



The Effect of Writing Therapy on Anxiety in Pregnant Women: A Randomized Controlled Trial

Maryam Montazeri¹, Khalil Esmailpour², Sakineh Mohammad-Alizadeh-Charandabi³, Sevda Golizadeh⁴ and Mojgan Mirghafourvand^{5,*}

¹Department of Midwifery, School of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

²Faculty of Education and Psychology, University of Tabriz, Tabriz, Iran

³Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

⁴Tabriz University of Medical Science, Tabriz, Iran

⁵Social Determinants of Health Research Centre, Tabriz University of Medical Sciences, Tabriz, Iran

*Corresponding author: Social Determinants of Health Research Centre, Tabriz University of Medical Sciences, Tabriz, Iran. Tel: +98-9143206121, Fax: +98-4134796969, Email: mirghafourvand@gmail.com

Received 2019 September 21; Revised 2020 March 15; Accepted 2020 April 03.

Abstract

Background: As one of the most enjoyable life experiences, pregnancy may be accompanied by many physiological and psychological changes that make women susceptible to developing mental disorders such as anxiety. Non-pharmacological methods such as writing therapy are among the ways to deal with anxiety.

Objectives: The present study aimed to determine the effect of writing therapy on anxiety in women during pregnancy.

Methods: This randomized controlled trial was conducted on 70 pregnant women with a gestational age between 28 - 31 weeks. The participants were assigned to an intervention group and a control group using a randomized block design. The intervention group received three in-person writing therapy-based counseling sessions and two telephone calls between the sessions, while the control group received routine pregnancy care. The Beck anxiety inventory was completed before and six weeks after the intervention. Independent *t*-test and ANCOVA were used for data analysis.

Results: There was no significant difference between the two groups in terms of socio-demographic variables and baseline anxiety scores. Based on ANCOVA with baseline score adjustment, the mean score of anxiety was significantly lower in the intervention group than in the control group after the intervention (adjusted mean difference = -6.8; 95%CI = -4.5 to -9.1; *P* < 0.001).

Conclusions: According to the results, writing therapy can reduce anxiety in pregnant women; however, further studies are needed before a definitive conclusion.

Keywords: Anxiety, Pregnancy, Writing Therapy

1. Background

As a natural and enjoyable life experience (1, 2), pregnancy may be accompanied by many physiological and psychological changes (1). These changes make women susceptible to mental disorders (3). Anxiety disorders are among the most common disorders, with a prevalence of 4.4 to 39% (4, 5). In Iran, the prevalence of anxiety disorders has been reported to be 15% (6). Anxiety, as a syndrome relatively distinct from other mental illnesses, reflects concerns about the child's health and well-being, childbirth and its consequences, and accepting a parental role (7). Anxiety is an unpleasant mental state associated with physical discomfort such as headache, stomachache, shortness of breath, palpitation, restlessness, excitement, stress, and

panic (8). However, anxiety is a condition that any person might experience due to pressures or environmental stress (9). Anxiety is considered as one of the most dangerous psychological disorders due to its harmful effects on the mother's and fetus's health (10). Anxiety increases in the first and third trimester due to increased estrogen levels and approaching delivery time, respectively, but decreases in the second trimester due to adaptation to physiological changes in pregnancy (11). Female perceptions of pregnancy, delivery pain, fear of delivery, marital satisfaction, physical violence of husband as well as low economic status and education are factors influencing pregnancy anxiety (2).

Maternal anxiety can lead to preterm labor, fetal death (12), intra uterine growth retardation (13), sleep prob-

lems (14), attention deficit hyperactivity disorder (15), fetal weight loss (16), crying, restlessness, and low mental development of the infant (17). Hormones such as catecholamines cause placental artery contraction, which restricts fetal oxygen supply and nutrition, and by passing the placenta, catecholamines affect fetal brain development (18), causing developmental and psycho-cognitive disorders in infants (19). Also, high levels of anxiety during pregnancy make the child susceptible to future schizophrenia and affective disorders (20). On the other hand, affecting the adrenal, pituitary-hypothalamic, and sympathetic nervous systems, stress, and anxiety lead to neuronal and endocrine changes, increasing in plasma levels of cortisol through secreting cortisol and adrenocorticotropin hormones (21). Since cortisol is high in anxious pregnant women and there is a high correlation between maternal and fetal cortisol concentrations, it rapidly affects the fetus, impairs fetal development, and decreases fetal heart rate variability (22, 23).

There are various therapies for pregnancy anxiety including behavioral therapy (24), music therapy (25), mindfulness (26), relaxation techniques (27), counseling (1), spiritual counseling (28), education (29), and distraction techniques (30), each performed in the form of individual therapy (31) or group therapy (32). Non-pharmacological methods such as writing therapy are among the ways to deal with anxiety (33, 34). Writing therapy is the art of disclosing emotions through writing (35). In this counseling approach, ambiguous and unsubstantiated feelings turn into meaningful words, raising one's awareness of fears in one's life (36). Writing leads to the cohesion of emotions and also to their evaluation and management, according to one's experiences. It also changes one's attitude toward stressful events, resulting in positive effects on physical and mental health as well as on overall physiological performance (37). Previous therapists used this approach for post-traumatic stress disorder control, schizophrenia treatment, memory enhancement, pain reduction, creativity enhancement, and acute and chronic anxiety treatment (38).

2. Objectives

Because of sensitive emotions during pregnancy associated with the fear of pharmacotherapy and the importance of mental health and also due to the cost-effectiveness of writing therapy, the researchers investigated the effect of this method on the reduction of pregnancy anxiety and its implications for improving quality

of life and physical health.

3. Methods

3.1. Participants and Study Design

The present randomized controlled trial was conducted on pregnant women visiting health centers in Tabriz, Iran, from September to December 2018.

