Original Article

The effectiveness of group counseling based on mindfulness on pregnancy worries and stress in Nulligravida women: A randomized field trial

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Abstract

Context: Giving birth to one's first child is associated with worries such as fear of fetal abnormalities, adapting to a new identity, and fear of childbirth, which can adversely affect the process of pregnancy, childbirth, and maternal and fetal/neonatal health.

Aims: The present study was conducted to determine the effect of mindfulness-based group counseling on pregnancy worries and stress in Nulligravida women.

Setting and Design: The present randomized field trial study was conducted on 114 Nulligravida women at 12–20 weeks of gestation covered by comprehensive health centers of Gorgan.

Materials and Methods: The data were collected using a demographic form and the Farsi version of the 25-item Pregnancy Worries and Stresses Questionnaire. In the intervention group (n = 53), 6 to 12 pregnant women participated in 8 weekly 120–150-min sessions of mindfulness-based group counseling. The mothers in the control group (n = 61) received no intervention. At the end of the eighth session, the posttest was completed by both groups.

Statistical Analysis Used: Data were analyzed in SPSS-16 at a confidence level of 95% using the parametric independent and paired t-tests and nonparametric Chi-squared, Mann-Whitney, and Wilcoxon tests.

Results: The mean scores of pregnancy stress and worries before and after mindfulness-based group counseling increased by 11 units from 23.46 ± 13.03 to 34.96 ± 15.88 in the intervention group ($P < 0.001$), but these scores showed no significant changes in the control group in the pretest and posttest ($P > 0.05$).

Conclusion: The results showed that mindfulness-based group counseling can abate the worries and stresses of Nulligravida women.

Keywords: Counseling, Mental health, Mindfulness, Pregnancy

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Received: 09 January 2022; **Revised:** 22 June 2022; **Accepted:** 06 July 2022; **Published:** 14 December 2022

Access this article online	
Quick Response Code:	Website: www.jnmsjournal.org
	DOI: 10.4103/jnms.jnms_6_22

How to cite this article: Baniaghil AS, Ebrahimi F, Aghili SM, Behnampour N, Moghasemi S. The effectiveness of group counseling based on mindfulness on pregnancy worries and stress in Nulligravida women: A randomized field trial. J Nurs Midwifery Sci 2022;9:288-95.

INTRODUCTION

Pregnancy and childbirth are a natural event in a woman's life that are accompanied by extensive mental and physical changes and can be a stressful experience. According to Salm Ward *et al*., about 63% of women experience at least one stressful event in the year leading to childbirth.[1] A study conducted in Iran estimated the prevalence of stress in pregnant women as 49.1%.[2] In addition, external stressors such as the coronavirus disease pandemic may contribute to stress during pregnancy.[3] In a study the perceived risk toward COVID-19 viral infection acquisition reported as a highly significant predictor for stress, anxiety, and depression in pregnant women.[4]

The mother's stress and mood changes during pregnancy affect the process of pregnancy, childbirth, and maternal and neonatal health. Both acute and chronic stress can result in disruptions in the maternal-placental-fetal endocrine and immune system responses and may increase the likelihood of preterm birth and preeclampsia.[3]

Moreover, there is considerable evidence that prenatal stress plays a causal role in a range of neurodevelopmental disorders. The underlying biological mechanisms for the effects of prenatal stress on fetal brain development have been on the Hypothalamic-Pituitary-Adrenal (HPA), the immune system is very likely to be involved also.[5]

Pregnancy worries are usually managed using pharmacological or nonpharmacological interventions. Of concern, some medicine has been associated with adverse behavioral effects in the infants hence women are reluctant to use medications during pregnancy, and many prefer to receive nonpharmacological interventions. Furthermore, some women may be taking pharmacological treatment but need or desire an additional complementary therapy. There are different nonpharmacological methods for stress reduction. However, some of them such as mindfulness and meditation, biofeedback, yoga, physical activity, and expressive writing are more accessible, feasible, and cheaper.[3]

Mindfulness techniques are effective in reducing stress symptoms and the behavioral changes associated with stress through mechanisms including decentralization, exposure, cognitive change, self-management, relaxation, and acceptance.[6]

