

# The Effect of Cognitive Behavioural Therapy on Anxiety, Depression and Stress in Women with Preeclampsia

ELAHE ASGHARI<sup>1</sup>, MAHBOBEH FARAMARZI<sup>2</sup>, ARSALAN KHAN MOHAMMMADI<sup>3</sup>

## ABSTRACT

**Introduction:** Stress induced by preeclampsia in pregnancy may have a detrimental effect on both the mother and child. Risk of anxiety, depression and stress during pregnancy is, therefore, commonly associated with preeclampsia.

**Aim:** To determine the effect of Cognitive Behavioural Therapy (CBT) on anxiety, depression and stress in pregnant women with preeclampsia.

**Materials and Methods:** In a clinical trial, 60 women with preeclampsia were selected by the convenience sampling method from the Imam-Ali Hospital of Amol city (North of Iran). The subjects were randomly divided into two groups; the study group (n=30) and the control (n=30). All participants completed the Hospital Anxiety and Depression Scale (HADS)

and a Pregnancy Distress Questionnaire (PDQ) at the beginning and end of the study. The intervention group received 12 CBT sessions lasting for 90 minutes over 4 weeks (3 sessions in a week) and the control group received no treatment.

**Results:** A MANCOVA test showed that CBT significantly reduced the mean scores of anxiety ( $5.5 \pm 3.2$  vs.  $9.7 \pm 3.8$ ) and depression ( $6.4 \pm 2.6$  vs  $9.3 \pm 4.0$ ) in preeclamptic women (F: 19.933, p-value <0.01). In addition, ANCOVA also revealed that CBT significantly improved the mean scores of specific-stress pregnancy ( $15.9 \pm 6.3$  vs  $22.2 \pm 6.8$ ) in women with preeclampsia (F: 10.214, p-value <0.01).

**Conclusion:** Psychotherapy was effective in reducing anxiety, depression and specific-stress pregnancy in pregnant women with preeclampsia.

**Keywords:** Distress, Pregnancy induced hypertension, Psychotherapy

## INTRODUCTION

Preeclampsia is a common complication in pregnancy, whereby the blood pressure increases following the 20<sup>th</sup> week and continues until the end. About 8–10% of pregnant women in developing countries suffers from preeclampsia [1] and is one of the three leading causes of death in women alongside bleeding and infection all over the world [2]. In developed countries, however, about 15% of maternal morbidity is attributed to preeclampsia [3].

Research has reported that the prevalence of stress and depression during pregnancy is high and that psychological factors are predictors of pregnancy stress [4-7]. High psychosocial stress can act to increase the risk of preeclampsia up to a 20-fold [8] and evidence has emphasized that women with preeclampsia experience more stress than non preeclamptic women [9]. Psychological stress is also significantly higher in women with severe preeclampsia compared to mild/moderate preeclampsia cases [10]. Furthermore, preeclamptic women are more likely to experience complications of anxiety and mood disorders in comparison to females with uncomplicated pregnancies [11]. Hence, prenatal and postnatal depression often increases in preeclamptic women [11,12]. By reducing stress in women with preeclampsia it may, therefore, prevent such consequences [9].

Many studies have shown that the method of exposure-based Cognitive Behavioural Therapy (CBT) has an effective role in reducing the symptoms of anxiety, stress and depression in pregnant women [12-15]. Nieminen et al., concluded that the realistic attitudes of participants were improved towards labor and that the patients showed more self-esteem and active coping strategies [16]. Green et al., also showed a significant decrease in anxiety and depressive symptoms following the use of CBT [17]. While, Netsi et al., found that depressed women who received CBT had a better night's sleep than the control group [18]. This was also supported by Carta et al., who showed that CBT was

effective in reducing postpartum depression in mothers who received this treatment versus the mothers who did not receive this treatment [19].

