

## Effect of Continuous Care Model on Self-care among Women with Preeclampsia

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### Abstract

**Background:** Preeclampsia during pregnancy is considered one of the major obstetrical problems in developing countries that cause maternal mortality and preterm birth throughout the world. **Aim:** The study aimed to evaluate effect of continuous care model on self-care among women with preeclampsia. **Research design:** Quasi-experimental design (pre-posttest, one group) was utilized. **Setting:** The study was conducted at Obstetrics and Gynecological out-patient clinic at Benha University hospital. **Sampling:** A purposive sample of 75 women with preeclampsia was recruited. **Tools of data collection:** Three tools were included 1) A self-administered questionnaire 2) women's knowledge questionnaire 3) self-care reported practices questionnaire. **Results:** There was a marked improvement in knowledge and self-care reported practices of studied sample regarding preeclampsia after implementation of the continuous care model with highly statistically significant difference ( $p < 0.001$ ) and there was highly statistically significant positive correlation between total knowledge and total self-care reported practices regarding preeclampsia at pre-intervention and post-intervention phases ( $p < 0.001$ ). **Conclusion:** Continuous care model had a positive effect on knowledge and self-care among women with preeclampsia. **Recommendations:** The continuous care model should be integrated as a nursing intervention for promoting women's self-care practices in preeclampsia care.

**Keywords:** Continuous Care Model, Self-care practices, Preeclampsia.

### Introduction

Preeclampsia is a form of pregnancy disorder characterized by the onset of hypertension, proteinuria and end-organ dysfunction after 20 weeks' gestation (Modzelewski, et al., 2023). Preeclampsia is a major contributor to maternal and perinatal morbidity and mortality, that affects 2-5% of all pregnancies and its incidence is higher in developing countries than in developed countries. Although the pathophysiology of preeclampsia is complex, evidence suggests that abnormal placentation, placental insufficiency, inadequate remodeling of the spiral arteries, inflammatory

responses and endothelial dysfunction play a role in the development of preeclampsia (Woldeamanuel et al., 2023).

Risk factors of preeclampsia classified into: (1) women are at high risk of preeclampsia if they have a history of hypertensive disease during a previous pregnancy or a maternal disease including chronic kidney disease, autoimmune diseases, diabetes or chronic hypertension. (2) Women are at intermediate risk if they are nulliparous,  $\geq 40$  years of age, have a body mass index (BMI)  $\geq 35$  kg/m, have a family history of preeclampsia, a multifetal pregnancy or a

pregnancy interval of more than 10 years (Ameen et al., 2023).

The clinical manifestations of preeclampsia vary from asymptomatic pictures to fatal complications for both the fetus and the mother. In severe cases, there may be renal, neurological, hepatic, or vascular system involvement. preeclampsia typically presents with new-onset hypertension and proteinuria at  $\geq 34$  weeks of gestation with severe clinical features ranging from persistent headache, nausea or vomiting to visual abnormalities, abdominal discomfort, and altered mental status (Vigil-De Gracia et al., 2023).

Self-care involves a wide range of learned and purposeful practices as well as conscious activities such as eating healthy diet with restricted salts and no fats, follow up physical exercises, knowing the correct time of taking the medication, daily weight, follow up fetal movement and count it, monitoring blood pressure with digital machine and urine analysis to for proteinuria by dipstick daily which is done by the person to provide, protect and promote health. Self-care leads to better management of symptoms, feeling healthy and improving life expectancy in patients. Self-care practices are associated with reduced physical and psychological symptoms, increased enjoyment of life and improved quality of life (Rozveh et al., 2022).

The continuous care model is one of the available theories and model introduced by Ahmadi et al. (2001). The model has four interconnected stages namely orientation, sensitization, control and evaluation. To implement this model, nurses need to identify patients' problem accurately, motivate, involve them and the family in the process of solving their problem. The model is aimed at designing and developing a program that

leads to acceptance, higher appropriate visions and controlling the diseases and the probable side effects (Akbari et al., 2022).