Studies on the effect of mindfulness on pregnancy stress and anxiety have reported contradictory results. Although some studies have shown the positive effects of mindfulness training on reducing perceived stress and depressive symptoms during pregnancy,[7,8] others have not reported significant changes in the mothers' stress or anxiety as a result of mindfulness meditation sessions.[9,10] The results obtained by Pan *et al*. showed that mothers' perceived stress increases significantly as their gestational age increases, and a mindfulness intervention leads to no significant differences between the intervention and control groups.[9] Beattie *et al*. reported no significant differences in the mothers' stress with a mindfulness intervention compared to conventional support programs.[10] A review of studies also shows that further studies are required to determine the effect of nonpharmacological intervention on stress during pregnancy.[3]

Given the importance of the management and treatment of pregnancy worries and stresses and the consequences of these emotions for the mother and offspring's, and the limited knowledge about the effectiveness of mindfulness-based approaches, the present study was conducted to determine the effect of mindfulness-based group counseling on pregnancy worries and stresses in Nulligravida women.

MATERIALS AND METHODS

Participants

The code of ethics obtained for this study was IR.GOUMS.REC.1396.141 and its code of registration with the Iranian Registry of Clinical Trials was IRCT20171026037015N4. The study population consisted of all the Nulligravida women presenting to comprehensive health centers in Gorgan, Iran who were identified using their electronic records in the comprehensive health information system of Golestan Province (NAB), and those meeting the inclusion criteria were invited over the phone to take part in the study.

The study inclusion criteria were: A gestational age of 12–20 weeks, age 18–35 years, reading and writing literacy, low-risk pregnancy and a score more than first decile (i.e., a score higher than 10) in the Pregnancy Worries and Stresses Questionnaire (PWSQ).

The study exclusion criteria were: Having qualifications in medical sciences, psychology, and counseling or having taken mindfulness courses, any known psychiatric disorders in the woman or her husband, use of psychiatric medications, chronic diseases, Cancers use of drugs, psychotropic substances and alcohol over the past 2 months by the woman or her husband, intense family arguments in the week prior to the study, or any experience of stressful events over the past 3 months (road traffic accidents or death of a first-degree relative).

Loss to follow-up criteria

Acute medical diseases or surgery during the study, low-risk pregnancy turning into a high-risk one, absence from more than two sessions of the classes.

Sampling and data collection were carried out from November 11, 2017 to April 9, 2018.

Sample size

Based on Zhang and Emory's study[11] and with 95% confidence interval and 80% test power (taking into account α =0.05 and β =0.2), the sample size was determined as 84 per group using the sample size equation for unlimited populations.

Equation1. Sample size in unlimited populations.

$$n_i, n_j = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2 [SD_1^2 + SD_1^2]}{(\mu_1 - \mu_2)^2}$$

Then, given the limited number of subjects in Gorgan and based on the sample size equation for limited populations, the sample size was determined as 48 per group. Taking into account a potential withdrawal rate of 10%, the final sample size per group reached 51. The 84 figure found using the first equation was replaced for *n* in the equation below:

Equation 2. Sample size in limited populations.

$$n^* = \frac{n}{1 + \frac{(n-1)}{N}}$$

Prior to the study, a pilot study was carried out that showed that the potential withdrawal will exceed the initially estimated value. Thus, to achieve the required sample size, more mothers were included in the study, and ultimately, the analysis was carried out on 96 subjects.

Intervention

The mindfulness group counseling sessions were prepared and developed according to relevant books on the subject.[6,12-14] The content included teaching principles and exercises that develop being in the present moment with acceptance and teach individuals to have a nonjudgmental attitude. These trainings lead to relief from distracting thoughts and help create nonjudgmental alertness, alternative attitudes and behaviors, and appropriate responses to complex situations. The trainings were carried out through lectures, brainstorming, class exercises, home assignments, and a review of the previous session according to the sessions' table of contents [Table 1].

The mothers performed exercises during the counseling sessions. They were asked to practice the trained techniques at home every day. The researcher reviewed and answered the subjects' questions at the end of each session. Pregnancy worries and stresses were evaluated at the end of the last counseling session in the intervention and control groups by self-reporting.

