

Effect of Cognitive Behavioral Therapy on Anxiety, Stress, Depression, and Coping Pattern among Pregnant Women with Preeclampsia

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Abstract Aim: Investigate the effect of cognitive behavioral therapy on anxiety, stress, depression, and coping pattern among pregnant with pre-eclampsia. **Method: Design:** Quasi experimental (pre and posttest) design. **Setting:** Antenatal outpatient clinic and high-risk inpatient department in Mansoura University Hospital. **Subjects:** Eighty six pre-eclamptic women who attending antenatal outpatient clinic, and high risk inpatient department, Mansoura University Hospital, subjects were divided randomly into two equal groups. **Types of sampling:** purposive sample. **Tools:** Five tools were used for data collection, structured interview schedule, Beck Anxiety Inventory, Perceived stress scale (PSS), Beck depression inventory-II (BDI-II) and Coping Patterns Scale. **Results:** The study findings revealed that there was a statistical significant difference in scores of depression, anxiety, and stress pre and post the cognitive behavioral therapy among the intervention group ($P \leq 0.001$) with large effect size ($\eta^2 = 0.7$). Conversely, in the control group, there was no statistical difference in scores of depression, anxiety, and stress pre and post the routine care ($P > 0.05$). **Conclusion:** Cognitive-behavioral therapy can be used as a treatment option for reducing pregnancy-specific anxiety, stress and depression in preeclamptic women. Also, improve coping pattern among high risk pregnant women. **Recommendations:** Involvement of CBT among routine hospital care especially in a high risk unit.

Keywords: anxiety, cognitive behavioral therapy coping pattern, depression, preeclampsia and stress

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1. Introduction

Pregnancy is a long-time journey accompanied with physical, physiological, and emotional changes which can lead to positive or negative effects on women life and their families [1,2]. It is often a period of happiness and expectation, however it may be a period of uncertainty. Women have issues regarding what's happening with their fetus and marvel [3].

A high-risk pregnancy (HRP) is one of the biggest risks for the woman or her fetus as an uncomplicated pregnancy. Pregnancy imposes additional physical and psychological stress on the woman's body. Woman who experienced health problems being pregnant or during pregnancy has risk for more physical and psychological problems [4].

One of the most serious complications during pregnancy is preeclampsia that not only affects maternal and fetal physical health, but also affects maternal mental health outcomes and can lead to psychological problems such as

depression and anxiety. Acutely, preeclampsia can be complicated by eclampsia, the development of HELLP syndrome (elevated liver enzymes, hemolysis, and low platelet count), ischemic or hemorrhagic stroke, liver dysfunctions, acute renal injury, and acute respiratory distress syndrome (ARDS) [5].

Pregnant woman, who is diagnosed to have a high risk pregnancy, has diverse psychological responses as stress, low self-esteem and inability to function a part of the normal stress of day to day life. Also, numerous studies focus on the undesirable effects of antenatal stress on the developing fetus. These effects include preterm birth, low birth weight. [6,7], reduced cognitive ability, elevated risk for respiratory and skin disease in early life and increased awakening cortisol levels. [8] Moreover, Kinsella et al. revealed that fetal heart rate, sleep patterns, activity and movements, all signals of neurobehavioral development were significantly influenced by mother's stress, anxiety and depression [9].

Anxiety during pregnancy may be normal but when levels of anxiety increased and caused physical and

psychological stress, the pregnant women need help. American Psychological Association defined anxiety as a feeling of tension, worried cognitions and physical changes such as elevated blood pressure. [10] According to the World Health Organization (WHO), depression defined as a common mental disorder characterized by loss of pleasure or interest, sadness, low self-worth or feelings of guilt, sleep disturbances, appetite changes, feeling of tiredness, and poor concentration". In the most severe cases potentially may lead to suicide [11].