Nurses play an important role in preeclampsia management which includes providing guidance and teach women regarding evidence-based approaches for minimizing preeclampsia risk. Encouraging all women during pregnancy to plan and work toward achieving a healthy body weight and consume a healthy diet with recommended nutrients. Providing guidance regarding limited foods with added sugars and those that are high in fat and eat a variety of fruits, grains, vegetables, low-fat or fat-free dairy and proteins (Elagamy et al., 2021).

#### **Significance of the study:**

Preeclampsia is one of the most common life-threatening complications during pregnancy. Preeclampsia occurs in 3 to 8% of pregnancies worldwide and is a major cause of maternal and perinatal morbidity and mortality accounting for 8–10% of all preterm births (Koulouraki et al., 2023). Four million pregnant women experience preeclampsia each year and as many as 50,000 to 70,000 women died from this preeclampsia and as many as 500,000 babies died from preeclampsia. In Africa, the prevalence of pre-eclampsia amongst pregnant women greatly varies between 1.8 to 16.7% (Namugongo et al., 2022). The prevalence of hypertensive diseases of pregnancy in Egypt, (4.2%) had pregnancy induced hypertension, (3.8 %) had preeclampsia and 0.3% had eclampsia (Soliman et al., 2021). Furthermore, limited previous studies were conducted to equip preeclamptic women with adequate knowledge to improve their self-care practices and quality of life and no previous studies had examined the effect of a continuous care model on preeclampsia women's self-care and quality of life. So, this

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study would be conducted to evaluate effect of application of continuous care model on preeclamptic women self-care and QOL.

### **Aim of the Study:**

This study was aimed to evaluate effect of continuous care model on self-care among women with preeclampsia.

### **Research Hypotheses:**

H1: There will be a significant improvement in knowledge among preeclamptic women after implementation of continuous care model than before implementation.

H2: There will be a significant improvement in self-care practices among preeclamptic women after implementation of continuous care model than before implementation.

### **Subjects & Methods**

#### **Research design:**

Quasi-experimental design (pre-posttest, one group) was followed to fulfill the aim of the study.

#### **Setting:**

The study was conducted at Obstetrics and Gynecological out-patient clinic at Benha University hospital in Benha city.

#### **Sampling:**

A purposive sample of 75 women were included in the study. The total of sample size was calculated according to Benha University Hospital Statistical Census Center (2020). The flow of rate of preeclamptic women was about 150 preeclamptic women. Thus, 50% of total sample included according to the following inclusion and exclusion criteria. Inclusion criteria: All women diagnosed with mild preeclampsia (systolic blood pressure < 160 mmHg and diastolic blood pressure < 110 mmHg with proteinuria  $\pm$  2 in urine test strip), gestational age 20 to 24 weeks and can read and write. Exclusion criteria: Women with obstetrical complications as gestational diabetes and eclampsia, history of

hypertension and attendance and reluctance to continue cooperation.

#### **Tools of data collection:**

Three tools were used in this study:

#### **Tool (I): Self-administered questionnaire:**

It was designed by the researcher after reviewing related literature (El Sayed & Desoky, 2019; Mou et al., 2021 ). It was written in an Arabic language in the form of close ended questions. The questionnaire included two parts:

**First Part:** General characteristics of studied sample, it included (age, residence, level of education, occupation, monthly income).

**Second Part** Previous and current obstetric history included data related to the gravidity, parity, number of abortions, number of antenatal care visits during the current pregnancy, and gestational age.

**Tool II:** Women's knowledge questionnaire regarding preeclampsia, it was designed by the researcher after reviewing related literature ( Wilkinson & Cole, 2017; Fondjo et al., 2019 ). It was used to assess women's knowledge regarding preeclampsia through questions written in Arabic language in the form of multiple-choice questions. It consisted of 15 questions.

**Knowledge scoring system: Scoring system of knowledge:** All knowledge variables were weighted according to items included in each question. Each item was given a score (2) when the answer was correct answer, a score (1) when the answer was incorrect answer or I don't know. The total score was calculated by summation of the scores of its items. **The score of total knowledge was converted into percentage and classified into:**

- Adequate when the total score was 75% to 100%.