Despite this, little research is available regarding the role of CBT in improving anxiety/depression symptoms in women with preeclampsia. Mahmoudjanlou et al., for instance, demonstrated that CBT reduce stress in pregnant women [20], a finding which was supported by Meijer et al., and Poel et al., [21,22]. In addition, CBT is safer than medicine for anxiety disorders during pregnancy [21]. Meijer et al., more specifically, showed that anxiety and depression was reduced in mothers during pregnancy and post-partum using CBT [22], while Poel et al., found that CBT significantly reduced psychological complaints in women with preeclampsia [23]. This study is the first to apply CBT for reducing pregnancy-specific stress in women with preeclampsia. Taking up the challenge and importance of mental health problems during pregnancy for fetal, maternal and the whole population, this study aimed to evaluate the impact of cognitive behavioural therapy on anxiety, depression and pregnancy specific-stress in preeclamptic women.

## MATERIALS AND METHODS

The present quasi-experimental study is an empirical pretest-post-test study with two groups of interest, the interventional and the control. All aspects of the study were approved by the Humanistic Science Committee of the Islamic Azad University of Ayatollah Amoli.

The independent variable of this study was CBT and its impact on post-test scores for the interventional group in comparison to the control group. In this study, however, the effects of CBT (independent variable) and anxiety, depression and gestational stress (dependent variable) were studied. Inclusion criteria for this study involved women in 28 to 34 weeks of pregnancy with mild to moderate preeclampsia. The women with severe preeclampsia,

fetal distress and indication for the termination of their pregnancy were excluded for medical reasons before the end of treatment in both groups.

All pregnant women with preeclampsia who were admitted in Imam Ali Hospital in Amol (North of Iran) from June to July 2015 were selected as the study population and convenience sampling was used. A total of 60 participants remained until the end of the study and were randomly divided into two groups, the study group ( $n = 30$ ) and the control group ( $n = 30$ ). As the aim of this study was to establish the impact of CBT on anxiety, depression and stress in women with preeclampsia, variable levels were not evaluated before sample enrollment.

All subjects were required to fill in two assessments, including the Hospital Anxiety and Depression Scale (HADS) questionnaire and the Pregnancy Distress Questionnaire (PDQ) [24,25]. Following this, the study group was divided into three groups of 10 patients. Each group received CBT for 12 sessions (90 minutes) over four weeks (three times in a week) by a female psychotherapist. The therapist was trained in CBT before starting the trial. The control group was also divided into three groups of 10 patients and received no intervention. Both groups received regular prenatal care by a midwife.

The post-test questionnaire was completed in the last session by the subjects. However, the control group completed the questionnaire after six weeks of the aforementioned study. To schedule the scheme of treatment, the cognitive behavioural model of Anthony Ryle was used [26]. In this model, coping strategies for stress, anxiety, and depression were provided. To collect anxiety and depression data, the Hospital Anxiety and Depression Scale (HADS) was used. This tool evaluates anxiety and depression in a parallel manner, and includes seven items for the evaluation of these disorders. Each item was measured on a scale of 0 to 3; therefore, the grade subscales of anxiety and depression ranged from 0 to 21. Psychometric assessment of the Persian version of the scale and subscales of anxiety and depression were validated by Cronbach's alpha 0.78 and 0.86, respectively [24].

To collect data regarding pregnancy specific-stress, a PDQ was used. Invented in 1999 by Yali and Lobel to measure specific pregnancy stress [26], the questionnaire consists of 12 brief questions and can be completed in a health care environment within five minutes. Thus, the 12 items of PDQ are commonly known to involve weight and body image and feelings and relationships [25]. Each of the 12 questions scored between 0 and 4, whereby the overall scores ranged from 0 to 48. The validity of this study was reported to be 81% (38) [26].

## STATISTICAL ANALYSIS

SPSS software version 16.0 was used to analyse the data of this study. Mean, standard deviation and percentage were used to describe the data. The Multivariate Analysis of Covariance (MANCOVA) test was also used to assess the differences between the mean scores of anxiety and depression in women with preeclampsia, in both the control and study groups. Furthermore, the Univariate Analysis of Covariance (ANCOVA) test was used to compare specific-pregnancy stress in two groups. Differences were regarded statistically significant when  $p < 0.05$ .

## RESULTS

[Table/Fig-1] shows the demographic characteristics of the population study. Two groups were similar based on age, education, gestational age, and parity. In both groups, those aged 20–29 years and had a parity equal to or less than two had the highest prevalence.