It is well known that prenatal anxiety has short- and long-term negative impacts on pre- and postpartum maternal mental health, delivery, and mental health in subsequent pregnancies [12]. It currently remains one of the leading causes of death and severe maternal morbidity [13] For every woman who dies, it is estimated that around 20 other women suffer from severe morbidity and disability [14,15] In view of the economic and social implications of this condition, great efforts have been made in prevention, diagnosis and treatment preeclampsia [16,17]

Anxiety and depression are associated with insecure mother-child attachment, in a premature, low birth weight, emotional, cognitive, and behavioral problem in the offspring. Ultimately, psychosocial complaints in pregnancy have also been related to increased maternal mortality [18].

Prior researches had reported higher rates of depression and stress during pregnancy and that such psychological factors are predictors of pregnancy stress [19,20] High psychosocial stress can act to increase the risk of preeclampsia up to a 20-fold [21] and evidence has emphasized that women with preeclampsia experience more stress than non preeclamptic women [22].

Furthermore, complications of mood disorders and anxiety are higher in preeclamptic women in comparison to women with uncomplicated pregnancy [23,24] reducing levels of stress in women with preeclampsia may prevent such poor outcomes [22].

Coping is defined as a continuum change in cognitive and behavioral efforts aimed at addressing the demands of specific attitudes that are attributed as stressful. In the context of pregnancy, coping efforts may affect birth consequences. Consequently, the selection and apply proper coping response can be a source of flexibility that protects pregnant woman and fetus safe from the potentially having an harmful effect on prenatal stress. [25]. the stress can lead to decrease adaptation capacity. An stress gesture mechanism is essential for pregnant woman to protect the health of both mother and baby. [26]. Implement adaptive cognitive and behavioral attempts to address reconfigurable demands as taxis or bypass resources. Factors affecting the situation and interpersonal relationships, the availability of resources, the contradictory beliefs and control over the situation, all affect a person's overall stress. [27] Adaptation is also strongly associated with disposition. Exemplarily, the optimum is associated with particular ways of coping in pregnant women [28].

Nurses have a vital role in satisfying the emotional and physiological beliefs of females that are at risk and that they lack confidence [29]. The nursing role is collaborating with other health teams, as well as interventions to reduce stress, evaluated the result of interventions, performing as a counselor and educator for women by instructing them

to handle the issues and Cognitive Behavioral Therapy [30].

1.1. Significant

WHO reported that maternal mortality ratio is 45 per 100000 live births in Egypt [31] According to [5] report in their study the prevalence of hypertensive diseases of pregnancy in Egypt (4.2%) had pregnancy induced hypertension, (3.8 %) had preeclampsia and eclampsia was (0.3%).Pre-eclampsia remains one of the principal causes of maternal morbidity and morbidity.If preeclampsia is left untreated, it can develop into eclampsia, a life-threatening condition.

Moreover, the crucial goal of any pregnancy is the birth of a healthy newborn. The nurse plays an important role in helping the pregnant woman (preeclamptic), her husband and her family to achieve this goal [32] The SDGs agenda give pointers and targets for all world organization member states to be adopted and utilized in framing their political agendas and policies in agreement with their priorities and therefore the world challenges at large, Goal three: "Good Health and Well-Being." guarantee healthy lives and promote well-being for all in the least ages [33] so the study will be carried in Mansoura university hospital at high risk units because it 's most important hospital and receive the referral cases also, it is the capital of medicine Mansoura city because this the study will carried to investigate the effect cognitive behavioral therapy on anxiety, stress, depression, and coping among pre- eclampsia.

1.2. Aim of the Study:

This study aimed investigate the effect cognitive behavioral therapy on anxiety, stress, depression, and coping pattern among pregnant with pre- eclampsia.

1.3. Study Hypotheses:

H(1): Anxiety level is lower in the post test than the pretest among the study subjects

H(2): Stress level is lower in the post test than the pretest among the study subjects

H(3): Depression level is lower in the post test than the pretest among the study subjects

H(4): Coping pattern is higher in the post test than the pretest among the study subjects

2. Subjects and Method

2.1. Design of the Study:

Quazi experimental (pre and posttest) design.