- Inadequate when the total score was less than 75%.

**Tool (III): Self-care reported practices questionnaire:** It was designed by the researcher after reviewing related literature (Afefy & Kamel, 2019; Koh et al., 2016). It was used to assess self-care reported practices that women practiced to control and manage preeclampsia. It comprised 11 items.

**Scoring system of self-care reported practices:** The items were rated based on three-point Likert scale; always (score 3), sometimes (score 2), and never (score 1). The range of obtained scores was between 11 and 33, with higher scores indicating more engagement in healthy behaviors. **The score of total practices was converted into percentage and classified into:**

-Satisfactory when the total score was 75% to 100%.

-Unsatisfactory when the total score was less than 75%.

**Content validity:**

Tools of data collection were reviewed by three jury experts in the field of obstetrics & gynecological nursing at Benha University to ensure its validity for comprehensiveness, accuracy and relevance. Modifications were done in the light of the valuable comments such as modifying some phrases which were unclear. For example, methods of diagnosis instead of diagnosis and rearrangement of some questions.

**Reliability of the tools:**

Reliability of the tools was assessed by using Cronbach's alpha coefficient test which indicated that the four tools were moderate to high reliability. Cronbach's Alpha for knowledge was 0.83, Cronbach's Alpha for self-care practices was 0.89.

**Ethical considerations:**

- Approval of the faculty ethics committee for scientific research was obtained for the fulfillment of the study .An official permission from the selected study settings was obtained for the fulfillment of the study .The aim and importance of this study was explained by the researcher to each pregnant women before applying the tools to gain their confidence and trust. The researcher took oral consent from women to participate in the study before data collection. The study didn't have any physical, social or psychological risks on the women. The women were free to withdraw from study at any time.

**Administrative approval:**

A written official approval to conduct the study was obtained from the Dean of Faculty of Nursing to the director of Benha University Hospital and delivered to the director of the nursing explaining aim of the study in order to obtain their agreement to conduct the study and seek cooperation.

**Pilot study:**

The pilot study was conducted on 10 % of the total sample (8 women) before starting data collection to estimate the time required for completing the sheets and to check the simplicity, clarity, applicability and feasibility of the developed tools. No modifications were done. Thus, women involved in the pilot study were included in the study sample.

**Field work:**

The study was conducted through continuous care model phases. At first, continuous care was implemented in four stages: Orientation, sensitization, control, and evaluation. Study was carried out from the beginning of February 2022 and completed at the end of March, 2023 covering 13 months. The researcher visited the previously mentioned setting three days/week (Sundays,

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Tuesdays, and Thursdays) from 9.00 Am to 12.00 Pm.

**Orientation stage:** This stage was the first step in which the researcher introduced herself, illustrated the study aim and expectations, explained the various stages of the model to the participant women, generated motivation and emphasized the value of continuing care contact between the researcher and the studied women, clarified the ways of communication and established the required phone calls schedules until the end of the intervention. At this stage, the researcher took oral consent from women to participate in the study. Data was collected by the researcher through the distribution of a self-administered questionnaire, women's knowledge questionnaire and self-care practices questionnaire. The number of women were interviewed women per week was 4-5 women. The average time taken for completing each sheet was around 25-40 minutes depending on the response of the women. Each woman was reassured that obtained information would be confidential and used only for the purpose of the study.

**Sensitization stage:** This stage was carried out to engage and apply continuous care process to the women with preeclampsia. Women were divided into 10 groups. The average number of women in each group (7-8 women). Each group attended four educational sessions (two sessions weekly). The actual time of each session was (45-60) minutes. These sessions were applied in the waiting area of Obstetrics and Gynecological outpatient clinic at Benha University Hospital. At the beginning of the first session the women were oriented with the program contents. Each woman was informed about the time of the next sessions at the end of session. The subsequent session started by feedback about the previous session and the objectives of the new session by using simple Arabic language to suit women's level of

understanding. Various educational methods (group discussion, role-playing, demonstration and re-demonstration) and materials (power point presentation, a designed booklet) were used. At the end of each session the researcher gave five minutes to participant women for asking any questions for correcting any misunderstanding.