Inclusion criteria included pregnant women with a gestational age between 28 - 31 weeks, first or second pregnancy, moderate anxiety based on the Beck anxiety inventory (BAI), and education of at least high school. Exclusion criteria included mental illness, any psychotropic drug use, alcohol addiction, and cigarette smoking that all were assessed by self-reported questions; high-risk pregnancies suffering from high levels of stress and anxiety, such as pregnancies affected by diabetes, cancer, hypertension, kidney disease, and epilepsy; multiple pregnancy; personal or family history of congenital anomalies and a history of preterm labor; mothers with no plan to take care of their infants for any reason after childbirth, such as divorced or surrogate mothers; and mothers with a previous child suffering from a known physical or mental health problem.

This study was a part of a large ongoing trial, entitled "the effect of writing therapy of anxious pregnant women on the quality of their neonates' sleep", in which pregnancy anxiety was assessed as a secondary outcome. A total of 33 pregnant women were determined using the G-Power software based on the results of Mirjam et al.'s study on anxiety (39), with $m_1 = 48.5$ (the pre-intervention anxiety score), a default 10% intervention-induced reduction in the mean anxiety score ($m_2 = 43.6$), $SD_1 = SD_2 = 4.8$, two-sided $\alpha = 0.05$, and power = 95% with a 20% attrition. In this study, 35 participants were evaluated in each group.

3.2. Sampling

Tabriz has 80 health centers, and sampling was conducted in 12 crowded health centers for people of various socio-economic levels. The family health department of the East Azerbaijan Province introduced the crowded centers based on the number of pregnant women covered in the health centers. The health centers were selected based on their locations in low-, middle- and high-income areas (four centers from each area) to represent different socio-economic conditions. After obtaining permission from the Ethics Committee of the Tabriz University of Medical Sciences (code: IR.TBZMED.REC.1397.408), submitting the study in the Iranian Registry of Clinical Trials (code:

IRCT20120718010324N45), and coordinating and obtaining permission from the health centers in Tabriz, sampling was conducted from 1st September to 15th December 2018. During this time, the authors attended these centers, selected pregnant women with a gestational age between 28-31 weeks from the records of pregnant mothers at each center, and made telephone calls after reviewing the inclusion and exclusion criteria. Then, a brief description of the research objectives was provided, and individuals who were eligible and interested in participating in the study were invited to visit the intended health centers.

The interested participants visited the centers to complete the BAI. Women with severe and mild anxiety were excluded from the study, and only those with a score of 16 to 25 (moderate anxiety) were included. Afterward, written informed consents were obtained from the participants, who then completed the socio-demographic characteristics questionnaire. Women with severe anxiety were referred to a psychiatrist.

3.3. Randomization

The participants were assigned to an intervention group and a control group using block randomization with a block size of four and six and a 1:1 allocation ratio. Random allocation to the groups was conducted by an individual not involved in the study using similar opaque envelopes. The envelopes were opened by the researcher and the assistant researcher in the presence of the participants to allocate them to the intended group.

3.4. Intervention

Three protocol-based writing therapy sessions in the groups, each including 3-6 individuals, were held at weeks 28-31, 32-35 (two to four weeks after the first session), and 34-37 of gestation (two weeks after the second session).

The first session was held at week 28-31 of gestation. It was run to communicate with all the participants, build intimate relationships with them, and gain their trust. The concept of anxiety and factors affecting it, as well as disadvantages of anxiety and its impact on mothers, were discussed at the meeting. For the next meeting (four weeks later), the clients were then asked to list anxiety-inducing factors and their worries on a piece of paper, and write their solutions in front of each factor. The first telephone consultation (for about 15 minutes) was held two weeks after the first session (at 30-33 weeks). In this follow-up call, the author examined the assignments and encouraged and motivated the participants to accomplish their tasks. The second session was performed between 32-

35 weeks of gestation. In this session, first, the assignments were reviewed. Then, the anxiety-inducing factors reported by the women were discussed in a group setting, and their strategies were analyzed. Next, each participant was asked to write a story about their problem for the next session, recount causes of their anxiety and the origin of their problem, and apply strategies based on what they learned in previous sessions. The participants were asked to seek guidance from the researcher if they had any problems. The second telephone session was a week after this meeting. In the second telephone call, the author answered the women's questions and assessed their ability to manage their anxiety relative to the baseline. The third session was held at weeks 34-37 of gestation. Similar to the previous session, first, the assignments were evaluated, and then, a group discussion was conducted about them. Afterward, the participants were asked to choose the best solution getting from their groupmates brainstorming and discuss their reasons. At the end of the third session, the mothers completed BAI. It was attempted to adhere to all the principles of counseling as much as possible during all the sessions. The control group only received routine pregnancy care.

3.5. Data Collection Tools

Data collection tools used in the present study were the socio-demographic characteristics questionnaire and BAI that were completed by the participants.

The socio-demographic characteristics questionnaire included questions about age, education, spouse's age, and education, occupation of wife and husband, income, number of pregnancies, and type of pregnancy (intended or unintended).

BAI specifically measures the severity of clinical anxiety symptoms in people. BAI is an inventory designed to measure the severity of anxiety in adolescents and adults. It is a 21-item scale, in which the participant chooses one out of four options, indicating the severity of their anxiety. The four options for each question are scored on a Likert scale from 0 to 3. Each of the items describes one of the most common symptoms of anxiety (mental, physical, and phobic symptoms). Therefore, the total score of this questionnaire is between 0 and 63. A score of 0-7, 8-15, 16-25, and 26-63 indicates no to minimum anxiety, mild anxiety, moderate anxiety, and severe anxiety, respectively. This questionnaire is highly valid. Types of validity, including the face, content, and construct validity, were assessed for this test, all of which indicate the high performance of this tool in measuring the severity of anxiety. An alpha coeffi-

cient of 0.92, a reliability coefficient of 0.75 with a one-week test-retest, and a correlation rate between 0.30 and 0.76 for the items were reported (40). Kaviani et al. (41) assessed the psychometric properties of the Persian version of BAI. The results showed that the inventory had good test-retest reliability ($r = 0.72$) and internal consistency ($\text{Alpha} = 0.92$).

