The influence of mindfulness-based stress reduction (MBSR) on stress, anxiety and depression due to unwanted pregnancy: a randomized clinical trial

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Keywords
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Background. Individuals with unwanted pregnancies often experience high levels of anxiety, stress and depression that associated with maternal-neonatal outcomes. Mindfulness training is a safe and acceptable strategy to support mental health before parturition. Purpose. The main objective of present study was to evaluate the influence of eight-week application of mindfulness-based stress reduction program. Method. In this study, 60 women with unwanted pregnancy before 32 weeks of gestational age were selected and randomly divided into two groups. Intervention group received MBSR sessions, practice at home and the recorded sound. Mental health was evaluated before intervention and at the end of the eight sessions by standard stress, anxiety and depression DASS-21 questionnaire. Data were analyzed using Chi-square, Mann-Whitney U and Wilcoxon tests. Findings. In order to compare pre-test and post-test scores in each group, the Wilcoxon Test was used. The results revealed that the participants in the intervention group reported a significant decrease in mean scores of stress, anxiety and depression compared to baseline (P = 0.0). Whereas no significant decrease in mean stress, anxiety and depression score were found in control group. P-value was estimated to be 0.346, 0.212 and 0.343 respectively. Conclusions. The mindfulness program has effectively reduced stress, anxiety and depression. Further research is needed to investigate the mechanisms and effects of mindfulness on maternal-neonatal outcomes.

Introduction
An unwanted pregnancy is unwanted or mistimed pregnancy. A mistimed pregnancy occurs in women who conceived sooner or later than the desired time. It happens in women who do not want any more children at the time of the conception [1]. Studies have shown that 49-51 percent of pregnancies in the United States of America are unwanted. Over time, the number of births due to requested pregnancy is decreased and births due to unwanted pregnancy are increased [2]. Unwanted pregnancy can lead to a wide range of physical and psychological consequences for mother and child and affects different aspects of social, economic and cultural health of the community [3, 4]. Women with unwanted pregnancies are most likely to receive inadequate pre-partum care and there were observed also high rates of alcohol consumption and smoking as well as premature labor as well as low birth weight and lactation among them [3, 5, 6]. In addition, the risk of physical and mental health problems increases among their children [3, 7, 8] which is one of the global concerns due to its association with physical, mental, social and economic consequences [9]. Unwanted pregnancy is one of the most common and debilitating factors of women’s mental health in fertility ages which, in turn, causes depression during pregnancy and after childbirth [10]. According to Abajobir et al. (2016), the prevalence of depression during pregnancy in women with unwanted pregnancies is twice [11]. Anxiety and depression are often experienced simultaneously [12, 13]. Anxiety appears to be influenced by emotion-oriented coping styles including emotional, selfish responds and fantasy reactions. Therefore, it is likely for consistent coping program such as mindfulness-based stress reduction program (MBSR) to reduce depression, anxiety and stress [13]. Early pregnancy depression in addition to predicate post-partum depression symptoms increases anxiety and stress in late pregnancy [14]. Based on the studies, unwanted pregnancy is associated with high levels of depression and perceived stress [15-18]. High stress level increases the risk of maternal mental health problems by mitigating coping skills [11]. In response to the stress levels, mindfulness
increasingly focuses on mental concentration as a key stress management strategy in order to help individuals more effectively respond to stressors [19]. According to the findings, MBSR program has been effective in reducing psychological symptoms [13, 20]. However, the potential benefits of MBSR program were not addressed in reducing depression, anxiety and stress among unplanned pregnant women. Accordingly, the purpose of this study was to investigate the effectiveness of counseling of MBSR as an intervention to reduce unwanted pregnancy depression, anxiety and stress.

**Methods**

**TYPE OF STUDY**

The data were collected from a randomized clinical trial in which the effect of independent variable, MBSR, on dependent variable, psychological reactions (e.g. anxiety, depression and stress), was measured.

**SAMPLES AND STATISTICAL POPULATION**

Participants were eligible pregnant women with unplanned pregnancies under 32-weeks of gestational age. Studies show that women with unwanted pregnancies are less likely to seek prenatal care and sometimes may not return until late in pregnancy. Since the purpose of this study was only to investigate the effect of mindfulness on mental disorders in women with unwanted pregnancies; therefore, to access more samples, we examined pregnant women under 32 weeks of gestational age. Sampling was carried out in Sirjan-kerman health center from 2018 to 2019.

