access to counseling services is associated with symptoms of depression (Lincoln et al. 2008), and in-depth psychosocial screening and counseling are recommended for women with unplanned pregnancy (American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women 2006). Therefore, considering the importance and necessity of paying attention to women with unplanned pregnancies, and given the lack of research on women with unplanned pregnancies, the present study aimed to determine the effect of counseling on depression and anxiety of women with unplanned pregnancy.

Materials and Methods

Design of Study and Participants

This study is a randomized controlled clinical trial which was performed on 80 pregnant women aged 15–49 with unplanned pregnancies who visited the health centers of Ardebil, Iran. Sampling started in April and ended in October 2017.

The inclusion criteria were singleton pregnancy, gestational age of 18 to 24 weeks, unwanted or mistimed pregnancy, lack of obstetric problems such as gestational diabetes, preeclampsia, bleeding, placenta previa, symptoms of threatened abortion, and preterm labor. The exclusion criteria were history of mental illness or current illness, use of psychiatric drugs or psychotropic substances, history of marital problems or conflicts according to the patient's remarks, diabetes or history or diabetes, hypertension, bleeding and preterm labor.

This study is part of a large project in which anxiety and depression were investigated as secondary outcomes. The sample size was calculated using G-Power, considering 15%

reduction in the mean score of anxiety and depression with test power 80%, and with regard to the data of state and trait anxiety and depression in the study by Shahhosseini et al. (2008):

State anxiety ($m_1 = 38.5$, $m_2 = 32.7$, $sd_1 = sd_2 = 9.9$, $n = 37$)
Trait anxiety ($m_1 = 41.2$, $m_2 = 35$, $sd_1 = sd_2 = 9.2$, $n = 28$)
Depression ($m_1 = 51.93$, $m_2 = 44.1$, $sd_1 = sd_2 = 10.4$, $n = 23$)

Since the sample size determined based on state anxiety was larger than that of the other cases, the sample size was considered 40 women, assuming a drop of 10% women.

Sampling

Sampling started after obtaining the ethical code and registration of the study on Iranian Registry of Clinical Trials (IRCT) website (IRCT2016122710324N36). The participants were selected using convenience sampling; to this end, the researcher attended the governmental and not referral health centers of Ardebil city in Iran. In Iran, all pregnant women have health records in public health centers and receive prenatal care, free of charge. The researcher selected the women who visited these centers for the second trimester of pregnancy care and whose pregnancy was unwanted or mistimed as stated by them. Then, she introduced herself, explained the main objective of the study, briefly explained the research stages, and initially registered the women interested to participate in the study. After that, they were provided with more detailed information about the objectives, importance, and benefits of participation in the study as well as the implementation stages of the research. After expressing their willingness to regularly and continuously participate in the study, the written informed consent was obtained and the socio-demographic characteristics questionnaire, the Edinburgh Postnatal Depression Scale (EPDS), and the Spielberger State-Trait Anxiety Inventory (STAI) were completed by the researcher using interviews.

Randomization

The participants were randomly divided into two 40-member groups, namely counseling and control, using the website www.random.org through block randomization with four and six blocks (stratified based on unwanted and mistimed pregnancies). Block randomization was performed by a person not involved in sampling and data analysis. To conceal the allocation sequence, the type of intervention was written on a paper and placed in opaque envelopes with consecutive numbers.

Intervention

The intervention group received one sessions of group counseling along with introduction (30 min) and five sessions of group counseling (90 min in groups with 7–10 women). The sessions were planned by the researcher and weekly held in six consecutive weeks. The counseling sessions were interactive and contributors were fully involved in question and answer.

An individual counseling session was held for each participant in the intervention group, which increased to three sessions as demanded by some of the participants. To achieve effective communication, the counseling principles and techniques were used in all counseling sessions, in a respectful and intimate atmosphere, to strengthen the spirit of self-esteem and prepare the ground for individuals' participation in group discussions.