3.6. Data analysis

The data were analyzed using SPSS 24. The Kolmogorov-Smirnov test confirmed the normality of the quantitative data. Chi-square, chi-square for trend, independent *t*-test, and Fisher's exact test were used to assess the consistency of the two groups in terms of socio-demographic characteristics. Moreover, an independent *t*-test was used to compare the mean score of anxiety in the study groups before the intervention, and ANCOVA was used after the intervention with adjustment of baseline values as a possible confounding variable.

4. Results

Of the 300 pregnant women evaluated, 70 met the inclusion criteria and accepted to participate in the study. They were thus allocated randomly to the study groups. The others ($n = 230$) were excluded from the study because of unwillingness, high-risk pregnancies, third and more pregnancies, and lack of education or inability to write. There was only one loss in each group due to lack of access, and the data of 34 participants in each group were statistically analyzed (Figure 1).

According to the socio-demographic characteristics of the participants, there was no significant difference between the two groups. The mean age (SD = standard deviation) of the women and their spouses was 27.5 (5.9) and 33.3 (5.5) in the intervention group and 27.7 (5.8) and 33.2 (5.4) in the control group, respectively. About half of the participants in the intervention (45.7%) and control (42.9%) groups had a diploma. The majority of women in both groups were homemakers. More than two thirds (68.6%) of mothers in both groups reported that their spouses were self-employed. More than half of the mothers (68.6% in the intervention group and 57.1% in the control group) stated that their family income was, to some extent, adequate for living expenses. The majority of women in both groups (94.3% in the intervention group and 97.1% in the control group) had a normal pregnancy. About half of the participants in the intervention (51.4%) and control (57.1%) groups were experiencing first pregnancy. The majority of women in both groups (76.5% in the intervention group

and 86.7% in the control group) reported the type of their previous delivery as vaginal. About one-third of women in both groups (37.1% in the intervention group and 34.3% in the control group) were satisfied with life. The mean (SD) number of family members was 2.8 (1.0) in the intervention group and 2.5 (0.7) in the control group (Table 1).

The results of the independent *t*-test showed no significant difference in the mean (SD) score of pre-intervention anxiety in the intervention 19.3 (3.3) and control 18.5 (2.8) groups ($P = 0.287$). The mean (SD) score of anxiety was 13.2 (5.2) and 19.4 (5.2) in the intervention and control groups, respectively, six weeks after the intervention. According to ANCOVA with baseline score adjustment, the score of anxiety had a significant reduction in the intervention group compared to the control group (adjusted mean difference: -6.8; 95% confidence interval: -9.1 to -4.5; $P < 0.001$) (Table 2).

5. Discussion

This study was conducted to investigate the effect of writing therapy on anxiety scores of pregnant women visiting health centers in Tabriz, Iran. The results showed that writing therapy had a significant positive impact on reducing anxiety scores during six weeks of intervention compared to the control group.

Crawley et al. (42) conducted a study to investigate the feasibility and acceptance of writing therapy in postpartum women. In this study, 865 postpartum women (6 - 12 weeks postpartum) were divided into three groups of controlled writing therapy based on the researcher's instructions, i.e., writing and disclosure of personal emotions, and control. Subjects in both intervention groups were required to complete their writing assignments within three consecutive days for 15 minutes. The results showed that the writing and disclosure of personal emotions groups had the least anxiety one and six months after the intervention (42). The results of a randomized controlled trial by Hasanzadeh et al. (43) on 80 patients with multiple sclerosis (MS) showed that writing emotional expression was effective on anxiety and stress scores in patients with MS one month after the intervention. In the study by Horsch et al. (44) in Lausanne, Switzerland, 120 postpartum women were allocated to control and intervention groups with writing therapy. The intervention group wrote their emotions within three consecutive days for 15 minutes. The intervention was performed on mothers whose children were still alive three months after the birth of a preterm infant. The author measured mothers' anxiety four and six