**First session:** at the beginning of the first session the researcher gave women the educational booklet and introduced an orientation of the educational booklet including the general and specific objectives by using Arabic language. Then the researcher started by providing women knowledge about preeclampsia including definition, risk factors, causes, classifications, maternal and fetal complications, preventive and therapeutic measures of preeclampsia.

**Second session:** The researcher educated women about the importance of participating in self-care practices to control and manage preeclampsia including the importance and procedure of measuring and recording blood pressure on a regular basis and teaching women how to check proteinuria with dipstick as well as the importance and procedure of counting and recording fetal movements daily.

**Third session:** The researcher demonstrated procedure of measuring and recording weight daily and discussed the importance of maintaining healthy weight, obtaining balanced diet with high protein, low salt, low fat and drinking plenty of water daily. Also, importance of stress reduction and techniques (relaxation exercise) to overcome stress caused by pre-eclampsia and performing regular physical activity (deep breathing and stretching exercises).

**Fourth session:** The researcher explained the importance of commitment to recommended antenatal visits, the importance of getting adequate rest, maintaining sleep



quality and the importance of compliance with prescribed medications.

**Control stage:** During this stage, the researcher maintained mutual relationships with studied women through weekly phone calls for each woman (4 calls) throughout one month, according to the women's preferred time for making phone calls (morning or afternoon). Each woman's weekly phone call lasted approximately 10-15 minutes and varied depending on a woman's educational needs and questions to help women strengthen and promote healthy self-care practices. Also, any new educational needs or health problems were recognized, processed and dissolved.

**Evaluation stage:** Immediately and one month of implementation of continuous care model, the researcher used the same previous assessment tools (II, III and IV) to evaluate the effect of continuous care model on knowledge, self-care and quality of life among women with preeclampsia.

**Statistical analysis:**

Data were verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 21) was used followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Friedman test, Chi-square test and Pearson correlation coefficients were used. A significant level value was considered when  $p \leq 0.05$ . And a highly significant level value was considered when  $p < 0.001$ .

**Results:**

**Table (1):** Shows general characteristics of the studied sample. It was cleared that less than two-thirds (62.7%) of studied sample were in age group  $< 30$  years with a mean age of  $23.02 \pm 7.57$  years. As regards the residence, less than three-quarters (70.7%) of them lived in rural areas. Furthermore, more than two-thirds of them (68.0%) were housewives. In

relation to the educational level, less than half (46.7%) of them had secondary education. Moreover; less than three-quarters (72.0%) of them had not enough monthly income.

**Table (2):** Illustrates that less than three-quarters (72.0%) of the studied sample were primigravida and nulliparous. The mean gestational age of them was  $(21.94 \pm 4.72)$  weeks. Additionally, the majority (94.7%) of them had no history of abortion. Concerning the number of antenatal care visits during the current pregnancy, more than half (50.7%) of the studied sample visited antenatal clinic three times or more /month.

**Figure (1):** Displays that, there was a marked improvement in total knowledge after implementation of continuous care model (28.0%), (69.3%) and (68.0%) of studied sample had adequate knowledge regarding preeclampsia at pre, immediately post and one month post-intervention phases respectively. While, it was revealed that (72.0%), (30.7%) and (32.0%) of them had inadequate knowledge regarding preeclampsia at pre, immediately post and one month post-intervention phases respectively.

**Table (3):** Clarifies that, there was a marked improvement in self-care reported practices of studied sample regarding preeclampsia after implementation of the continuous care model with as reported highly statistically significant difference ( $p < 0.001$ ) among pre, immediately post and one month post-intervention phases. The highest percentages (always) were observed in immediately post-intervention phase (97.3%, 92.0%, 85.3% and 81.3%) related to consuming the recommended diet, drinking 8 to 10 glasses of water daily, measuring blood pressure daily and counting fetal kicks daily respectively. While the lowest percentages (always) were observed concerning managing and coping with stress and compliance with prescribed medications with (46.7%, and 58.7%) respectively.