The outlines of the counseling sessions included the expression of physiological, anatomical, and hormonal changes during pregnancy, familiarity with fetal development during pregnancy, unplanned pregnancy complications faced by the mother and the fetus and continuation of the complications after delivery, solutions for further compliance with pregnancy; the effect of nutrition and prenatal care on maternal and fetal health; the process of delivery and its stages and postpartum care; the importance of early mother-infant communication after birth as well as the importance of early breastfeeding; signs and symptoms of risk in pregnancy and their treatment and the effect of pregnancy changes on mother's mental health, and acceptance of maternal role. The control group received only the routine pregnancy care including weight and vital signs control, periodic laboratory tests to monitor the health of the mother and fetus and to check for warning signs as vaginal bleeding, rupture of membranes, preeclampsia, etc. and also providing the routine educations regarding diet, breastfeeding, signs and symptoms of labor and delivery, etc.

Four weeks after the end of the intervention, the Edinburgh Postnatal Depression Scale (EPDS) and the Spielberger State-Trait Anxiety Inventory (STAI) were again completed by the participants.

Data Collection Tools

Data were collected using socio-demographic questionnaire, the EPDS and the STAI. The socio-demographic questionnaire included questions about maternal ages, number of children, undergoing medical ultrasound, and fetal gender determination, maternal and paternal satisfaction with the fetal gender, maternal and paternal job and education, economic condition, the first decision after becoming aware of pregnancy, consultation on abortion, and the reason for continued pregnancy.

The EPDS was developed by Cox et al. in 1978 and includes ten items based on a 4-point Likert scale. Each question has a score of zero to three, with a minimum score of zero and a maximum score of 30. In this research, a score of more than 12 was considered depression. In Iran, the validity and reliability of this tool was confirmed with a Cronbach's alpha coefficient of 0.83 (Mazhari and Nakhaee 2007) and an internal correlation coefficient of 0.80 (Montazeri et al. 2007).

The STAI includes 40 items in two parts; the first part refers to the individual's state anxiety and includes 20 items based on a 4-point Likert scale (never to too much), in which each item is scored from zero to three The second part has also 20 items (21 to 40) based on a 4-point Likert scale (almost never to almost always) and is used to measure the individual's trait anxiety. The items 1, 2, 5, 8, 10, 11, 15, 16, 19, 20, 21, 23, 26, 27, 30, 33, 34, 36, 39 are scored inversely. The scores of two parts for both state and trait anxieties are summed and calculated separately. This scale correlates with the Taylor Manifest Anxiety Scale (TMAS), which indicates its criterion validity, and correlation coefficients have been reported between 75 and 85% (Spielberger 1983). According to a study in Iran, the Cronbach's alpha coefficient was 0.92 in the state anxiety scale and 0.90 in the trait anxiety scale (Taghavi et al. 2013).

Content validity was used to determine the validity of the socio-demographic characteristics questionnaire. To this end, the ten faculty members of the Faculty of Nursing and Midwifery were provided with the questionnaire. After collecting their opinions, necessary corrections were made and the reliability of the depression and anxiety questionnaires were determined by a conducting a pilot study on 20 individuals and calculating the Cronbach's alpha coefficient (internal coherence), which was obtained 0.823 for depression, 0.932 for state anxiety, and 0.923 for trait anxiety.

Statistical Analysis

The data were analyzed in SPSS-21 (SPSS Inc., Chicago, IL, USA). First, the normality of quantitative data was investigated using the K–S test, and all data were normally distributed. To compare the socio-demographic characteristics between the groups, independent t, Chi square, and Fisher exact tests were used.

The independent *t* test was used to compare the depression and state and trait anxiety scores between the groups before the intervention, and the ANCOVA test with adjusted preintervention scores after the intervention. All analyses were performed based on intention to treat. $P < 0.05$ was considered as significant.

Ethical Approval

This study was approved by the Ethics Committee of Tabriz University of Medical Sciences (Ethics code: IR.TBZMED.REC.1395.1104).