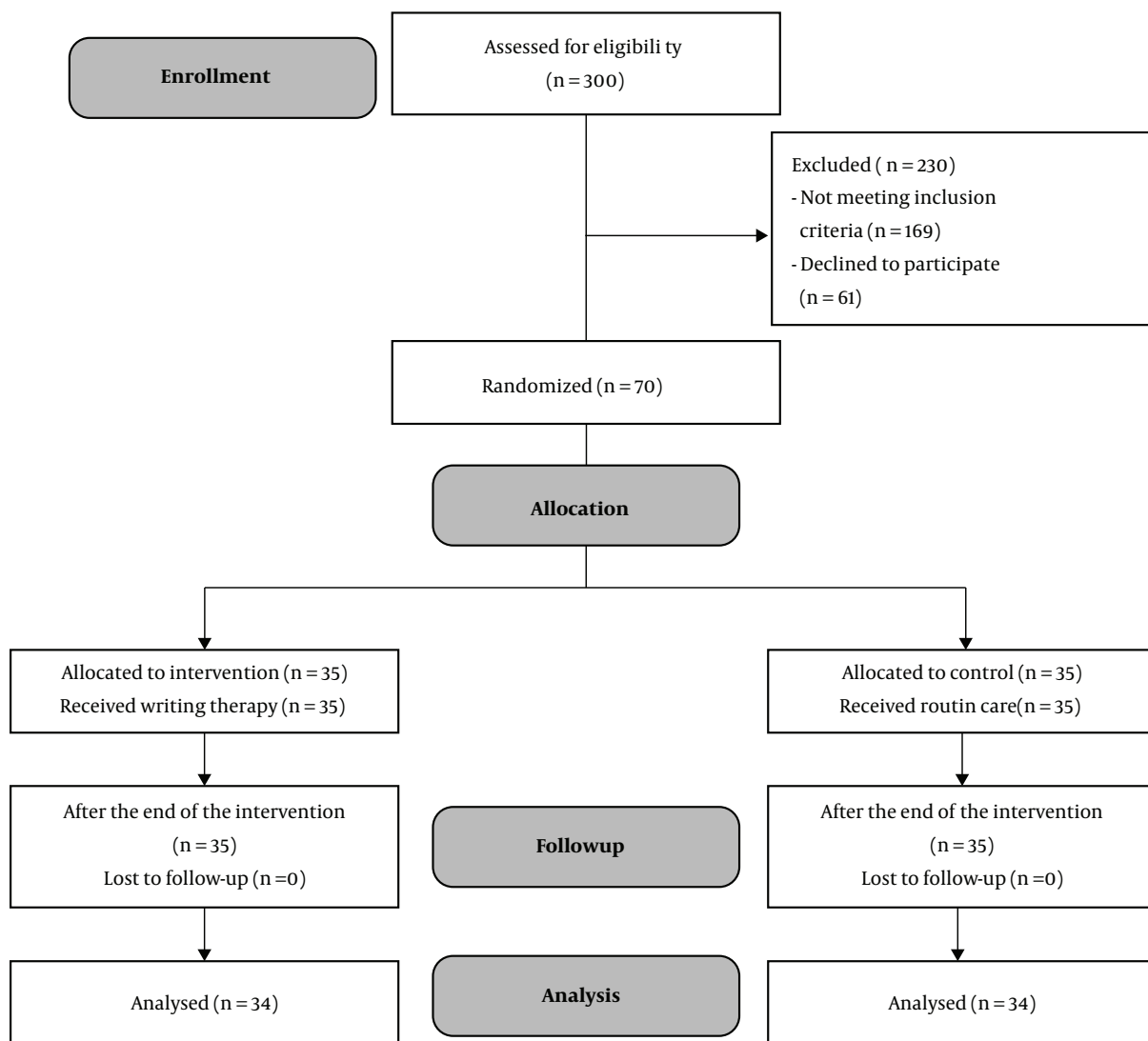


Figure 1. The flowchart of the study

months postpartum.

The results showed that the level of depression and post-traumatic stress decreased significantly in the intervention group compared to the control group at the end of the intervention and 6 six months postpartum (44). Moradmam et al. (45) showed in their study that written emotional disclosure reduced anxiety scores of students undergoing writing therapy compared to the control group. The results of the above studies are in line with the results of the present research. Writing about traumatic events leads to reduced anxiety and depression by reducing negative emotions. Moreover, writing about negative emotions enables one to make sense of one's vague

feelings in the mind. Being aware of these emotions empowers one to overcome them, resulting in reduced anxiety (43).

In a study by Panagopoulou et al. (46), 148 women undergoing infertility treatment at the Aristotle University of Thessaloniki in Greece were allocated to emotional disclosure writing, reality writing, and control groups. The aim was to investigate the effect of disclosing emotions on these women using writing therapy. The results showed that the anxiety score was not significantly different between the three groups, and, more interestingly, the infertility treatment was more successful in the control group than in the other groups (46), which is not consistent

Table 1. The socio-Demographic Characteristics of the Participants in the Study Groups^a

Variable	Intervention Group (N = 35)	Control Group (N = 35)	P Value
Woman's age, y	27.5 ± 5.9	27.7 ± 5.8	0.888 ^b
Spouse's age, y	33.3 ± 5.5	33.2 ± 5.4	0.948 ^b
Woman's education			0.847 ^c
High school	9 (25.7)	11 (31.4)	
Diploma	16 (45.7)	15 (42.9)	
Academic education	10 (28.6)	9 (25.7)	
Spouse's education			0.354 ^c
Under high school diploma	11 (31.4)	16 (45.7)	
High school diploma	16 (45.7)	9 (25.7)	
Academic education	8 (22.9)	10 (28.6)	
Woman's job			1.000 ^d
Homemaker	32 (91.4)	33 (94.3)	
Working at home other than homemaking	1 (2.9)	1 (2.9)	
Working outside the home	2 (5.7)	1 (2.9)	
Spouse's job			0.542 ^d
Unemployed	1 (2.9)	0 (0)	
Worker	4 (11.4)	2 (5.7)	
Employee	6 (17.1)	9 (25.7)	
Self-employed	24 (68.6)	24 (68.6)	
Income			0.241 ^c
Not enough	6 (17.1)	5 (14.3)	
Somewhat enough	24 (68.6)	20 (57.1)	
Enough	5 (14.3)	10 (28.6)	
Type of pregnancy			1.000 ^d
Natural	33 (94.3)	34 (97.1)	
Assisted reproductive techniques	2 (5.7)	1 (2.9)	
Number of pregnancy			0.745 ^d
One	18 (51.4)	20 (57.1)	
Two	17 (48.6)	15 (42.9)	
Type of previous delivery			0.659 ^d
NVD	13 (37.1)	13 (37.1)	
C/S	4 (11.4)	2 (5.7)	
Pregnancy desire			0.218 ^d
Yes	26 (74.3)	31 (88.6)	
No	9 (25.7)	4 (11.4)	
Life satisfaction			0.917 ^c
Absolutely satisfied	13 (37.1)	12 (34.3)	
Somewhat satisfied	12 (34.3)	14 (40)	
Neutral	6 (17.1)	4 (11.4)	
Somewhat dissatisfied	2 (5.7)	3 (8.6)	
Absolutely dissatisfied	2 (5.7)	2 (5.7)	
Family member number	2.8 ± 1.0	2.5 ± 0.7	0.215 ^b

^aValues are expressed as No. (%) or mean ± SD.

^bIndependent t-test.

^cChi-square for the trend test.