[Table/Fig-2], on the other hand, shows the mean scores of anxiety, stress and depression from two groups based on both pre- and post-tests. With regards to answering the hypothesis,

Variables	Interventional group N (%)	Control group N (%)
<b>Age (years)</b>		
<20	2 (6.7)	3 (10.0)
20-29	21 (70.0)	16 (53.3)
30-39	7 (23.3)	11 (36.7)
<b>Education (years)</b>		
<12	20 (66.7)	16 (53.3)
>12	10 (33.3)	14 (46.7)
<b>Gestational age (weeks)</b>		
<30	14 (46.7)	12 (40)
>30	16 (53.3)	18 (60)
<b>Parity</b>		
1	14 (46.7)	14 (46.7)
2	12 (40)	10 (33.3)
3	4 (13.3)	6 (20.0)

[Table/Fig-1]: Demographic characteristics of the Sample.

Variables	Interventional group		Control group	
	Pre-test	Post-test	Pre-test	Post-test
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Specific-pregnancy stress	21.06 (8.6)	15.96 (6.3)	19.23 (7.2)	22.20 (6.8)
Anxiety	7.73 (4.02)	5.56 (3.2)	8.7 (4.2)	9.70 (3.8)
Depression	8.56 (3.7)	6.46 (2.6)	7.73 (3.7)	9.30 (4.04)

[Table/Fig-2]: The mean and standard deviations of the stress, anxiety and depression during trial in two groups.

Multivariate Analysis of Covariance (MANCOVA) and Univariate Analysis of Covariance (ANCOVA) were used to compare the mean scores from the control and interventional groups for pre- and post-tests.

Furthermore, [Table/Fig-3] shows whether a test was significant or not ( $p < 0.05$ ). Overall, the table identifies there was a significant difference regarding the scores of pregnancy anxiety and depression in women with preeclampsia for both the control and study groups. Wilks' lambda test, with a value of 0.741 and  $F = 9.956$ , also revealed a significant difference between the scores of pregnancy anxiety and depression in women with preeclampsia for both groups ( $p < 0.05$ ). To assess the difference between the mean scores of anxiety and depression in women with preeclampsia, a MANCOVA test was used and the results are shown in [Table/Fig-4]. As the findings demonstrate [Table/Fig-4], the calculated  $F = 19.933$ , with a significant difference of  $< 0.001$ , is less than 0.05. Thus, it can be concluded that there is a significant difference for the mean of anxiety in women with preeclampsia following CBT. [Table/Fig-4] also shows the calculated  $F = 10.214$  with a significance level of  $< 0.001$ , whereby this falls lower than a standard error of 0.05. Hence, it can be concluded that there is a significant difference in the depression scores between the study and control groups of pregnant women with preeclampsia. As well as, it means that CBT reduced depression in pregnant women and that CBT significantly improved anxiety, depression and specific pregnancy stress in preeclamptic women.

[Table/Fig-5] demonstrated that the amount of  $F$  is equal to 13.469. With a significance level of  $< 0.001$  and a standard error

Test	Value	F	df	Significance	Eta
Pillai effect	0.259	9.956	2.0	0.001	0.259
L	0.741	9.956	2.0	0.001	0.259
Hi	0.349	9.956	2.0	0.001	0.259
Roy	0.349	9.956	2.0	0.001	0.259

[Table/Fig-3]: Results of MANCOVA test on anxiety and depression in two groups.

	SS	df	MS	F	Significance	Eta
Between groups						
Anxiety	256.267	1	256.267	19.933	0.001	0.256
Depression	120.417	1	120.417	10.214	0.001	0.150
Error						
Anxiety	745.667	58	12.856			
Depression	683.767	56	11.789			
Sum						
Anxiety	4498.000	60				
Depression	4533.000	60				

**[Table/Fig-4]:** The mean the scores of anxiety and depression.

	SS	df	MS	F	Significance	Eta
Between group	582.817	1	582.817	13.469	0.001	0.188
Error	2509.767	58	43.272			
Sum	24943.000	60				

**[Table/Fig-5]:** Results of ANCOVA test on specific-pregnancy stress in two groups.

of 0.05, there was a significant difference between both groups regarding specific pregnancy stress in women with preeclampsia. Therefore, CBT significantly reduced specific pregnancy stress in women with preeclampsia.