Results

The study was conducted from April to October, 2017. From 250 pregnant women with unplanned pregnancy and gestational age of 18 to 24 weeks who visited the health centers, 25 were excluded due to unwillingness to participate in the study, and 75 due to failing to meet the inclusion criteria (21 women with a history of mental illness, 19 with marital problems, and 35 with history of diseases). The remaining 80 women were randomly assigned to two groups, namely intervention and control. During the implementation phase, three women in the intervention group (two cases due to having a child under 2 years of age and one unwillingness to receive counseling) and one in the control group (due to abortion) were excluded. Finally, 37 women remained in the counseling group and 39 in the control group, and they were analyzed (Fig. 1).

There was no significant difference between the two groups in terms of socio-demographic characteristics ($P > 0.05$). The mean (SD) age of the participants in the intervention and control groups was 28.5 (7.4) and 30.7 (5.4) years, respectively. Table 1 shows the socio-demographic characteristics in two study groups.

The mean (SD) depression score in the intervention group decreased from 11.1 (6.2) before counseling to 6.3 (5.9) 4 weeks after counseling; however, the mean (SD) depression score in the control group was 10 (5.7) before the intervention and 10.7 (5.8) 4 weeks after the completion of the counseling. There was no significant difference between the intervention and control groups before the intervention in terms of depression score ($P = 0.425$). However, based on the ANCOVA test and controlling the preintervention depression score, the mean depression score in the counseling group was significantly lower than in the control group (adjusted mean difference: −4.6, CI 95% −6.5 to −2.6; $P < 0.001$).

The mean (SD) state anxiety score in the intervention group decreased from 44.7 (11.3) before intervention to 36.4 (11.2) 4 weeks after counseling; however, the mean (SD) state anxiety score in the control group was 43.9 (11.9) before the intervention and 44.8 (11.6) 4 weeks after the completion of the counseling. There was no significant difference between the intervention and control groups before the intervention in terms of state anxiety score ($P = 0.759$). Based on the ANCOVA test and controlling the preintervention state anxiety score, the mean state anxiety score in the