^dFisher's exact test.

with the present study. Perhaps the reason for the discrepancy is the difference in the number of counseling ses-

sions and type of emotions disclosed, as in the present study, counseling was performed in three in-person and

Table 2. Comparison of the Mean Anxiety Score Between the Study Groups ^{a, b}

Variable	Intervention Group (N = 35)	Control Group (N = 35)	MD (95% CI)	P Value
Total anxiety (Score: 0 - 63)				
Before the intervention	19.3 ± 3.3	18.5 ± 2.8	0.8 (-0.6 - 2.2)	0.287
Six weeks after the intervention	13.2 ± 5.2	19.4 ± 5.2	-6.8 (9.1 - 4.5)	< 0.001

Abbreviation: MD (95% CI), mean difference (95% confidence interval).

^aValues are expressed as mean ± SD.

^bFor comparison of the groups before the intervention, an independent *t*-test was used, while for comparison of the groups after the intervention, ANCOVA was used by adjusting the baseline score.

two telephone sessions. The participants in our study were asked to disclose their emotions soon after becoming upset. However, participants in the above study were asked to write about the problems they experienced with infertility. Writing in the short period revives negative memories and affects the mood, but in the long period, it reinforces positive emotions (47). Further, in a pilot study, Anderson et al. (48) examined the effect of emotional disclosure on rape victims. To this purpose, 670 American students with a history of rape were examined. The results showed that the post-traumatic stress score was not significantly different between the two groups one month after the intervention. However, there was a significant difference between the two groups by continuing the treatment and in the third month after the intervention in favor of the intervention group (48), which is not consistent with the present study. Perhaps the reason for this disagreement is the severity of psychological trauma caused by rape, which takes longer to be healed. However, in the present study, women with moderate anxiety were assessed.

Writing transforms meaningless words and emotions into meaningful and comprehensible words. What is unseen and invisible is more frightening and scary, which reduces awareness of the event criticality (38, 49, 50). Moreover, since people are not exposed to face to face encounters, expressing their emotions, fears, and shames not being confirmed by others, this approach could be even more effective than in-person counseling. Further, writing is easy, inexpensive, and accessible and thus, could be a good technique to disclose emotions and prevent or treat anxiety-inducing factors in life (37, 39).

The significant effect of other techniques such as counseling (1), training (51), and lifestyle-based education (29) has been reported on reducing anxiety disorders in pregnant women. It is suggested to assess and compare the effect size of various techniques in a systematic review and meta-analysis.

One of the strengths of this study was to observe all the principles of clinical trial design, including random as-

signment and allocation concealment to prevent selection bias. Efforts were made to ensure equal communication with all the participants and give them full confidence in doing their assignments. The entire staff of the health centers helped the researchers access the mothers' records. Using the standard questionnaire to measure anxiety was the other strength of this study. However, one of the limitations of this study was the lack of a similar consultation space at all the centers such that the consultation room used for the counseling sessions was a more suitable place for holding the counseling sessions at some centers, but more cramped and compact at some others, which might influence the intervention result. In addition, to prevent the participants' lack of cooperation, the counseling sessions were arranged according to the health care schedule at each center. Therefore, the interval between the sessions was not fully observed for some of the participants. Due to the nature of the intervention, it was not possible to blind the participants and the data collector. It is recommended to study the effect of writing therapy on stress levels during pregnancy or grieving a pregnancy loss in case of miscarriage or infant death.

5.1. Conclusions

According to the results of this study, writing therapy has a positive effect on reducing maternal anxiety. Writing therapy is a secure and self-directed method in reducing maternal anxiety and ultimately reducing maternal and neonatal complications without the need for clinical and pharmaceutical services.

Acknowledgments

This study was extracted from a Master's thesis. The authors would like to give their gratitude to all women participating in the study for their cooperation.

Footnotes

Authors' Contribution: Maryam Montazeri, Khalil Esmaeilpour, Sevda Golizadeh and Mojgan Mirghafourvand designed and performed the study. Sakineh Mohammad-Alizadeh-Charandabi assisted with data analysis and interpretation of the findings. Maryam Montazeri and Mojgan Mirghafourvand drafted the manuscript and revised it. All the authors read and approved the final manuscript.

Clinical Trial Registration Code: The clinical trial registration code was IRCT20120718010324N45.

Conflict of Interests: The authors declare that there is no conflict of interest.

Ethical Approval: The ethical code was IR.TBZMED.REC.1397.408.

Funding/Support: This study was financially supported by the Tabriz University of Medical Sciences.

Informed Consent: Written informed consent were obtained from eligible patients in their native language (Persian).