## DISCUSSION

In this study, four weeks of psychotherapy yielded statistically significant improvements in anxiety/depression symptoms and in pregnancy-specific stress, when compared to control group.

Previous studies provided a strong support regarding the efficacy of CBT adapted for the treatment of general anxiety in pregnant and non-pregnant women. This finding is consistent with the studies of Nieminen et al., Green et al., Arch et al., Majior et al., Karamouzian and Asgarizadeh, Jabbari et al., Dareshouri -Mohammadi et al., and Hoffman [16,17,21,22,24,27-29].

In addition, CBT reduced pregnancy-specific stress which has been found in the interventional group. The large effects of CBT on pregnancy-specific stress and psychological symptoms have not yet been reported in previous studies for other psychotherapies. Thus, the result of the study is consistent with Jabbari's findings [27]. To explain these results, it can be said that stress stimulates the adrenal glands and the sympathetic nervous system, and, therefore, subsequently increases respiratory rate, heart rate, pulse, and blood pressure through a complicated mechanism. One of the coping strategies against stress is the progressive muscle relaxation technique, which was one of the techniques used for the first group [30].

The results showed that CBT improved depression symptoms in the interventional group for women suffering with preeclampsia. This result is also consistent with the findings of Green et al., Nesti et al., Carta et al., Majior et al., Karamouzian and Asgarizadeh and Jabari [17-19,22,24,27].

Although this study is the first to apply CBT to the reduction of pregnancy-specific stress in preeclamptic women, we believe the substantial effect was found to have stress symptoms which may be related to the type of the method used. Anxiety and depression play an important role in increased symptoms in women with preeclampsia. Experience of pregnancy is, therefore, considered as a crisis in women's life. Various forms of anxiety cause problems for both the mother and fetus. Thus, the most efficacious factor in inducing anxiety may be allied to inefficient thoughts and wrong beliefs about pregnancy and childbirth. Throughout therapy sessions, the negative thoughts were repurposed and the participant's anxiety levels reduced. Previous clinical trials provided

a strong support for the efficacy of CBT regarding the treatment of anxiety in pregnant women [31]. As with many applications of CBT related meditation techniques, there are some values in framing CBT within a relaxation or stress management context. This is noticeable in relation to preeclampsia, as stress is a common trigger of complications in pregnancy [32]. Another key aspect of CBT involves helping patients recognize how anxiety/depression-based thoughts may exacerbate their preeclamptic symptoms. CBT provides individuals with a heightened ability to simply observe feelings, behaviours and experiences, to disengage automatic and often dysfunctional reactivity and to allow themselves to work and develop wiser, more balanced relationships. Hence, this linking process may be an important therapeutic mechanism. The focus of CBT on emotions and thoughts may be effective due to the increasing awareness of emotional changes and distress in possible treatment outcomes. Thus, a release from anxiety/depression symptoms and pregnancy specific-stress may improve the regulation of emotional affects and may have central healing effect on preeclampsia women. Therefore, it seems that the coordination between the method of CBT and the nature of preeclampsia may have contributed to the successful results seen in this study.

## LIMITATION

There were many limitations during our research. For instance, hospital bureaucracy, sample size, lack of ability to generalize the results, time limitation and a low willingness in patients to cooperate were our main limitations. In such studies, the investigators need to motivate the participants to understand the importance of the problem and provide a conscious contribution in the educational process at home.

## CONCLUSION

In preeclamptic women, psychotherapy may adjust the emotions and feelings, and psychosocial amendment. Thus, problematic health behaviour would be reduced. Cooperation of obstetrician and psychiatric experts as a team in the treatment of psychological disorders (anxiety, depression and specific-pregnancy stress) can help to improve unfavorable conditions in women during pregnancy. In addition, the effectiveness of other psychological therapies in the treatment of mental disorders in women with preeclampsia is imperative. Therefore, according to our results, such educational programs can play an important role in improving mental health for mothers and reduce the common maternal mood disorders post-pregnancy.

**Funding:** This paper is retrieved from a Master thesis (NO. 23920705932004). The Deputy Research of Ayatollah Amoli University, Amol Branch, approved and supported the study.