2.2. Study Setting:

This study was implemented at Mansoura university hospital specific at antenatal outpatient clinic which composed of 2 clinic room and class room and high risk inpatient department,4 departments, (9,10,15, and 18), Egypt, from May 2019 to August 2019.

2.3. Sample Type:

Purposive sample technique was used.

2.4. Sample Size:

Selected 90 female who attending antenatal outpatient clinic and high risk in patient department, Mansoura University Hospital, Sample size was calculated for each group (Intervention and Control) by comparing two means using Open Epi, Version 3 (www.OpenEpi.com) according to the following parameters:

- Confidence Interval (2-sided) = 95%
- Power = 80%
- Ratio of sample size (Group 2/Group 1) = 1

	Group 1	Group 2	Difference*
Mean (Depression)	23.16	16.9	6.26
Sample size	43	43	
Standard deviation (Depression)	5.79	6.7	
Variance	33.5241	44.89	

* Mean difference= (Group 1 mean) - (Group 2 mean)

- Sample size for Group 1 is at least 16
- Sample size for Group 2 is at least 16
- Total sample size is at least 32
- The study was conducting on 90 pregnant women (Power= 99.63% by the normal approximation method) with preeclampsia who attending antenatal outpatient clinic and high risk in patient department, Mansoura University Hospital, who fulfilled the following criteria:

2.5. Inclusion Criteria:

Pregnant women in 24 to 30 weeks with mild to moderate preeclampsia, read and write and accept to participate in the study.

2.6. Exclusion Criteria:

The pregnant women with (severe preeclampsia - fetal distress and indication for the termination of their pregnancy, not attend 2 consecutive session).

2.7. Tools of Data Collection:

Data were collected through

- **Tool one: A Structured Interview Schedule:** It was designed by the researchers after reviewing related literatures; to be filled from each pregnant woman. It consisted of three parts:
- **Part 1:** subjects general characteristics (age, education, occupation, residence, family income and duration of marriage).
- **Part 2:** profile of current pregnancy (para, abortion, gestational age, gender).
- **Part 3:** This part covered wellbeing of fetal health status.

Tool two. Beck Anxiety Inventory (BAI).

This scale was originally adopted by [34] to measure the symptoms of anxiety in adult patients. It was translated

into Arabic language and validated by [35] The BAI has 21 items that assess anxiety intensity. A score of 0-7 refers to a minimum level of anxiety; 8-15 mild anxiety, 16-25 moderate and 26-63 severe anxiety.

Tool three: Perceived stress scale (PSS)

It was adopted from [36]. It was used to measure the perception of stress. It consisted of 10 items. The total score was calculated by finding the sum of 10 items; reverse coding questions [4,5,7,8] as Never (3)- Sometime (2) - Often(1), while coding questions [1,2,3,6,9,10]. The SPSS had a range of scores between(0 -30). A higher score indicates more stress.

Tool four: Beck Depression Inventory-II (BDI-II).

This scale was adopted from [37] in response to the American Psychiatric Association's publication of the "Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)". It was translated into Arabic language and validated by [38]. This tool consisted of twenty-one items, and the intensity of each item varies according to the degree of symptom severity. A score of 0-13 refers to absence of depression; 14-19 mild depression, 20-28 moderate depression and 29-63 severe depression.

Tool five: Coping Patterns Scale: Adopted from [39]

It was used to assess different coping patterns among high risk pregnant mothers. It included 27 statements that cover six coping mechanisms; positive attitude, spiritual support, denial, acceptance, irony, lifestyle change and social support. The mother was asked to give scores for each statement ranged from never, sometimes, and always as follow 1, 2, & 3 respectively.

Validity of the Tool:

Tools were reviewed by three jury experts and specialized university professors in maternity nursing field to test the content validity. According to their comments, modifications were considered.

Reliability of the Tools:

Reliability of tools was tested for 10 women during pilot study by using Cronbach's (alpha) are 0.90 for **Beck Anxiety** and 0.94 for **depression**.