The counseling sessions were held by F. A., a postgraduate student with a certificate in mindfulness techniques, and the process of counseling was supervised by a postgraduate in psychology with clinical experience in the field of mindfulness.

Procedure

Once eligible women were identified (except for the PWSQ score), they were invited to visit the health centers to complete the paper form of the PWSQ. Thus, 185 eligible women completed the PWSQ; however, 71 were excluded from the study due to getting a score lower than the required limit (n = 11) and decline to participate (n = 60). The rest (n = 114) were grouped in a descending order based on their PWSQ score and were then assigned to groups A (Intervention) and B (Control) by block randomization by a statistician and methodologist colleague and the researcher remained blinded in this

Table 1: The main content of the mindfulness group counseling sessions

Sessions	Outline
Session 1	Introduction to mindfulness Raisin exercise MoB
Session 2	BS Handling thoughts and emotions during practices Practice review
Session 3	WM 1st and 2nd suffering Practice review
Session 4	BS Introduction and discussion about negative memories Practice review
Session 5	BS Group discussion about ways to overcome a bad mood Love and compassion Practice review
Session 6	BS MoB Group discussion about emotions and feeling in pregnancy and childbirth Practice review
Session 7	BS MoB Practice review
Session 8	BS Practice review Incorporating mindfulness in daily life End of the programme

BS: Body scan, MoB: Mindfulness of breathing, WM: Walking meditation

process. Then, the mean score of each group was determined, and limited minimization was also applied if necessary. Thus, of the 114 women who entered the study, 53 were assigned to the intervention group and 61 to the control group.

Twelve groups of six to 12 women (mean group size = 8) were formed, including six intervention and six control groups. Eight mindfulness group counseling sessions were held once weekly for each intervention group, lasting 120-150 min each. The content of the sessions was taught based on the guide using Q and A and class and home exercises.[12] For the posttest, each intervention group completed the PWSQ at the end of the eighth session. Simultaneously, the control groups were asked over the phone to complete the questionnaire again on the same day or the day after the intervention groups' last session. The researchers paid for the control group's commute to the center and provided food and snacks. The researcher also held a Q and A session for the control group as a reward for their participation in the study and their midwifery questions were answered.

A total of 5 women were excluded from the intervention groups as follows: Group one started with ten women, but one woman was eliminated due to miscarriage and one for being absent from more than two sessions, and group one thus ended the intervention sessions with eight women. Group two started and ended with seven women. Group three started with seven women, but one woman was excluded due to immigration and the sessions thus ended with six women. The fourth group began with 12 women, but one woman was excluded due to more than two sessions of absence. Group five started with 11 women, but one woman was excluded after her sister died in a car accident, and the group ended with ten women. Group six started and finished with six women.

A total of 5 women were excluded from the control group as follows: Two due to miscarriage and three because their low-risk pregnancy turned high-risk. Eight women were also excluded from the analysis by the statistician for postmatching purposes. Ultimately, the analysis was carried out on the data of 96 subjects. Figure 1 shows CONSORT 2010 flow diagram.

Data collection tools

The data collection tools included a demographic form and the PWSQ by Arch. This questionnaire has 25 items in six subscales, including mother's health (6 items), newborn's health (5 items), childbirth and mother's