References

- Parsa P, Saeedzadeh N, Masoumi SZ, Roshanaei G. The effectiveness of counseling in reducing anxiety among nulliparous pregnant women. *J Fam Reprod Health*. 2016;**10**(4):198.
- Azizi S, Molaeinezhad M. Anxiety status in pregnant mothers at third trimester of pregnancy and its related factors in referrals to Bandar Abbas hospitals in 2012. *Iran J Obstet Gynecol Infertility*. 2014;**17**(122):8-15.
- Shahhosseini Z, Pourasghar M, Khalilian A, Salehi F. A review of the effects of anxiety during pregnancy on children's health. *Mater Sociomed*. 2015;**27**(3):200-2. doi: [10.5455/msm.2015.27.200-202](https://doi.org/10.5455/msm.2015.27.200-202). [PubMed: [26236168](https://pubmed.ncbi.nlm.nih.gov/26236168/)]. [PubMed Central: [PMC4499279](https://pubmed.ncbi.nlm.nih.gov/PMC4499279/)].
- Nagl M, Linde K, Stepan H, Kersting A. Obesity and anxiety during pregnancy and postpartum: A systematic review. *J Affect Disord*. 2015;**186**:293-305. doi: [10.1016/j.jad.2015.06.054](https://doi.org/10.1016/j.jad.2015.06.054). [PubMed: [26265300](https://pubmed.ncbi.nlm.nih.gov/26265300/)].
- Cuijpers P, Sijbrandij M, Koole S, Huibers M, Berking M, Andersson G. Psychological treatment of generalized anxiety disorder: A meta-analysis. *Clin Psychol Rev*. 2014;**34**(2):130-40. doi: [10.1016/j.cpr.2014.01.002](https://doi.org/10.1016/j.cpr.2014.01.002). [PubMed: [24487344](https://pubmed.ncbi.nlm.nih.gov/24487344/)].
- Zareipour M, Sadaghianifar A, Amirzehni J, Parsnezhad M, Ayuoghi Rahnama V. Exploring of depression, anxiety and stress in pregnant women referred to health centers of Urmia. *Rahavard Salamat J*. 2017;**3**(2):19-30.
- Huizink AC, Mulder EJ, Robles de Medina PG, Visser GH, Buitelaar JK. Is pregnancy anxiety a distinctive syndrome? *Early Hum Dev*. 2004;**79**(2):81-91. doi: [10.1016/j.earlhumdev.2004.04.014](https://doi.org/10.1016/j.earlhumdev.2004.04.014). [PubMed: [15324989](https://pubmed.ncbi.nlm.nih.gov/15324989/)].
- Sadock B, Ruiz P. *Kaplan and Sadock's synopsis of psychiatry: Behavioral sciences*. New York: Walters Kluwer; 2015.
- Bazr Afshan MR, Mahmoodi Rad A. The relationship between women's anxiety during pregnancy and labor outcomes in Larestan hospitals. *J Lorestan Univ Med Sci*. 2009;**1**(1):1-12.
- Dunkel Schetter C, Tanner L. Anxiety, depression and stress in pregnancy: Implications for mothers, children, research, and practice. *Curr Opin Psychiatry*. 2012;**25**(2):141-8. doi: [10.1097/YCO.0b013e3283503680](https://doi.org/10.1097/YCO.0b013e3283503680). [PubMed: [22262028](https://pubmed.ncbi.nlm.nih.gov/22262028/)]. [PubMed Central: [PMC4447112](https://pubmed.ncbi.nlm.nih.gov/PMC4447112/)].
- Mohammadi ZD, Bosaknejad S, Sarvghad S. A survey on the effectiveness of stress management training with cognitive-behavioral group therapy approach on state/trait anxiety, pregnancy anxiety and mental health of primiparous women. *Jentashapir J Health Res*. 2012;**3**(4).
- Maryam GA, Shohre GS, Javad K. Effectiveness of hardiness training on anxiety and quality of Life of pregnancy women. *Proced Soc Behav Sci*. 2013;**84**:1785-9. doi: [10.1016/j.sbspro.2013.07.034](https://doi.org/10.1016/j.sbspro.2013.07.034).
- Arfaie K, Nahidi F, Simbar M, Bakhtiari M. The role of fear of childbirth in pregnancy related anxiety in Iranian women: A qualitative research. *Electron Physician*. 2017;**9**(2):3733-40. doi: [10.19082/3733](https://doi.org/10.19082/3733). [PubMed: [28465800](https://pubmed.ncbi.nlm.nih.gov/28465800/)]. [PubMed Central: [PMC5410899](https://pubmed.ncbi.nlm.nih.gov/PMC5410899/)].