**INCLUSION CRITERIA**

Inclusion criteria involved having a spouse aged 15-49 years, pregnancy less than 32 weeks [21, 22] and not suffering neuro-psychiatric disorder, absence of drug abuse, Lack of psychiatric medication as well as lack of convulsions and mental disability, readiness and consent to participate in this study.

**EXCLUSION CRITERIA**

The exclusion criteria included missing more than 2 sessions in training course, failure to follow instructions and exercise related to each session, participant’s unwillingness to continue, stressful events, acute and unexpected events at each stage of the plan and acute psychotic disease.

**SAMPLE SIZE AND SAMPLING**

Using software GPower V.3.1 and sample size formula to compare mean values at two groups and taking a = 0.05 and 1-ß = 0.9, standard deviation of 6.22 depression in the study of Hosseini Shahidi et al. [23], and the difference of average at least 5 aspects of depression in two groups into account, the sample size included in each group was estimated to be 25 subjects. Taking the loss of sample size by 15%, 30 subjects were considered. In this randomized cluster sampling, 6 health centers were selected from the existing 19 centers. Two health centers selected from each districts of the city; One center was considered as an intervention and one as a control. Thus, all pregnant mothers under 32 week of pregnancy were contacted by telephone and those who had unplanned pregnancies were invited to clinic to complete the questionnaire. Women who had a stress score higher than 14 or an anxiety score higher than 7 or a depression score higher than 9 were identified. So, 60 people, 10 eligible patients from each center were selected. Afterward, among those with psychological symptoms, 30 subjects were selected for intervention group and 30 subjects were selected for control group, randomly (Fig. 1).

**DATA COLLECTION AND METHODOLOGY**

The protocol for this study was reviewed and approved by the human ethics committee of Kerman University of medical science (IR.KMU.REC.1397.487). 60 women with unplanned pregnancies who had at least one designated case of cut off for stress, anxiety or depression responded to the invitation to participate and informed and written consents were obtained from the participants. Subjects were randomly divided into two groups of MBSR treatment and control. The main content of MBSR program was standard yoga, sitting, walking, breathing, body scan and eating meditation; that was performed by a mental health midwife who had educated in conselling in midwifery and was trained about several kinds of intervention for improving mental health. This program was conducted for 8 sessions and each session lasted for 2 hours (one session per week). Participants followed instructions for mindfulness meditation, exercise group discussion and homework assignments during 8 weeks. The control group received only routine pregnancy training and care. The summary of training session is presented in Table I. In the eight sessions and at the end of the program, the questionnaires were again reviewed for depression, anxiety and stress in each group.control group were at waiting list and also after the post-test, an educational pamphlet containing a summary of the contents of the counseling sessions was provided to them.

**MEASURING TOOLS**

Depression, anxiety and stress DASS-21 scale was used. This scale contains 21 items related to three subscales of depression DASS-21, anxiety DASS-21 and stress DASS-21. That is the summarized version of fundamental DASS-21 questionnaire that includes 7 items per subscales. Items were expressed on a 4-point Likert spectrum ranging from 0 to 3 meaning 0 = no and 3 = most of the time, and the sum of the scores obtained from each scale would be multiplied by 2. The range for each scale is from 0 to 42. Higher scores reflect higher levels of depression, anxiety and stress. The Cronbach’s Alphas for depression, anxiety and stress were 0.82, 0.90 and 0.93, respectively [23].
In a study by Henry and Crawford (2005) and present study, these coefficients were reported as -0.851, -0.712 and 0.875, respectively. The cutoff scores from which the samples were included were considered 15 for stress, 8 for anxiety and 10 for depression.

**Unplanned pregnancy**

We consider pregnancy based on positive pregnancy test that was taken at health center. We examined the unwanted pregnancy based on a number of questions:

1. did you plan to have a baby before the pregnancy?
2. did you feel happy when you found out you were pregnant?
3. did you seek approaches for your abortion?
4. did you and your spouse plan to get pregnant?
5. when you became pregnant, did you plan to be pregnant or did you wanted to become pregnant in the future?

**Demographic information background properties**

Demographic information of fertility characteristics was initially evaluated including age, age of marriage, age of first menstruation, age of first pregnancy, number of children, type of previous pregnancy, the type of unwanted pregnancy, the type and cause of current unwanted pregnancy and consistency with
partner, education, employment status and family income level.