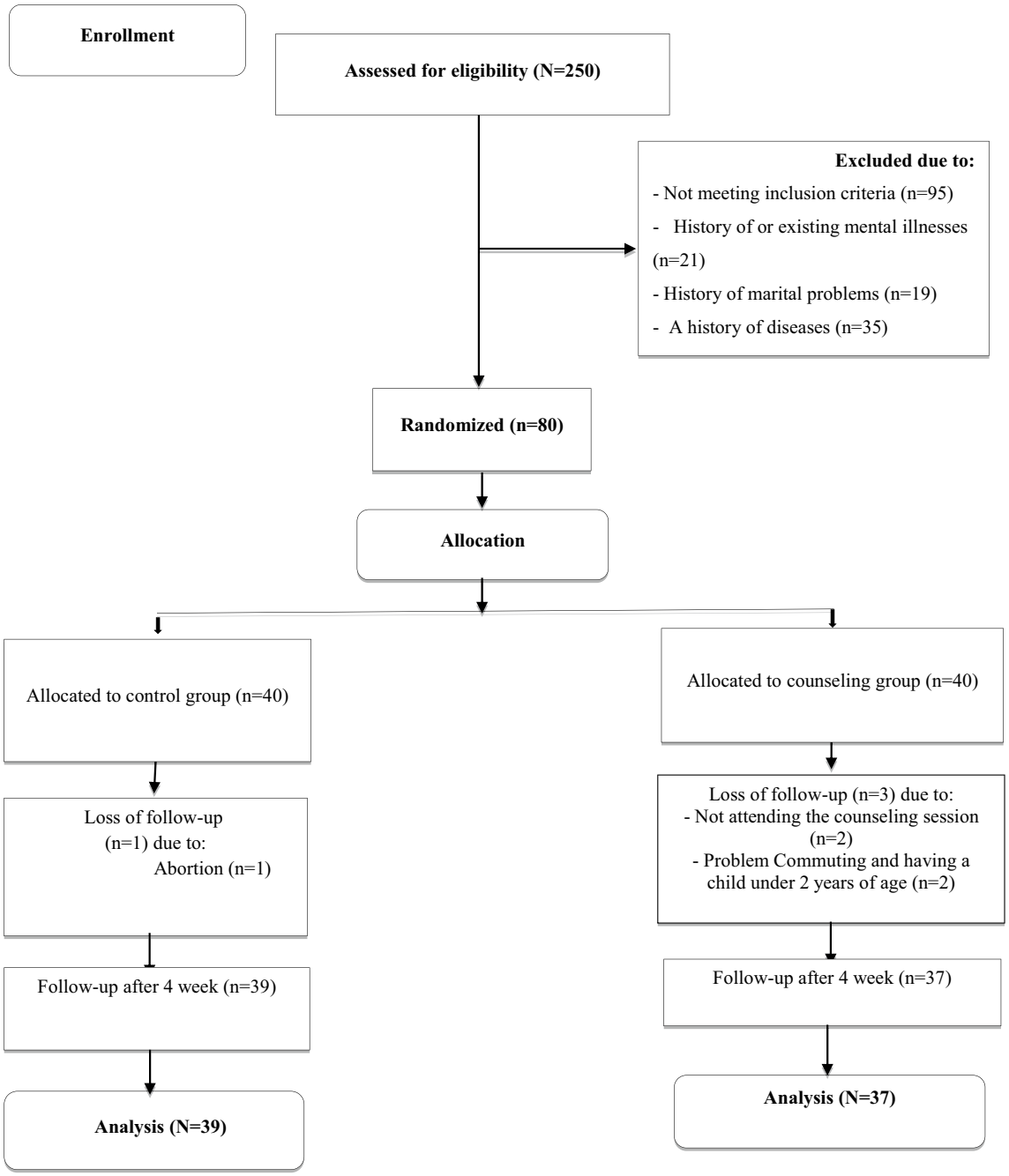

Fig. 1 Flowchart of the study

counseling group was significantly lower than on the control group (adjusted mean difference: −7.8, CI 95% −4.5 to −11.1; P < 0.001).

The mean (SD) trait anxiety score in the intervention group decreased from 43.2 (10.3) before counseling to 35.8 (10.3) 4 weeks after counseling; however, the mean (SD) trait anxiety score in the control group was 41.5 (10.2) before the intervention and 42.9 (11.4) 4 weeks after the completion of the counseling. There was no significant difference between the intervention and control groups before the intervention in terms of trait anxiety score (P = 0.473). Based on the ANCOVA test and controlling the preintervention trait anxiety score, the mean trait anxiety score in the counseling group was significantly lower than on the control group (adjusted mean difference: −8.2, CI 95% −10.9 to −5.4; P < 0.001) (Table 2).

Table 1 Socio-demographic characteristics of participants in study groups

Characteristic	Counseling (n = 40) number (%)	Control (n = 40) number (%)	P-value
Age[#]	28.5 (7.4)	30.7 (5.4)	0.142[*]
Number of children			0.006[‡]
Zero or one	22 (55)	17 (42.5)	
Two or more	18 (45)	23 (57.5)	
Undergoing medical ultrasound			0.083[†]
Yes	36 (90)	29 (72.5)	
No	4 (10)	11 (27.5)	
Fetal gender determination			0.628[†]
Girl	18 (50)	17 (56.7)	
Boy	18 (50)	13 (43.3)	
Maternal satisfaction with the fetal gender			0.742[†]
Yes	29 (80.6)	26 (86.7)	
No	7 (19.4)	4 (13.3)	
Paternal satisfaction with the fetal gender			1.000[†]
Yes	32 (88.9)	27 (90)	
No	4 (11.1)	3 (3)	
Maternal job			1.000[‡]
Housewife	38 (95)	38 (95)	
Employee	2 (5)	2 (5)	
Paternal job			0.528[‡]
Worker	6 (15)	7 (17.5)	
Employee	8 (20)	4 (10)	
Shopper	6 (15)	4 (10)	
Other	20 (50)	25 (62.5)	
Maternal education			0.717[§]
Primary school	4 (10)	4 (10)	
Secondary school	10 (25)	4 (15)	
High school	3 (7.5)	4 (10)	
Diploma	17 (42.5)	16 (40)	
University	6 (15)	10 (25)	
Paternal education			0.121[§]
Illiterate	0	1 (2.5)	
Primary school	8 (20)	3 (7.5)	
Secondary school	4 (10)	8 (20)	
High school	3 (7.5)	4 (10)	
Diploma	11 (27.5)	17 (42.5)	
University	14 (35)	7 (17.5)	
Economic condition			0.173[§]
Adequate	14 (35)	9 (22.5)	
Less than adequate	23 (57.5)	23 (57.5)	
Inadequate	3 (7.5)	8 (20)	
The first decision after becoming aware of pregnancy			1.000[†]
Abortion	10 (25)	9 (22.5)	
Continue	16 (40)	16 (40)	
Hesitate	14 (35)	15 (37.5)	
Counseling on abortion			0.568[†]
Yes	9 (22.5)	6 (15)	
No	31 (77.5)	34 (85)	
The reason for continued pregnancy			0.792[‡]
Maternal desire	19 (47.5)	20 (50)	