- Second tool (PSS): Chronbach's alpha was 0.722 and test retest $r = 0.792$, $P 0.001$).

- Third tool (**Coping Patterns Scale**): Chronbach's alpha was 0.887 and test retest ($r = 0.861$, $P 0.001$). So both tools were reliable and valid.

Ethical Considerations:

- Prior to data collection, an ethical approval was obtained from the woman's health and midwifery department and the research ethics committee of the faculty of the nursing Mansoura University.

- An official permission was obtained from the head of obstetrics and gynecology department at Mansoura University hospital.

- Written informed consent was obtained from the pregnant women who participated in the study after explaining the purpose of the study.

- The pregnant women were reassured about the confidentiality of the information. They were informed about their rights to refuse participation or withdraw at any time. The study maneuvers couldn't entail any harm to participants.

Pilot Study:

A pilot study was conducted on 10 mothers in order to

test the applicability and relevance of the study tools and to test the clarity of the designed questionnaire as well as to estimate the time needed to answer them and then the necessary modifications were done as change the options of second tool from five to three. These mothers were excluded from the study sample.

Field Work:

- The study was carried out in the period from May 2019 to August 2019. Over a period of 4 months. The researchers divided the pregnant women into eight groups; each group consisted from 5 -6 pregnant women. The researchers collected the data during the morning 2 days per week. The implementation of the study take into three phases (pre assessment phase, implementation phase, and evaluation (post assessment phase)

Pre Assessment phase:

A comfortable, private room was chosen for the interviewers. Orientation was done about the purpose of the study and content of the study. Each pregnant woman was individually interviewed where pre assessment was done using (a structured interviewing questionnaire, Beck Anxiety Inventory(BAI), Perceived stress scale (PSS), Beck Depression Inventory-II (BDI-II) and Coping Patterns Scale(CPS). As a base line data.

Implementation phase:-

The study group after chosen and take the base line data stated with program session, start to discuss objective and the aim of the study

The general objective of the program:-

Evaluating the impact of the Cognitive Behavioral Therapy (CBT) program as nursing intervention strategy on overcoming anxiety, depression, stress & coping pattern during pregnancy among preeclampsia.

This aim will be fulfilled through the following objectives

- Assess anxiety, depression, & stress among pregnant women with preeclampsia.
- Implement nursing intervention (CBT Program) for pregnant women with preeclampsia.
- Evaluate the effect of nursing intervention on anxiety, stress, depression & coping pattern of pregnant women with preeclampsia at the end of sessions.

2.8. Content of the Program:

" Cognitive Behavioral Therapy Program (CBT)"

- Cognitive Behavioral Therapy Program (12 sessions) for managing the anxiety and depression, stress in with preeclampsia
- All sessions were restructured in a simple way to be suitable for all pregnant woman's level of understanding:
 - Easy and understandable Arabic language and no jargons.
 - All sessions consist of five parts; title of the session, goals of the session, agenda, homework and the terminating phase of the session. each session take 1 hrs

2.9. Objectives of the CBT Program:

General objective:

At the end of application of the CBT Program, the patients' levels of depression, stress and anxiety will be decreased.

Specific objectives:

- Pregnant woman will be able to identify the nature of the CBT Program and the rules of the participation.
- Pregnant woman will be able to recognize symptoms of depression and anxiety related to distress.
- Pregnant woman will be able to understand the difference between feeling and thoughts, including how these relate to behaviors.
- Pregnant woman will be able to identify automatic thoughts and cognitive distortions which contribute to the portion of activity restriction.
- Pregnant woman will be able to master stress management relaxation techniques.
- Pregnant woman will be able to challenge any cognitive distortions.
- Pregnant woman will be able to overcome anxiety and life stressors through systematic desensitization technique
- Pregnant woman will be able to use problem solving strategies effectively in identifying the best technique for dealing with life difficulties.
- Pregnant woman will be able to improve their mood through increasing behavioral activation.
- Pregnant woman will be able to identify advantages and disadvantages of the options for dealing with the stressors.
- Pregnant woman will be able to recognize the warning signs for cognitive or behavioral regression.