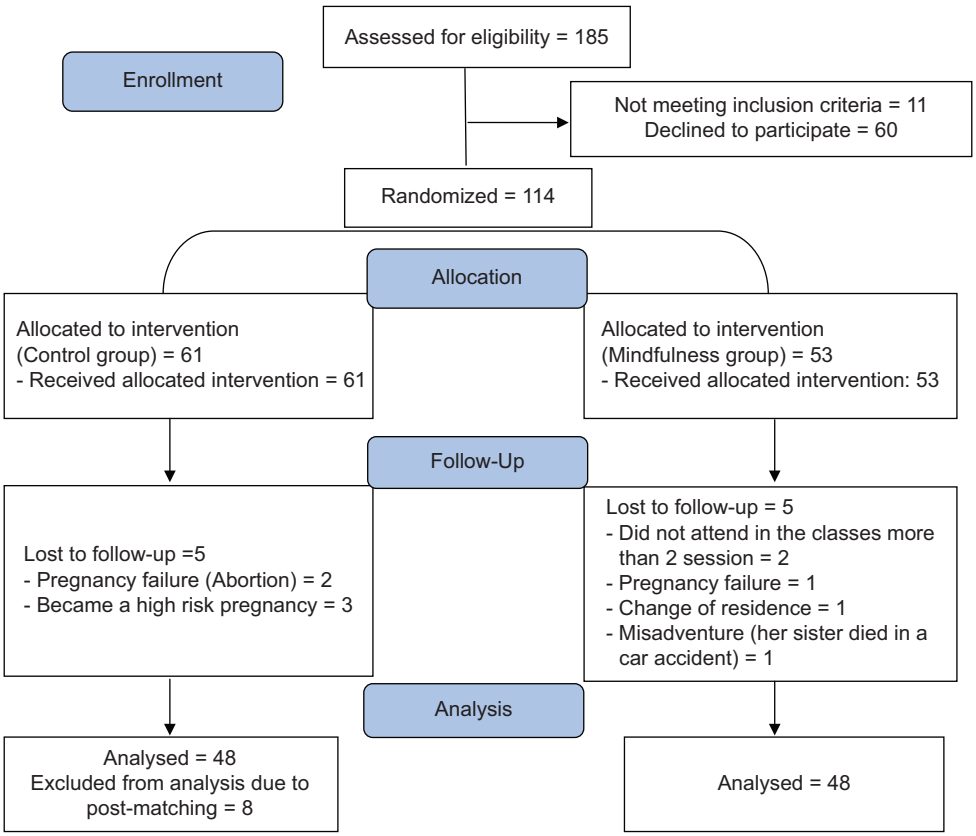

Figure 1: CONSORT diagram of the participants of the Mindfulness on Pregnancy Worries and Stress in Nulligravida Women study

experience (4 items), mother–newborn bonding (2 items), personal-family (5 items), and personal-occupational (3 items),[15,16] with scoring based on a 5-point Likert scale (never = 0, rarely = 1, occasionally = 2, often = 3, and always = 4), with a minimum score of 0 and a maximum of 100, such that higher scores indicate higher pregnancy worries and stresses. The PWSQ is a pregnancy-specific questionnaire with fairly complete domains and has no cutoff points. The validity and reliability of this questionnaire have been assessed in the Iranian pregnant population and can be used in all the trimesters of pregnancy. The reliability of the Farsi version of this questionnaire has been confirmed with Cronbach's alpha of 0.89.[15]

Statistical analysis

The statistical tests were performed in SPSS-16 software (SPSS Inc., Chicago, IL, USA). After verifying the normal distribution of the data using the Shapiro–Wilk test, if the assumptions of the parametric tests held, the mean values were compared between the two groups using the independent *t*-test; otherwise, Mann–Whitney's test was used. To compare the mean values in each group before and after the intervention, first, the normality of their difference in the pretest and posttest was assessed, and if the normality assumption held, the paired *t*-test was used; otherwise, the Wilcoxon test was used.

RESULTS

Table 2 describe and compare the two groups' demographic details. The results showed no significant differences between the two groups.

Table 3 describes and compares the total score of pregnancy worries and stresses and the subscales.

The intra-group test results in the intervention group showed a significant reduction in the mean total score and subscale scores of pregnancy worries and stresses, except for the scores of maternal-neonatal and personal-occupational interests, before and after mindfulness counseling. Although the mean change in the scores of these two subscales was not significant in the intervention group, the mean scores did reduce nonetheless.

The intra-group test results in the control group showed no significant differences between the mean total score and subscale scores in the pretest and posttest, except for personal-occupational interests. In the control group, the mothers' stress in the personal-occupational subscale increased significantly with gestational age.