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**Figure (2):** Displays that, there was a marked improvement in total self-care reported practices after implementation of continuous care model (25.3%), (66.7%) and (65.3%) of studied sample had satisfactory level of self-care reported practices regarding preeclampsia at pre, immediately and one month post-intervention phases respectively. While, it was revealed that (74.7%), (33.3%) and (34.7%) of them had unsatisfactory level

of self-care reported practices regarding preeclampsia at pre, immediately and one month post-intervention phases respectively.

**Table (4):** Clarifies that; there was a highly significant statistical positive correlation between total knowledge and total self-care reported practices regarding preeclampsia at pre-intervention and post-intervention phase ( $P \leq 0.001$ ).

**Table (1): Distribution of studied sample according to general characteristics (n=75).**

General characteristics	No	%
<b>Age:</b>		
< 30	47	62.7
> 30	28	37.3
<b>Mean ± SD = 23.02±7.57</b>		
<b>Residence:</b>		
Rural	53	70.7
Urban	22	29.3
<b>Level of education:</b>		
Primary education	14	18.6
Secondary education	35	46.7
University education	26	34.7
<b>Occupation:</b>		
Housewife	51	68.0
Employed	24	32.0
<b>Monthly income:</b>		
Enough	21	28.0
Not enough	54	72.0

Table (2): Distribution of the studied sample regarding previous and current obstetric history (n=75).

Obstetric history	No	%
<b>Current gestational age in weeks:</b>		
Mean $\pm$ SD = 21.94 $\pm$ 4.72		
<b>Gravida:</b>		
Primigravida	54	72.0
Multigravida	21	28.0
<b>Parity:</b>		
Nulliparous	54	72.0
Primipara	9	12.0
Multipara	12	16.0
<b>Previous abortions:</b>		
Yes	4	5.3
No	71	94.7
<b>Number of ante natal care visits during the current pregnancy:</b>		
Once/month	16	21.3
Two times/month	21	28.0
Three or more times/month	38	50.7

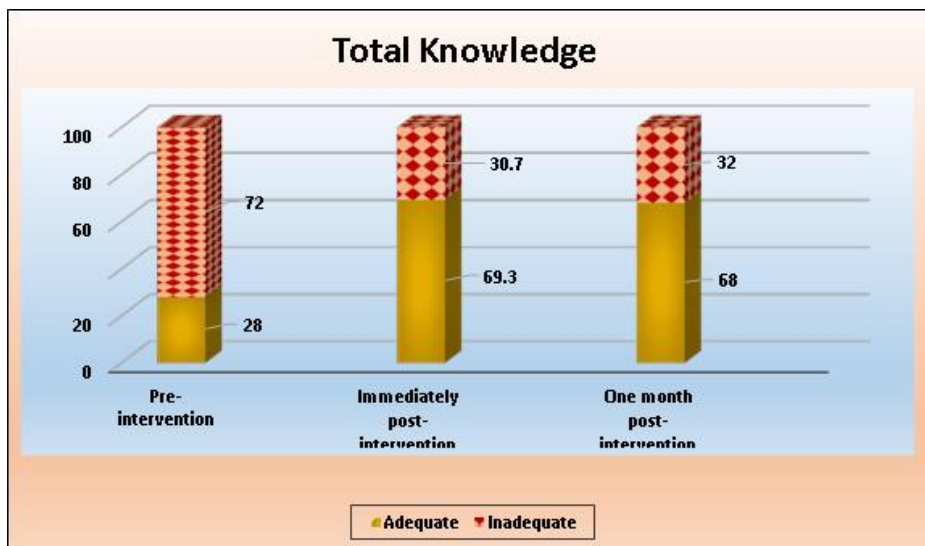


Figure (1): Percentage distribution of studied sample regarding total knowledge score about preeclampsia at pre, immediately and one month post-intervention phases (n=75).