Evaluation (Post assessment phase):-

Finally evaluation was done using pre assessment tools to evaluate the effectiveness of the CBT program after 12 sessions on anxiety, depression, stress and coping pattern.

Limitation of study:

4 cases not complete the sessions

3. Result

Table 1 demonstrates the socio-demographic characteristics of the studied sample. The two groups, intervention and control, were somewhat similar based on age, educational levels, residence, occupation, income, and other characteristics. Mean age of the intervention group was 29.67 and of the control group was 29.62. As regards the educational level, it was found that 60.5% of intervention group had middle education and 65.1% of the control group had middle education. In addition, 69.8% of the intervention group and 86% of the control group reside rural areas. More than two thirds of the intervention group (72.1%) was not working and more than three quarters (76.7) of the control group were not working. More than one third of the intervention group (34.9%) was sometimes borrowing while more than half of the control group (55.8%) their income was enough to necessities. Most of the intervention and control group (97.7%) were married.

Figure 1 shows obstetric and gynecological history of the studied sample. More than two fifth of the intervention and control group (46.5% and 41.9% respectively) were got pregnant for the first time. It was found that 48.8% of the intervention group and 41.9% of the control group had no deliveries. In addition, more than three quarters of the

intervention and control group (76.7% and 79.1% respectively) were not previously aborted.

Table 2 reveals a comparison between fetal wellbeing among the intervention and the control group before and after the intervention. After CBT, 93%, 90.7, and 95% of the studied patient reported improvement and normality in fetal movement, fetal heart rate, and amniotic fluid

respectively. On the other hand, before routine care, 86%, 90.7, and 88.4% of the studied patient reported normality in fetal movement, fetal heart rate, and amniotic fluid respectively while after routine care, 83.7%, 88.4, and 90.7% of the studied patient reported normality in fetal movement, fetal heart rate, and amniotic fluid respectively.

Table 1. Distribution of the subjects Socio-demographic Characteristics

Socio-demographic characteristics		Intervention group (n=43)		Control group (n=43)	
		NO.	%	NO.	%
Age in years		Mean \pm SD = 29.67 \pm 4.3		Mean \pm SD = 29.62 \pm 5.06	
Educational Level	Middle education	26	60.5	28	65.1
	High education	17	39.5	15	34.9
Residence	Rural	30	69.8	37	86
	Urban	13	30.2	6	14
Occupation	Housewife	31	72.1	33	76.7
	Working	12	27.9	10	23.3
Income	Usually borrowing	11	25.5	8	18.6
	Sometimes borrowing	15	34.9	7	16.3
	Enough to necessities	14	32.6	24	55.8
	Enough and more	3	7	4	9.3
Religious	Muslim	41	95.3	40	93
	Christian	2	4.7	3	7
Marital status	Married	42	97.7	42	97.7
	Divorced	1	2.3	1	2.3
Marriage duration	< 2 years	14	32.6	11	25.6
	2-6 years	23	53.4	19	44.2
	> 6 years	6	14	13	30.2
Number of children	No	24	55.8	20	46.5
	1	11	25.6	10	23.3
	2-3	6	14	9	20.9
	> 3	2	4.7	4	9.3