DISCUSSION

The present study showed that mindfulness-based group counseling can effectively improve pregnancy worries

Table 2: Comparison of demographic variables between intervention and control groups

Variable	Frequency (%)		*P*-value
	Intervention	Control	
Age (mean±SD)	26.21±4.61	25.52±4.38	0.45*
Family income (Tomans) (mean±SD)	1,382,916±848,944	1,283,541±744,427	0.66**
Education level			
Diploma and less	18 (37.4)	21 (43.8)	0.61***
Undergraduate	26 (54.2)	24 (50)	
Postgraduate	4 (8.3)	3 (6.2)	
Job status			
Unemployed	41 (85.4)	41 (85.4)	0.95***
Free job	3 (6.2)	3 (6.2)	
Employed	4 (8.3)	4 (8.3)	
Pregnancy status			0.33***
Wanted	41 (85.4)	44 (91.7)	
Unwanted	7 (14.6)	4 (8.3)	
Previous infertility			
Yes	3 (6.2)	3 (6.2)	1.0***
No	45 (93.8)	45 (93.8)	
Preferred sex for the baby (by woman)			
Yes	9 (18.8)	11 (22.9)	0.61***
No	39 (81.2)	37 (77.1)	
Preferred sex for baby (by spouse)			0.16***
Yes	10 (20.8)	16 (33.3)	
No	38 (79.2)	32 (66.7)	
Marital satisfaction status			
Excellent	38 (79.2)	28 (58.3)	0.07***
Good	7 (14.6)	11 (22.9)	
Moderate	3 (6.2)	9 (18.8)	

*Independent *t*-test,**Mann–Whitney *U*-test,***Chi-square test. SD: Standard deviation

Table 3: Between and intra-group comparison mean±standard deviation of pregnancy's worries and stress and its subscales, before and after intervention

Variable	Mean±SD						Intra-group (*P*-value)	
	Baseline			After intervention				
	Intervention	Control	*P*-value	Intervention	Control	*P*-value	Intervention	Control
Childbirth and mother's experience	8.58 (3.54)	8.39 (3.41)	0.79*	5.58 (3.14)	8.85 (3.43)	<0.0001*	<0.0001***	0.25***
Newborn's health	5.81 (4.12)	5.41 (3.99)	0.60**	3.77 (3.29)	5.45 (3.57)	0.01**	<0.0001****	0.48****
Mother–newborn bonding	0.58 (1.20)	0.44 (0.99)	0.50**	0.45 (0.99)	0.58 (0.98)	0.45**	0.46****	0.28****
Mother's health	9.29 (5.80)	10.31 (5.44)	0.31**	5.83 (3.53)	10.39 (4.52)	<0.0001**	<0.0001****	0.88***
Personal-family	7.94 (4.75)	7.48 (4.41)	0.62*	5.54 (3.54)	6.87 (3.70)	0.075*	<0.0001****	0.33****
Personal-occupational	2.81 (3.00)	3.06 (2.87)	0.52**	2.06 (2.43)	3.60 (2.86)	0.006**	0.06****	0.05***
Total score	34.96 (15.88)	34.96 (16.29)	1.0**	23.46 (13.03)	35.56 (13.34)	<0.0001*	<0.0001***	0.61***

*Independent *t*-test, **Mann–Whitney *U*-test, ***Paired *t*-test, ****Wilcoxon test. SD: Standard deviation

and stresses in Nulligravida women. These findings agree with the results obtained by, Matvienko-Sikar and Dockray,[17] and Luberto *et al*.[18] In the cited studies, mindfulness-based trainings over eight or nine group sessions reduced stress and anxiety both as a general complication and pregnancy-specific concerns. The results obtained by Pan *et al*. showed that despite the lack of a significant difference between the mindfulness and routine care groups, perceived stress and depression reduced and childbirth self-efficacy increased in the mindfulness group.[9] The results obtained by Beattie *et al*. in their pilot study (2017) with a mindfulness intervention group (11 women) and a pregnancy support program group (nine women) showed no significant difference in stress between the mothers in the two groups, as each of these approaches reduced the mothers' stress by a different mechanism. Stress is controlled from an internal source in mindfulness and by peer support in support programs. The benefit of mindfulness is therefore its less dependence on others for feeling good.[10]

In the present study, mindfulness counseling reduced the mothers' stress and worries about "childbirth and experience of maternity." Similarly, the results by Pen *et al*. showed that mindfulness improves childbirth self-efficacy.[9] In a randomized controlled trial, pregnant women participated in a short, 2.5 day mindfulness-based or standard childbirth preparation showed greater childbirth self-efficacy and mindful body awareness.[19] It seems that promoting healthy psychological adjustment in the perinatal period using mindfulness, result in participants experience large improvements in childbirth self-efficacy and fear of childbirth.