- O'Connor TG, Caprariello P, Blackmore ER, Gregory AM, Glover V, Fleming P, et al. Prenatal mood disturbance predicts sleep problems in infancy and toddlerhood. *Early Hum Dev*. 2007;**83**(7):451-8. doi: [10.1016/j.earlhumdev.2006.08.006](https://doi.org/10.1016/j.earlhumdev.2006.08.006). [PubMed: [17008033](https://pubmed.ncbi.nlm.nih.gov/17008033/)]. [PubMed Central: [PMC2853892](https://pubmed.ncbi.nlm.nih.gov/PMC2853892/)].
- O'Connor TG, Heron J, Golding J, Beveridge M, Glover V. Maternal antenatal anxiety and children's behavioural/emotional problems at 4 years. Report from the Avon longitudinal study of parents and children. *Br J Psychiatry*. 2002;**180**:502-8. doi: [10.1192/bjp.180.6.502](https://doi.org/10.1192/bjp.180.6.502). [PubMed: [12042228](https://pubmed.ncbi.nlm.nih.gov/12042228/)].
- Rice F, Harold GT, Boivin J, van den Bree M, Hay DF, Thapar A. The links between prenatal stress and offspring development and psychopathology: Disentangling environmental and inherited influences. *Psychol Med*. 2010;**40**(2):335-45. doi: [10.1017/S003291709005911](https://doi.org/10.1017/S003291709005911). [PubMed: [19476689](https://pubmed.ncbi.nlm.nih.gov/19476689/)]. [PubMed Central: [PMC2830085](https://pubmed.ncbi.nlm.nih.gov/PMC2830085/)].
- Glover V. Maternal depression, anxiety and stress during pregnancy and child outcome; what needs to be done. *Best Pract Res Clin Obstet Gynaecol*. 2014;**28**(1):25-35. doi: [10.1016/j.bpobgyn.2013.08.017](https://doi.org/10.1016/j.bpobgyn.2013.08.017). [PubMed: [24090740](https://pubmed.ncbi.nlm.nih.gov/24090740/)].
- Monk C, Fifer WP, Myers MM, Sloan RP, Trien L, Hurtado A. Maternal stress responses and anxiety during pregnancy: Effects on fetal heart rate. *Dev Psychobiol*. 2000;**36**(1):67-77. [PubMed: [10607362](https://pubmed.ncbi.nlm.nih.gov/10607362/)].
- Buss C, Davis EP, Muftuler LT, Head K, Sandman CA. High pregnancy anxiety during mid-gestation is associated with decreased gray matter density in 6-9-year-old children. *Psychoneuroendocrinology*. 2010;**35**(1):141-53. doi: [10.1016/j.psyneuen.2009.07.010](https://doi.org/10.1016/j.psyneuen.2009.07.010). [PubMed: [19674845](https://pubmed.ncbi.nlm.nih.gov/19674845/)]. [PubMed Central: [PMC2795128](https://pubmed.ncbi.nlm.nih.gov/PMC2795128/)].
- Khashan AS, Abel KM, McNamee R, Pedersen MG, Webb RT, Baker PN, et al. Higher risk of offspring schizophrenia following antenatal maternal exposure to severe adverse life events. *Arch Gen Psychiatry*. 2008;**65**(2):146-52. doi: [10.1001/archgenpsychiatry.2007.20](https://doi.org/10.1001/archgenpsychiatry.2007.20). [PubMed: [18250252](https://pubmed.ncbi.nlm.nih.gov/18250252/)].
- Kammerer M, Adams D, Castelberg Bv BV, Glover V. Pregnant women become insensitive to cold stress. *BMC Pregnancy Childbirth*. 2002;**2**(1):8. doi: [10.1186/1471-2393-2-8](https://doi.org/10.1186/1471-2393-2-8). [PubMed: [12437774](https://pubmed.ncbi.nlm.nih.gov/12437774/)]. [PubMed Central: [PMC137604](https://pubmed.ncbi.nlm.nih.gov/PMC137604/)].
- Gitau R, Fisk NM, Teixeira JM, Cameron A, Glover V. Fetal hypothalamic-pituitary-adrenal stress responses to invasive procedures are independent of maternal responses. *J Clin Endocrinol Metab*. 2001;**86**(1):104-9. doi: [10.1210/jcem.86.1.7090](https://doi.org/10.1210/jcem.86.1.7090). [PubMed: [11231985](https://pubmed.ncbi.nlm.nih.gov/11231985/)].
- Sandman CA, Davis EP, Buss C, Glynn LM. Exposure to prenatal psychobiological stress exerts programming influences on the mother and her fetus. *Neuroendocrinology*. 2012;**95**(1):7-21. doi: [10.1159/000327017](https://doi.org/10.1159/000327017). [PubMed: [21494029](https://pubmed.ncbi.nlm.nih.gov/21494029/)]. [PubMed Central: [PMC7068789](https://pubmed.ncbi.nlm.nih.gov/PMC7068789/)].