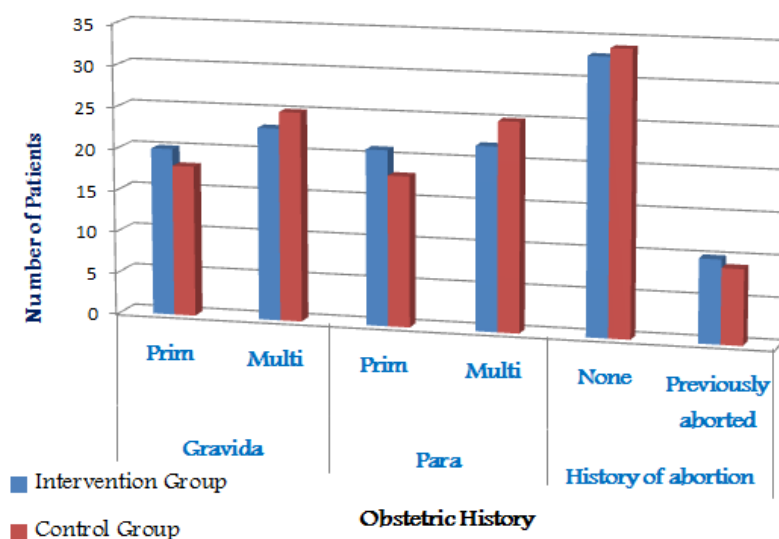


Figure 1. Obstetric and Gynecological History of the study subjects

Table 2. Distribution of Fetal Wellbeing among the Studied Sample

Socio-demographic characteristics		Fetal wellbeing pre the intervention				Fetal wellbeing post the intervention			
		Intervention group (n=43)		Control group (n=43)		Intervention group (n=43)		Control group (n=43)	
		NO.	%	NO.	%	NO.	%	NO.	%
Fetal movement	Normal	34	79.1	37	86	40	93	36	83.7
	Low	9	20.9	6	14	3	7	7	16.3
Fetal heart rate	Normal	37	86	39	90.7	39	90.7	38	88.4
	Abnormal	6	14	4	9.3	4	9.3	5	11.6
Amniotic fluid	Normal	37	86	38	88.4	41	95.3	39	90.7
	Low	6	14	5	11.6	2	4.7	4	9.3
Gestational age in weeks		Mean \pm SD = 29.11 \pm 4 Intervention group				Mean \pm SD = 29.02 \pm 3.75 Control group			

Table 3. Differences of Depression, Anxiety, and Perceived Stress between pre and post Cognitive Behavioral Therapy

Intervention group (n=43)	Variable		Mean ± SD	df	T	P	η ² (Effect Size)
	Depression	Pre CBT	23.16±5.79	42	12.939	≤0.001*	0.7 (Large)
		Post CBT	16.9±6.7				
	Anxiety	Pre CBT	21.62±8.7	42	12.115	≤0.001*	0.7 (Large)
		Post CBT	14.48±8.31				
Stress	Pre CBT	14.67±2.36	42	10.016	≤0.001*	0.7 (Large)	
	Post CBT	9.51±3.41					
Control group (n=43)	Variable			Mean ± SD	Df	t	P
	Depression	Baseline evaluation		22.51±6.68	42	0.167	0.868
		Post routine care		22.46±6.25			
	Anxiety	Baseline evaluation		19.95±8.48	42	-0.781	0.439
		Post routine care		20.13±8.43			
Stress	Baseline evaluation		13.83±2.79	42	0.167	0.868	
	Post routine care		13.79±2.81				

(*) Statistically significant at $p < 0.05$
 $\eta^2=0.01$ (Small effect), $\eta^2=0.06$ (Medium effect), $\eta^2=0.14$ (Large effect)

As shown in Table 3, there was statistical significant difference in scores of depression, anxiety, and stress pre and post CBT among the intervention group ($P \leq 0.001$) with large effect size ($\eta^2=0.7$). Conversely, in the control group, there was no statistical difference in scores of depression, anxiety, and stress pre and post the routine care ($P > 0.05$).

Apparently, Table 4 reveals that there was statistical significant difference in scores of all coping patterns, positive attitude, spiritual coping, denial, acceptance, irony, life style changes and seeking social support, pre and post CBT among the intervention group ($P < 0.005$). By contrast, in the control group, there was no statistical difference in scores of all coping patterns pre and post the routine care ($P > 0.05$).