The present findings confirmed the effectiveness of mindfulness counseling on pregnant women's concerns about their "neonate's health." This domain addresses fear of fetal death and neonatal harm. In a study on nonpregnant individuals, Schultz and Arnau concluded that mindfulness exercises can significantly reduce the importance of death in participants' minds, but make no difference in individuals with rumination.[20]

The present findings also showed that mindfulness counseling is effective on mothers' worries in the domain of "maternal health," which agrees with the results reported by Warriner *et al*. in their study of a mindfulness parenting program. These trainings can improve maternal stress and experiences of pregnancy and childbirth as well as fathers' stress compared to before training.[21]

The present findings showed that mindfulness counseling can reduce pregnant women's worries in the "personal-occupational" domain. These questions deal with mothers' worries about having to stay at home and the imbalance in their personal life and career. Similarly, studies conducted on nurses and faculty members by Yang *et al*. and Bostock *et al*., respectively, showed that mindfulness interventions effectively reduce stress and anxiety in working individuals.[22,23] In the present study, although most women in both groups were homemakers, the mothers' concerns about becoming home-bound and losing the balance in their personal life and career were effectively abated by mindfulness counseling. Further studies are needed for more accurate evaluations of pregnant working women.

In the present study, mindfulness-based group counseling was not effective in the "maternal-neonatal interests" and "personal-family interests" domains, such that although the mean score of stress in the "maternal-neonatal interests" domain reduced in the intervention group and increased in the control group compared to the initial assessment, the difference between them was not significant, and the reasons for this lack of significance include the women's low level of worry and stress about a mutual affection between themselves and their future child, the pregnancy being intentional, and having no preference for a particular gender for the child in both the intervention and control groups.

In the "personal-family" domain, stresses and worries reduced as their gestational age increased in both groups, but this reduction was more significant in the intervention group. As shown in Table 2, in the above domain, the difference in the mean pretest and posttest scores was fully significant in the intervention group, but not in the controls.

CONCLUSION

Midwifery counselors can reduce pregnancy stresses and worries in pregnant women by providing mindfulness-based group counseling, consisting of teaching principles and exercises that develop being in the present moment with acceptance and having a nonjudgmental approach.

Study limitations

The study limitations included the lack of access to or the incorrect phone number of some of the pregnant women in the NAB electronic system. Furthermore, despite fully explaining the study's importance, objectives, and facilities, the pregnant women of the surveyed centers were less inclined to participate in the counseling sessions, which could have been due to their poor knowledge of the matter and the underestimation of psychological interventions in the community, such that, despite an initial agreement to take part in the study, some women withdrew from the classes. Nonetheless, only two mothers from the intervention group were unwilling to continue their participation in the classes after the sessions had already begun.

Consent for publication

All of the authors give their consent for publication of submitted manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of interest

There are no conflicts of interest.

Authors' contributions

Dr. Baniaghil was responsible for project development and management, study design, data analysis, and manuscript writing.

Mrs Ebrahimi was responsible for, project development, data collection, data management, and critical revision and editing, manuscript writing.

Dr. Aghili was responsible for project development, data gathering management, critical revision and editing, manuscript writing.

Dr. Behnampour was responsible for project development, data analysis, and critical revision and editing, manuscript writing.

Dr. Moghasemi was responsible for project development, critical revision and editing and manuscript writing.

All authors have read and approved the final manuscript.

Financial support and sponsorship

This work was financially supported by the Golestan University of Medical Sciences (grant code: 513).

Acknowledgment

The authors wish to express their gratitude to all the participating pregnant women and the health care workers in Health centers affiliated with Golestan University of medical sciences, Gorgan.

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