**Data analysis**

SPSS version 22 was used to analyze the data. Chi-square, T-test and Mann-Whitney U were used to compare baseline values of demographic and dependent variables between the two groups. Mann-Whitney U and Wilcoxon Test were used to compare stress, anxiety and depression variables between the intervention and control group.

**Results**

**Sample specifications**

Tables II and III show that there were no significant differences between intervention and control groups.
with unplanned pregnancy in terms of demographic variables such as age, age of first menstruation, age of first pregnancy.

There was no significant difference between the two groups in terms of anxiety, depression and stress before intervention (P > 0.05). There were statistically significant differences between two groups after intervention based on Table IV (P = 0). The mean score of depression in the intervention group decreased significantly (P = 0). There was also slight decrease in the mean depression score in the control group. However, this decrease was not significant (P = 0.343). The mean score for stress in the intervention group decreased significantly after intervention (P = 0). In the control group, the mean score for stress decreased while this decrease was not significant (P = 0.346). The mean score for anxiety in the intervention group decreased significantly after intervention (P = 0) while the score in control group increased slightly (P = 0.212) (Tab. V).

**Discussion**

The purpose of this study was to evaluate the effectiveness of mindfulness based-stress reduction program on reducing the psychological symptoms of unplanned pregnancy. Results indicated a significant decrease in stress, anxiety and depression in the intervention group, which are in line with the results of other studies such as Guth et al. (2017) who examined the effects of mindfulness on 54 pregnant women with psychotic symptoms and found a significant reduction in anxiety and depression symptoms. Mindfulness is an ideal and low-risk intervention that is associated with reducing stress, anxiety as well as improving mood and quality of life [24]. Also Setterborg et al. (2017) examined the effects of mindfulness based-stress reduction counseling on childbirth and parenting on pregnant women and found reduction in the symptoms of depression, anxiety and stress [25]. Jing et al. (2016) showed that mindfulness-based intervention significantly increases mindfulness, self- efficacy, coping strategy and significant reduction in emotional adjustment problems, passive and active coping strategy in pregnant women which is probably due to high degree of awareness at modern age without judgment in pivot mindfulness interventions and it seems to help cure emotional problems [26]. No significant difference was observed between control and intervention groups in the study of Krusche dp hil et al. (2018) which is inconsistent with the findings of the present study. This is probably due to virtual teaching style of the consultation and the lack of regular attendance at the meetings such that in virtual education, due to absence advisor to address problems and questions of clients and the lack of social support from other participants, the level of contact with researcher and the low motivations in participants the level of learning is low [27]. In the study of Goodman et al. (2014), coping with anxiety through living mindfully which is kind of mindfulness-based cognitive therapy significantly reduces the level
of anxiety after intervention. Probably, it is because this program teaches common ways of responding to anxiety symptoms that include mindfulness techniques, cognitive approaches, training of anxiety and depression and cognitive distortions of anxiety and depression along with homework to encourage using mindfulness in daily life through regular practice [28]. The findings in study of Guardino et al. (2013) indicated the effectiveness of mindfulness to reduce stress and anxiety in pregnancy in the intervention group which was consistent with the present study. But the decrease in anxiety in the control group was not consistent with present study [22]; which is probably due to using book to increase information about pregnancy that works in stress management and some of them were attending a yoga class. The results of Nyklicek et al. (2018) and Hicks et al. (2018) showed that mindfulness skills during pregnancy are effective predictors of depressive symptoms during pregnancy and birth weight and are known as predictors of depressive symptoms in parents such that people with lower mindfulness showed higher levels of depression before delivery [29, 30]. Data analyzed in this study supported the possibility of offering a stress-reduction mindfulness program for women with unplanned pregnancy and can help reduce stress, anxiety, and depression in them. However, more similar studies are needed.

Conclusions

According to the results of the present study, early intervention in women with unplanned pregnancy can reduce stress, anxiety and depression and increase mothers’ awareness, as pregnant mothers are vulnerable stratum of society and unwanted pregnancies increase mental health problems and awareness-making in the health system can be of particular importance.

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Conflicts of interest statement

The authors declare no conflict of interest.

Authors’ contributions

FKH and KA designed the work and drafted the manuscript. NKH and PD had prepared counselling package. PS and KA had full access to all of the data and took responsibility for the integrity of the data. YJ was responsible for accuracy of the data analysis. All authors read and approved the final manuscript.

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