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**Table (3): Distribution of studied sample regarding self-care reported practices about regarding preeclampsia at pre, immediately and one month post-intervention phases (n=75).**

Practices items	Pre-intervention			immediately post-intervention			One month post-intervention			Friedman test	
	Always	Sometime	Never	Always	Sometime	Never	Always	Sometime	Never	X2	P-value
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)			
Measuring blood pressure daily	7 (9.3)	12 (16.0)	56 (74.7)	64 (85.3)	4 (5.3)	7 (9.3)	62 (82.7)	2 (2.7)	11 (14.6)	113.5	0.000**
Checking and recording weight daily	2 (2.7)	24 (32.0)	49 (65.3)	58 (77.3)	9 (12.0)	8 (10.7)	53 (70.7)	8 (10.7)	14 (18.6)	117.2	0.000**
Checking urine for proteinuria by dipstick daily	0 (0.0)	11 (14.7)	64 (85.3)	51 (68.0)	3 (4.0)	21 (28.0)	50 (66.7)	3 (4.0)	22 (28.7)	105.4	0.000**
Consuming the recommended diet	6 (8.0)	59 (78.7)	10 (13.3)	73 (97.3)	1 (1.3)	1 (1.3)	71 (94.7)	0 (0.0)	4 (5.3)	131.4	0.000**
Drinking 8 to 10 glasses of water daily	20 (26.7)	33 (44.0)	22 (29.3)	69 (92.0)	4 (5.3)	2 (2.7)	68 (90.7)	3 (4.0)	4 (5.3)	101.6	0.000**
Participating in regular physical activity	19 (25.3)	23 (30.7)	33 (44.0)	47 (62.7)	13 (17.3)	15 (20.0)	45 (60.0)	12 (16.0)	18 (24)	75.6	0.000**
Compliance with prescribed medications	19 (25.3)	30 (40.0)	26 (34.7)	44 (58.7)	11 (14.7)	20 (26.7)	43 (57.3)	10 (13.3)	22 (29.4)	56.8	0.000**
Taking rest and adequate sleep	6 (8.0)	41 (54.7)	28 (37.3)	55 (73.3)	6 (8.0)	14 (18.7)	50 (66.7)	4 (5.3)	21 (28)	97.5	0.000**
Managing and coping with stress	1 (1.3)	15 (20.0)	59 (78.7)	35 (46.7)	24 (32.0)	16 (21.3)	30 (40.0)	21 (28.0)	24 (32)	100.9	0.000**
Counting fetal kicks daily	3 (4.0)	25 (33.3)	47 (62.7)	61 (81.3)	6 (8.0)	8 (10.7)	61 (81.3)	4 (5.3)	10 (13.4)	124.1	0.000**
Compliance with recommended antenatal visits	4 (5.3)	21 (28.0)	50 (66.7)	53 (70.7)	10 (13.3)	12 (16.0)	54 (72.0)	12 (16.0)	9	117.5	0.000**