## ACKNOWLEDGMENTS

We thank all study participants who collaborated in this study.

## REFERENCES

- [1] Vata PK, Chauhan NM, Nallathambi A, Hussein F. Assessment of prevalence of preeclampsia from Dilla region of Ethiopia. *BMC Res Notes*. 2015;8(1):816.
- [2] Allahyari E, Rahimi-Foroushani A, Zeraati H, Mohammad K, Taghizadeh Z. A predictive model for the diagnosis of preeclampsia. *JRI*. 2009;10(4):261-67.
- [3] Sibai B, Dekker G, Kupferminc M. Preeclampsia. *Lancet*. 2005;365(9461):785-99.
- [4] Rezaee R, Faramarzi M. Predictors of mental health during pregnancy. *Iran J Nurs Midwifery Res*. 2014;19:45-50. [In Persian].
- [5] Barcelona de Mendoza V, Harville E, Savage J, Giarratano G. Association of complementary and alternative therapies with mental health outcomes in pregnant women living in a post disaster recovery environment. *J Holist Nurs*. 2015;26 pii: 0898010115609250. [Epub ahead of print]
- [6] Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence. *J Obstet Gynecol*. 2005;106(5):1071-83.
- [7] Faramarzi M, Pasha H. The role of social support in prediction of stress during pregnancy. *J Babol Univ Med Sci*. 2015;17(11):52-60.