24. Green SM, Donegan E, McCabe RE, Streiner DL, Agako A, Frey BN. Cognitive behavioral therapy for perinatal anxiety: A randomized controlled trial. *Aust N Z J Psychiatry*. 2020;**54**(4):423-32. doi: [10.1177/0004867419898528](https://doi.org/10.1177/0004867419898528). [PubMed: 31957479].
25. Corbijn van Willenswaard K, Lynn F, McNeill J, McQueen K, Dennis CL, Lobel M, et al. Music interventions to reduce stress and anxiety in pregnancy: A systematic review and meta-analysis. *BMC Psychiatry*. 2017;**17**(1):271. doi: [10.1186/s12888-017-1432-x](https://doi.org/10.1186/s12888-017-1432-x). [PubMed: 28750631]. [PubMed Central: PMC5531014].
26. Shahoei R, Sharifis HS, Soufizadeh N, Khanpour F. [Evaluation of the effectiveness of mindfulness-based stress reduction on anxiety in pregnant women]. *S J Nurs Midwifery Paramed Fac*. 2019;**5**(3):83-94. Persian.
27. Alipour M, Ghahremani L, Amooee S, Keshavarzi S. [The effectiveness of relaxation techniques on depression, anxiety and stress in pregnant women: Based on self-efficacy theory]. *Sci J Kurdistan Univ Med Sci*. 2017;**22**(3). Persian.
28. Haghghat M, Mirghafourvand M, Mohammad-Alizadeh-Charandabi S, Malakouti J, Erfani M. The effect of spiritual counseling on stress and anxiety in pregnancy: A randomized controlled clinical trial. *Iran Red Crescent Med J*. 2018;**In Press** (In Press). doi: [10.5812/ircmj.64094](https://doi.org/10.5812/ircmj.64094).
29. Sanaati F, Mohammad-Alizadeh Charandabi S, Farrokhi Eslamlo H, Mirghafourvand M, Alizadeh Sharajabad F. The effect of lifestyle-based education to women and their husbands on the anxiety and depression during pregnancy: A randomized controlled trial. *J Matern Fetal Neonatal Med*. 2017;**30**(7):870-6. doi: [10.1080/14767058.2016.1190821](https://doi.org/10.1080/14767058.2016.1190821). [PubMed: 27186630].
30. Amiri P, Najjarzadeh M, Mirghafourvand M. Application of distraction techniques in obstetrics and gynaecology: A systematic review. *J Clin Diagn Res*. 2019. doi: [10.7860/jcdr/2019/40856.12801](https://doi.org/10.7860/jcdr/2019/40856.12801).
31. Michalak J, Crane C, Germer CK, Gold E, Heidenreich T, Mander J, et al. Correction to: Principles for a responsible integration of mindfulness in individual therapy. *Mindfulness*. 2019;**10**(11):2479. doi: [10.1007/s12671-019-01190-y](https://doi.org/10.1007/s12671-019-01190-y).
32. Takahashi T, Sugiyama F, Kikai T, Kawashima I, Guan S, Oguchi M, et al. Changes in depression and anxiety through mindfulness group therapy in Japan: The role of mindfulness and self-compassion as possible mediators. *Biopsychosoc Med*. 2019;**13**:4. doi: [10.1186/s13030-019-0145-4](https://doi.org/10.1186/s13030-019-0145-4). [PubMed: 30820241]. [PubMed Central: PMC6378713].
33. Rafiee B, Akbarzade M, Asadi N, Zare N. [Comparison of attachment and relaxation training effects on anxiety in third trimester and postpartum depression among primipara women]. *J Hayat*. 2013;**19**(1):76-88. Persian.
34. Frederiksen Y, O'Toole MS, Mehlsen MY, Hauge B, Elbaek HO, Zachariae R, et al. The effect of expressive writing intervention for infertile couples: A randomized controlled trial. *Hum Reprod*. 2017;**32**(2):391-402. doi: [10.1093/humrep/dew320](https://doi.org/10.1093/humrep/dew320). [PubMed: 28007790].
35. Pizarro J. The efficacy of art and writing therapy: Increasing positive mental health outcomes and participant retention after exposure to traumatic experience. *Art Therapy*. 2004;**21**(1):5-12. doi: [10.1080/07421656.2004.10129327](https://doi.org/10.1080/07421656.2004.10129327).
36. Langens TA, Schuler J. Effects of written emotional expression: The role of positive expectancies. *Health Psychol*. 2007;**26**(2):174-82. doi: [10.1037/0278-6133.26.2.174](https://doi.org/10.1037/0278-6133.26.2.174). [PubMed: 17385969].
37. Pennebaker JW. Writing about emotional experiences as a therapeutic process. *Psychol Sci*. 2016;**8**(3):162-6. doi: [10.1111/j.1467-9280.1997.tb00403.x](https://doi.org/10.1111/j.1467-9280.1997.tb00403.x).
38. Esterling BA, L'Abate L, Murray EJ, Pennebaker JW. Empirical foundations for writing in prevention and psychotherapy. *Clin Psychol Rev*. 1999;**19**(1):79-96. doi: [10.1016/s0272-7358\(98\)00015-4](https://doi.org/10.1016/s0272-7358(98)00015-4).
39. Schoutrop MJ, Lange A, Hanewald G, Davidovich U, Salomon H. Structured writing and processing major stressful events: A controlled trial. *Psychother Psychosom*. 2002;**71**(3):151-7. doi: [10.1159/000056282](https://doi.org/10.1159/000056282). [PubMed: 12021557].
40. Beck AT, Steer RA. *Manual for the Beck anxiety inventory*. San Antonio, TX: Psychological Corporation; 1990.
41. Kaviani H, Mousavi AS. [Psychometric properties of the Persian version of Beck anxiety inventory (BAI)]. *Tehran Uni Med J TUMS Publ*. 2008;**66**(2):136-40. Persian.
42. Crawley R, Ayers S, Button S, Thornton A, Field AP, Lee S, et al. Feasibility and acceptability of expressive writing with postpartum women: A randomised controlled trial. *BMC Pregnancy Childbirth*. 2018;**18**(1):75. doi: [10.1186/s12884-018-1703-7](https://doi.org/10.1186/s12884-018-1703-7). [PubMed: 29580213]. [PubMed Central: PMC5870252].
43. Hasanzadeh P, Fallahi Khoshknab M, Norozi K. [Impacts of journaling on anxiety and stress in multiple sclerosis patients]. *Complementary Med J Fac Nurs Midwifery*. 2012;**2**(2):183-93. Persian.
44. Horsch A, Tolsa JF, Gilbert L, du Chene LJ, Muller-Nix C, Bickle Graz M. Improving maternal mental health following preterm birth using an expressive writing intervention: A randomized controlled trial. *Child Psychiatry Hum Dev*. 2016;**47**(5):780-91. doi: [10.1007/s10578-015-0611-6](https://doi.org/10.1007/s10578-015-0611-6). [PubMed: 26659113].
45. Moradmand M, Khanbani M. [Efficacy of written emotional disclosure on self-efficacy and affective control in student with anxiety]. *J Appl Psychol*. 2016;**10**(1):21-37. Persian.
46. Panagopoulou E, Montgomery A, Tarlatzis B. Experimental emotional disclosure in women undergoing infertility treatment: Are drop outs better off? *Soc Sci Med*. 2009;**69**(5):678-81. doi: [10.1016/j.socscimed.2009.06.031](https://doi.org/10.1016/j.socscimed.2009.06.031). [PubMed: 19615806].
47. Ahmadi TM, Ramezani V, Abdollahi MH, Najafi M, Rabieei M. [The effectiveness of emotional disclosure (written and verbal) on symptoms of depression, anxiety and stress in students]. *J Clin Psychol*. 2011;**2**(8). Persian.
48. Anderson T, Fende Guajardo J, Luthra R, Edwards KM. Effects of clinician-assisted emotional disclosure for sexual assault survivors: A pilot study. *J Interpers Violence*. 2010;**25**(6):1113-31. doi: [10.1177/0886260509340542](https://doi.org/10.1177/0886260509340542). [PubMed: 20410374].
49. Petrie KJ, Fontanilla I, Thomas MG, Booth RJ, Pennebaker JW. Effect of written emotional expression on immune function in patients with human immunodeficiency virus infection: A randomized trial. *Psychosom Med*. 2004;**66**(2):272-5. doi: [10.1097/01.psy.0000116782.49850.d3](https://doi.org/10.1097/01.psy.0000116782.49850.d3). [PubMed: 15039514].
50. Kloss JD, Lisman SA. An exposure-based examination of the effects of written emotional disclosure. *Br J Health Psychol*. 2002;**7**(Pt 1):31-46. doi: [10.1348/135910702169349](https://doi.org/10.1348/135910702169349). [PubMed: 14596716].
51. Asgharian B, sehhatie F, Mirghafourvand M. The effect of training pregnant women and their husband's on the anxiety in pregnant women with previous adverse pregnancy outcomes: A controlled randomized clinical trial. *J Fetal Med*. 2019;**6**(1):17-23. doi: [10.1007/s40556-019-00193-y](https://doi.org/10.1007/s40556-019-00193-y).