\*\* Highly Statistically significant  $p \leq 0.00$

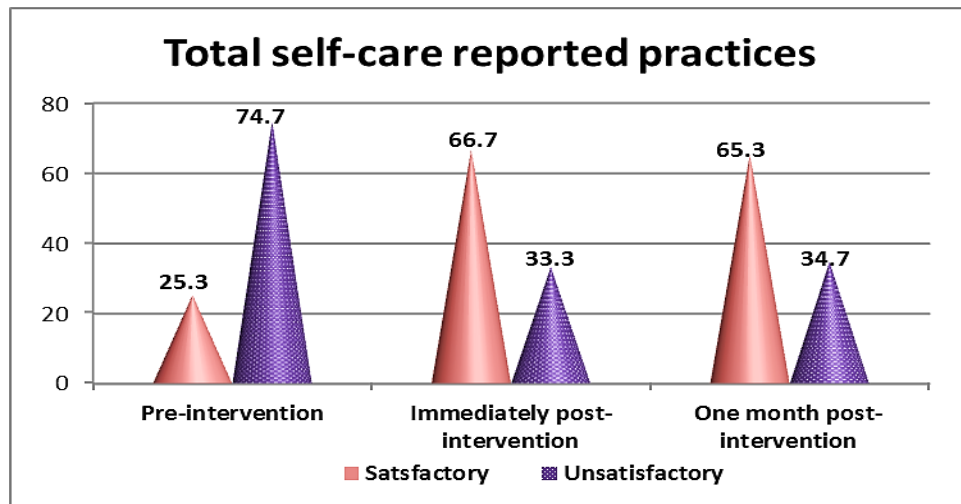


Figure (2): Percentage distribution of studied sample regarding total self-care reported practices about regarding preeclampsia at pre, immediately and one month post-intervention phases (n=75).

Table (4): Correlation between total knowledge and total self-care reported practices scores of the studied sample regarding preeclampsia at pre, immediately and one month post-intervention phases (n=75).

Variables	Total knowledge					
	Pre-intervention		immediately post-intervention		one month post-intervention	
	r	P-value	r	P-value	r	P-value
Total self-care reported practices	0.524	0.000**	0.388	0.001**	0.581	0.000**

\*\*A Highly Statistical significant  $p \leq 0.00$

### Discussion

Preeclampsia constitutes one of the leading causes of mortality and morbidity in pregnant women. In fact, approximately 10–15% of pregnancy-associated maternal deaths are due to complications related to preeclampsia (PE). (Boroń et al., 2023).

The ultimate goal of the continuous care model was to produce a care plan for promoting acceptance, proper performance and management of the disease and its potential complications. Following up

women’s behaviors could help manage diseases more efficiently. This reduced the frequency of their readmission to hospital, cost of hospitalization and mortality rate (Baghaei et al., 2021).

Concerning general characteristics, the result of the present study showed that less than two-thirds of studied sample were in age group  $< 30$  years with a mean age of  $23.02 \pm 7.57$  years. As regards the residence, less than three-quarters of them lived in rural areas. Furthermore, more than two-thirds of them were housewives. In relation to the

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educational level, less than half of them had secondary education. Moreover, less than three-quarters of them did not have enough monthly income.

Results of the current study could positively effect on the women's acquired information because young women age had an opportunity to interact with the researcher and were acquired more information. Being the highest percentage of women living in rural area and being housewives, this result could explain the low level of women's knowledge because the women don't have the opportunity to acquire knowledge about preeclampsia. From the researcher's point of view, educational level might affect on the level of information where knowledge will be improved resulting in well understanding and applying the program well.

This result was similar to **Ali et al, (2022)** who studied "Effect of Lifestyle Modification Guidelines on Maternal and Fetal Outcomes Among Pregnant Women with Mild Preeclampsia, Dakahlia, Egypt" revealed that mean age of the study groups was  $29.85 \pm 6.99$ . In addition, three-quarters of them were housewives. Also, more than half of them had secondary education. Also, this result was nearly similar to **El Sayed & Desoky, (2019)** who studied "Effect of lifestyle alteration of pregnant women with mild preeclampsia on maternal and fetal Status, Zagazig, Egypt" showed that half of pregnant women with preeclampsia had a secondary education, did not have enough income. As well as majority of them were housewives from rural areas.

Pertaining to **previous and current obstetric history**, the result of current study illustrated that less than three-quarters of the studied sample were primigravida and nulliparous. The mean gestational age of them was  $(21.94 \pm 4.72)$  weeks. Additionally,

the majority of them had no history of abortion. Concerning the number of antenatal care visits during the current pregnancy, more than half of the studied sample visited antenatal clinic three times or more /month.

This result was in accordance with **Logan et al., (2020)** demonstrated that nulliparous mothers were 4.8 times more likely to suffer from preeclampsia/eclampsia than multiparous mothers (OR=4.8, 95% CI=1.0-22.4,  $p=0.045$ ) whereas primiparous mothers were 1.4 times more likely to develop preeclampsia/eclampsia than those that were multiparous (OR=1.4, 95% CI=0.9-2.3,  $p=0.187$ ) and women who had fewer than four antenatal care visits were 1.8 times more likely to have preeclampsia.