4. Discussion

This study was aimed to investigate the effect of CBT on anxiety, stress, depression, and coping among pregnant with pre-eclampsia. This aim was realized through the current study results. The findings of the current study

regarding the effect of CBT on stress and anxiety during pregnancy indicated lower scores of stress and anxiety in the intervention group than in the control group after completing the CBT program, which suggests that the use of psychological therapies such as CBT for stress help significantly reduce stress and anxiety in preeclamptic women.

The current study findings revealed that the mean age of the study sample age was 29.67 ± 4.3 years, about more than half of them had had middle education and about three quarter are house wife among intervention group, this result agree with [40] who studied Benson's Relaxation Therapy: Its effect on Stress and Coping among Mothers with High Risk Pregnancy, Egypt and stated that the mean age of women's age 26.3 ± 5.73 years and more than half of them had secondary educational level. Also, the present study result was in the same line with [41] who studied the profile of high risk pregnancy among Saudi women in Taif-KSA and reported that the majority of women did not work. The agreement of the present study results with other studies may be due to more than half of study sample was low socioeconomic which is considered as a risk factor which may related to socioeconomic status.

Table 4. Differences of Coping Patterns between pre and post Cognitive Behavioral Therapy

	Variable		Mean \pm SD	df	T	P	η^2 (Effect Size)
Intervention group (n=43)	Positive attitude	Pre CBT	13.72 \pm 3.64	42	-7.067	$\leq 0.001^*$	0.5 (Large)
		Post CBT	18.86 \pm 4.26				
	Spiritual	Pre CBT	4.62 \pm 1.02	42	-2.957	0.005*	0.17 (Large)
		Post CBT	5.09 \pm 0.86				
	Denial	Pre CBT	9.69 \pm 1.3	42	-3.334	0.002*	0.2 (Large)
		Post CBT	9.9 \pm 1.23				
	Acceptance	Pre CBT	9.76 \pm 1.37	42	-7.805	$\leq 0.001^*$	0.5 (Large)
		Post CBT	11.51 \pm 0.98				
	Irony	Pre CBT	1.18 \pm 0.39	42	2.216	0.032*	0.104 (Medium)
		Post CBT	1.04 \pm 0.21				
Control Group (n=43)	Positive attitude	Baseline evaluation	14.88 \pm 3.44	42	0.903	0.372	0.372
		Post routine care	14.81 \pm 3.44				
	Spiritual	Baseline evaluation	4.62 \pm 0.95	42	-0.350	0.728	0.728
		Post routine care	4.67 \pm 0.8				
	Denial	Baseline evaluation	9.09 \pm 1.39	42	-1.276	0.209	0.209
		Post routine care	9.53 \pm 1.57				
	Acceptance	Baseline evaluation	10.16 \pm 1.63	42	0.861	0.394	0.394
		Post routine care	10.39 \pm 1.51				
	Irony	Baseline evaluation	1.16 \pm 0.37	42	0.298	0.767	0.767
		Post routine care	1.13 \pm 0.35				
	Life style changes	Baseline evaluation	9.23 \pm 2	42	1.536	0.132	0.132
		Post routine care	9 \pm 1.9				
	Seeking social support	Baseline evaluation	8.65 \pm 2.01	42	0.805	0.425	0.425
		Post routine care	8.48 \pm 1.8				
	Total Coping	Baseline evaluation	57.81 \pm 7.54	42	-.0466	0.644	0.644
		Post routine care	58.09 \pm 6.76				

(*) Statistically significant at $p < 0.05$
 $\eta^2=0.01$ (Small effect), $\eta^2=0.06$ (Medium effect), $\eta^2=0.14$ (Large effect)

Concerning to statistical significant difference in scores of depression, anxiety, and stress pre and post CBT among the intervention group ($P < 0.001$) with large effect size ($\eta^2=0.7$). Conversely, in the control group, there was no statistical difference in scores of depression, anxiety, and stress pre and post the routine care ($P > 0.05$). Thus, the first study hypotheses was accepted.