- [8] Yu Y, Zhang S, Wang G, Hong X, Mallow EB, Walker SO, et al. The combined association of psychosocial stress and chronic hypertension with preeclampsia. *Am J Obstet Gynecol*. 2013;209(5):438.e1–438.e12.
- [9] Leeners B, Stiller R, Neumaier-Wagner P, Kuse S, Schmitt A, Rath W. Psychosocial distress associated with treatment of hypertensive diseases in pregnancy. *Psychosom*. 2008;49(5):413–19.
- [10] Black K. D. Stress, Symptoms, Self – monitoring confidence, well – being, and social support in the progression of preeclampsia / gestational hypertension. *University College of health professions Philadelphia*. 2007;36, 419-29.
- [11] Thiagayson P, Krishnaswamy G, Lim ML, Sung SC, Haley CL, Fung DS, et al. Depression and anxiety in Singaporean high-risk pregnancies - prevalence and screening. *Gen Hosp Psychiatry*. 2013;35:112–16.
- [12] Stewart DE. Clinical practice, Depression during pregnancy. *N Engl J Med*. 2011;365:1605–11.
- [13] Practice guideline for the treatment of patients with major depressive disorder. 3<sup>rd</sup> ed. Washington, DC: American Psychiatric Association, 2010:66-70.
- [14] Antenatal and postnatal mental health: the NICE guideline on clinical management and service guidance. London: National Institute for Health and Clinical Excellence, 2007. (<http://www.nice.org.uk/CG045/fullguideline>).
- [15] Yonkers KA, Wisner KL, Stewart DE, Oberlander TF, Dell DL, Stotland N, et al. The management of depression during pregnancy: a report from the American Psychiatric Association and the American College of Obstetricians and Gynecologists. *Gen Hosp Psychiatry*. 2009;31:403-13.
- [16] Nieminen K, Malmquist A, Wijma B, Ryding EL, Andersson G, Wijma K. Nulliparous pregnant women's narratives of imminent childbirth before and after internet-based cognitive behavioural therapy for severe fear of childbirth: a qualitative study. *An International Journal of Obstetrics and Gynecology*. 2015;122(9):1259-65.
- [17] Green SM, Haber E, Frey BN, McCabe RE. Cognitive-behavioural group treatment for perinatal anxiety: a pilot study. *Arch womans ment health*. 2015;18(4):631-38.
- [18] Netsi E, Evans J, Wulff K, O'Mahen H, Ramchandani PG. Infant outcomes following treatment of antenatal depression: Findings from a pilot randomized controlled trial. *J Affect Disord*. 2015;29(188):252-56.
- [19] Carta G, D'Alfonso A, Parisse V, Di Fonso A, Casacchia M, Patacchiola F. How does early cognitive behavioural therapy reduce postpartum depression? *Clin Exp Obstet Gynecol*. 2015;42(1):49-52.
- [20] Mahmoudjanlou N, Hasansadeh R, Mirzaian B, Gholampour F, Mostafaei M, Hafezian, M. The role of cognitive – behavioural therapy (Intermention) in reducing blood pressure and stress during pregnancy and before pregnancy. *Reef Resources Assessment and Management Technical paper*. 2014;40:835-46.
- [21] Arch J, Dimidjian S, Chesslck CH. Are exposure – based cognitive behavioural therapies safe during pregnancy? *Health Pregnancy*. 2012;308-09.
- [22] Meijer L, Bockting LH, Beijers C, Verbeek T, Stant D, Ormel J, et al. Pregnancy outcomes after a maternity intervention for stressful emotions (PROMLSSES): Study protocol for a randomized controlled trial. *Int J Car Sci*. 2011;6:215-21.
- [23] Poel YMH, Swinkels P, Vries JIP. Psychological treatment of women with psychological complaints after pre-eclampsia. *J Psychosom Obstet Gynecol*. 2009;30(1):65-72.
- [24] Ryle A. Cognitive Analytic Therapy and Borderline Personality Disorder: The Model and the Method. 1999; Chichester: Wiley.
- [25] Kaviani H, Syfvyran H, Sharifi V, Ebrahim Khani N. Reliability and Validity of the Hospital Anxiety and Depression Scale (HADS): Iranian patients with depression and anxiety. *Faculty of Tehran University of Medical Sciences*. 2008;67(5):385-79. [In Persian]
- [26] Yali AM, Lobel M. Coping and distress in pregnancy: An investigation of medically high risk women. *J Psychosom Obstet Gynecol*. 1999;20(1):35-52.
- [27] Jabari Z, Hashemi H, Haghighyegh AB. The effect of stress management, cognitive - behavioural stress, anxiety and depression in pregnant women. *Journal of Health System Research*. 2012;8(7). [In Persian].
- [28] Dareshouri Mohammadi Z, Bosaknejad S, Sarvghad S. A survey on the effectiveness of stress management training with cognitive-behavioural group therapy approach on state/trait anxiety, pregnancy anxiety and mental health of primiparous women. *Jentashapir*. 2012;3(4):495-504 [In Persian].
- [29] Hofmann SG, Fang A, Gutner CA. Cognitive enhancers for the treatment of anxiety disorders. *Journal of Restorative Neurology and Neuroscience*. 2014;32(1):183-95.
- [30] Jacobson E. Progressive relaxation: A Psychological and clinical investigation of muscle state and their significance in psychological and medical practice. Chicago, University of Chicago Press; 1983.
- [31] Faramarzi M, Yazdani S, Barat S. A RCT of psychotherapy in women with nausea and vomiting of pregnancy. *Hum Reprod*. 2015;30(12):2764-73.
- [32] Mizuuchi M, Cindrova-Davies T, Olovsson M, Charnock-Jones DS, Burton GJ, Yung HW. Placental endoplasmic reticulum stress negatively regulates transcription of placental growth factor via ATF4 and ATF6 $\beta$ : implications for the pathophysiology of human pregnancy complications. *J Pathol*. 2016;238(4):550-61.

#### PARTICULARS OF CONTRIBUTORS:

1. Student, Department of Psychology, Ayatollah Amoli Branch, Islamic Azad University, Amol, Mazadreran, Iran.
2. Assistant Professor, Infertility and Reproductive Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran.
3. Assistant Professor, Department of Psychology, Ayatollah Amoli Branch, Islamic Azad University, Amol, Mazadreran, Iran.

#### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Mahbobeh Faramarzi,  
Department of Psychology, Infertility and Reproductive Health Research Center, Health Research Institute,  
Babol University of Medical Sciences, Babol, Iran.  
E-mail: mahbob330@yahoo.com

**FINANCIAL OR OTHER COMPETING INTERESTS:** As declared above.

Date of Submission: **May 08, 2016**

Date of Peer Review: **May 26, 2016**

Date of Acceptance: **Aug 22, 2016**

Date of Publishing: **Nov 01, 2016**