Table 1 (continued)

Characteristic	Counseling (n = 40) number (%)	Control (n = 40) number (%)	P-value
Husband's insist	12 (30)	13 (32.5)	
Family or friend's insist	6 (15)	5 (12.5)	
Lack of access to abortion equipment	2 (5)	0	
Hearing the fetal heart sounds	1 (2.5)	2 (5)	

[§]Linear-by-linear association

[‡] Fisher's exact test

[†]Chi square

[*]Independent T-test

[#]Mean (SD)

Table 2 Comparison of depression and state-trait anxiety in intervention and control groups before and after counseling

Variable	Counseling group (n = 37) mean (SD)	Control group (n = 39) mean (SD)	Mean difference (95% confidence interval)	P-value
Depression				
Before intervention	11.1 (6.2)	10 (5.7)	1.1 (−1.6 to 3.7)	0.425[*]
4 Weeks after intervention	6.3 (5.9)	10.7 (5.8)	−4.6 (−6.5 to −2.6)	< 0.001[†]
State anxiety				
Before intervention	44.7 (11.3)	43.9 (11.9)	0.8 (−4.4 to 5.9)	0.759[*]
4 Weeks after intervention	36.4 (11.2)	44.8 (11.6)	−7.8 (−11.1 to −4.5)	< 0.001[†]
Trait anxiety				
Before intervention	43.2 (10.3)	41.5 (10.2)	1.6 (−2.9 to 6.2)	0.473[*]
4 Weeks after intervention	35.8 (10.3)	42.9 (11.4)	−8.2 (−10.9 to −5.4)	< 0.001[†]

[*]Independent T-test

[†]ANCOVA

Discussion

The results of this study indicate that the level of depression and state and trait anxiety in women with unplanned pregnancy decreased 4 weeks after intervention in counseling group. The results of this study are consistent with the results of other studies. In a controlled clinical trial, Kordi et al. (2016) examined the guided imaging intervention on 67 pregnant women with unplanned pregnancy. In this study, 35 women in the intervention group received a guided imaging session at the gestational age of 34 weeks and then performed it at home twice a week for 2 weeks using the CD they were provided with. The control group received routine pregnancy care; the results showed a decrease in the levels of depression and anxiety in the intervention group. In the aforementioned study, all participants were nulliparous and the intervention type differed from the counseling intervention of this study.

In a clinical trial by Spinelli and Endicott (2003), the effect of interpersonal psychotherapy interventions and parental education on reducing depression among pregnant women were compared. 50 pregnant women with a gestational age of 16 to 36 weeks, in the age group of 18 to 36 year, participated in the above-mentioned study, and were randomly assigned into the interpersonal psychotherapy group (intervention) and the parental education group (control). One of the conditions for parental education was lack of using counseling techniques. According to the results, interpersonal psychotherapy decreased depression in the intervention group. There are fundamental differences in terms of the type of intervention and the number of participants between the current study and the one mentioned above. However, the abovementioned study also confirms the impact of counseling techniques on decreasing depression among pregnant women, which is also used in the present study.