Closely related to the current study results are those of a study conducting by [42] who found that the mean total of pregnancy worries and stress questionnaire score was 21.12 ± 15.06 in the intervention group and 39.09 ± 19.55 in the control group. Similarly, [43] reported significant improvements in levels of stress and anxiety in intervention group than control group.

In addition, CBT reduce stress and psychological symptoms, this result is consistent with [44] results. These results could be explained by that stress can stimulate the sympathetic nervous system and the adrenal glands. Subsequently, it can increase heart rate, respiratory rate, and cause hypertension.

The current study findings revealed that CBT can reduce levels of depression in the interventional group.

Several researches have shown that methods of exposure-based CBT have effective impacts in decreasing the symptoms of anxiety, stress and depression in pregnant women [45]. Moreover, Nieminen et al., stated that the realistic attitudes of participants were improved towards labor and that the patients showed improved self-esteem and active coping strategies [46].

Moreover, a significant decrease in levels of anxiety and depression were reported after implementation of CBT [47]. While, Netsi et al., indicated that women with depression had a better night's sleep than the control group after CBT [48]. This was also agreed by Carta et al., who reported that mothers had significant improvements in postpartum depression after receiving CBT [49].

In addition, Mahmoud janlou et al., stated that CBT reduces levels of stress in pregnant women and CBT is safer than medication for anxiety disorders during pregnancy [50,51]. This result finding in agreement with [52]. Based on the strength of evidence, CBT is recommended as a first-line intervention for those with psychiatric disorders (OCD) regardless of pregnancy. More specifically, another study indicated that depression

and anxiety levels were reduced in mothers during pregnancy and post-partum after CBT, while Garg et al., found that CBT significantly reduced psychological complaints in women with preeclampsia [53]. Consistent with the findings of [47].

The present study findings showed that despite there was no significant difference at baseline assessment, there were increase scores of all coping patterns, positive attitude, spiritual coping, denial, acceptance, irony, life style changes and seeking social support, among the intervention group. Thus, the second study hypothesis was confirmed and supported **“increase level of coping with anxiety, depression and stress among pregnant with pre-eclampsia after applying CBT.”**

Regarding fetal wellbeing post intervention the result finding reported that fetal movement and FHR improved after CBT sessions this is reflected upon when the psychological state is well stress, anxiety, and depression level decreased it affect general status not only of mother it also affect the fetus. This reflects CBT Concentrating on emotions and thoughts can be effective due to the growing awareness of emotional changes and distress in the possible outcomes of treatment. Thus, a release of anxiety / depression symptoms and pregnancy-specific stress can improve the regulation of emotional affects and can have a central healing effect on pre-eclampsia women. Therefore, it appears that coordination between the CBT method and the nature of preeclampsia may have contributed to the positive results observed in this study [53].

Finally the present study finding had directed our attention that the, CBT is the most key excessively adopted health promotion strategies used for pre eclampsia, and is almost universally represented as effective coping pattern. In addition all supportive sessions concentrate on master stress management relaxation techniques, overcome anxiety and life stressors and be able to use problem solving strategies effectively in identifying the best technique for dealing with life difficulties. These achieve the study hypothesis and improve the management of preeclampsia and prevention of further complications which was reflected upon utilization of CBT.

5. Conclusion

Based on the current study findings, It was evident that cognitive-behavioral therapy can be used as a treatment option for reducing pregnancy-specific anxiety, stress and depression in preeclamptic women. Also, improve coping pattern among high risk pregnant women.

6. Recommendations

- Continuous training program for nurses at maternity hospital about CBT.
- Involvement of CBT among routine hospital care especially in a high risk unit.
- Applying the CBT in the different fields of clinical nursing.

- Stressing on cooperation between obstetrician and psychiatric experts can help to improve unfavorable conditions in women during pregnancy

6.1. For Further Study:

- Assess cofactors that increase stress, anxiety, depression among high risk hospitalized pregnant women

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Limitation of Study

4 pregnant women withdrawal during study

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