According to a review study by Dennis and Hodnett (2007), not only psychosocial interventions are effective in decreasing depression during pregnancy, but also, as studies suggest, they have longer-lasting effects on decreasing depression than any type of drug interventions.

In a quasi-experimental study, Delaram and Soltanpour (2012) investigated the effect of counseling on the anxiety of

primiparous women in the third trimester of pregnancy. The number of participants was 68 women and both the intervention and control groups had 34 participants. In addition to routine pregnancy care, the intervention group received counseling on various issues of pregnancy and delivery during each visit. However, the control group only received routine pregnancy care. The results showed a decrease in anxiety in the intervention group at the time of delivery. This study was also carried out on nulliparous women, regardless of whether their pregnancies were planned or not.

According to a clinical trial by Bastani et al. (2005) entitled "Does relaxation training affect the outcomes of pregnancy in anxious primiparous women?" 110 women aged 18 to 30 years in the gestational age of 14 to 28 weeks were included in the study and equally divided into the intervention and control groups. The intervention group received seven 90 min sessions of relaxation training for 7 weeks; the control group received routine care. The results of this study indicated that the level of anxiety decreased in the intervention group and the participants had a better mental health and pregnancy outcomes. The target group of this study was only primiparous women, and no attention was paid to the planned or unplanned pregnancy. In addition, the type of intervention and the number of sessions were also different from the present study. Both studies investigated the level of anxiety among mothers.

In an interventional study by Momeni et al. (2018) on 96 pregnant women, the intervention group received five sessions of group psychological counseling and the control group received routine care. The results showed that the counseling reduced the state and trait anxiety in the intervention group. The difference of our study and this one is that sampling group in the Momeni et al.'s study is not women with unplanned pregnancy.

The results of the present study and the above mentioned similar studies indicate the positive effect of counseling on decreasing of depression and anxiety in pregnant women. Although the most studies were conducted on pregnant women regardless of whether their pregnancies were planned or not, however, the results of all studies show the importance of appropriate counseling services during pregnancy. The present research shows that the counseling about psychosocial issues related to unplanned pregnancy is often limited. Based on the obtained results, providers should be well advised to provide counseling sessions for women with unplanned pregnancy in order to offer the opportunity for women with unplanned pregnancy to discuss their feelings about the pregnancy. Implementing of such sessions can support these women and prevent from the mental health problems such as depression and anxiety.

About 40% women suffered from moderate to severe anxiety and depression during pregnancy (Molarius et al. 2009). Depression and anxiety during pregnancy is not merely a health problem for pregnant women, it also affects fetal development. In other words, anxiety during pregnancy makes women afraid of childbirth and consequently undergo cesarean section. Depression in this period can cause postpartum depression. Given these conditions, it is better to start psychological interventions during pregnancy (Bennett et al. 2004; Rubertsson et al. 2014). Since any woman during her fertility period can be exposed to unplanned pregnancy (Iranfar et al. 2005) and this type of pregnancy is directly related to depression and anxiety (Karmaliani et al. 2009), it is recommended that some interventions, including psychological intervention as the best option during pregnancy, should be carried out to improve the condition of these women. Given the continuous relationship between women and healthcare workers during pregnancy, primary prevention and early intervention, known as a major strategy during pregnancy, should start by healthcare professionals during this period (Austin 2004).

Limitations and Strengths

As a limitation of this study, the effect of counseling was investigated 4 weeks after the end of the intervention, and it was not investigated after delivery to determine the impact of continuation of such counseling on postpartum depression or anxiety. Positive aspects of this study include involvement of unplanned pregnant women, as well as the observance of all principles of clinical trial, including random allocation and allocation concealment.

Conclusion

The results of this study indicate that counseling reduces the level of depression and anxiety in unplanned pregnancies. Due to the high rate of unplanned pregnancy and high prevalence of depression and anxiety in this group of women, appropriate training and counseling packages, in addition to routine pregnancy care, can be provided for women with unplanned pregnancy.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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