The results of current study were supported by **Mekie et al., (2020)** who studied "Cohabitation duration, obstetric, behavioral and nutritional factors predict preeclampsia among nulliparous women in West Amhara Zones of Ethiopia: Age matched case control study, Ethiopia" showed that developing PE were found to be 2.13 times higher among nulliparous women (AOR = 2.13, 95% CI (1.10, 4.11). Moreover, women who had frequent ANC visits had a low risk of experiencing PE compared with their counterparts (COR = 0.51, 95% CI (0.29, 0.92).

Regarding total knowledge score about preeclampsia at pre, immediately weeks and one month post-intervention phases displayed that, (more than one quarter and more than two thirds) of studied sample had good knowledge regarding preeclampsia at pre, immediately post and one months post-intervention phases respectively. While, it was revealed that (less than three quarters and less than one third) of them had poor knowledge regarding preeclampsia at pre, immediately post and one month post-intervention phases respectively. This result

demonstrated that continuous care model was very effective in improving the pregnant women's knowledge level regarding preeclampsia.

From the researcher point of view, this improvement may be related to that the educational program and educational sessions affect the knowledge of the pregnant women positively as all women in the sample share in the program and become more equipped by the important information about preeclampsia and the instructional guidelines included the needed information about preclampsia in simple, concise and clear language. In addition, the topic of the study is considered vital and very important to pregnant women during pregnancy and postpartum period. So, women were very interested in and gratified during the educational sessions as well as the written booklet supported with pictures which they considered as a reference at any times even

This result was in agreement with **Elagamy et al., (2021)** who studied "Effect of Nursing Intervention Guided by PRECEDE Model on Knowledge and Practice of Preventive Behavior of High-Risk Pregnant Women regarding Preeclampsia, Egypt" pointed out that the mean knowledge score regarding preeclampsia was decreased pre-nursing intervention implementation. While there was an increase in the mean score of knowledge score with statistical significance immediately and after one month of nursing intervention implementation.

Furthermore, the result of our study matched with **Parsa et al., (2019)** who carried out "Improving the knowledge of pregnant women using a pre-eclampsia app: A controlled before and after study, Iran" illustrated that there was no significant difference between the scores of the two groups before the intervention. Their

difference after the intervention was highly significant ( $p < 0.001$ ). The difference between the knowledge of the participants before and after the intervention was significant in both groups ( $p < 0.05$ ).

Owing to Self-care reported practices of the studied sample regarding preeclampsia at pre, immediately and one month post-intervention phases, the result of current study showed that there was a marked improvement in self-care reported practices of studied sample regarding preeclampsia after implementation of the continuous care model with as reported a highly statistical significant difference ( $p < 0.001$ ) at pre, immediately post and one month post-intervention phases. This may be attributed to a lack of knowledge among pregnant women about preeclampsia because of lack of planned preeclampsia educational or awareness program in out patient clinics.

In relation to total practices score, the current study findings clarified that, there was a marked improvement in total self-care reported practices after implementation of continuous care model (more than one quarter and more than two thirds) of studied sample had satisfactory level of self-care reported practices regarding preeclampsia at pre, immediately and one month post-intervention phases respectively. While, it was revealed that (less than three quarters, one third and more than one third) of studied women had unsatisfactory level of self-care reported practices regarding preeclampsia at pre, immediately and one month post-intervention phases respectively. This may be due to the continuing sensitization process that motivated, encouraged and empowered these women to adhere to self-care practices to control and reduce the complications of preeclampsia. In addition, the effect of regular attendance at sessions followed by

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weekly follow-up care organized by phone calls. This reflected the importance and effectiveness of introducing educational sessions through application of continuous care model that commonly associated with improving self-care practices.

The results of current study were in the same line with **Afey & Kamel, (2019)** illustrated that there were statistically significant differences in mean self-care practice score ( $f=248.9$ ,  $p<, 0.001$ ). There were significant changes from the pre-intervention scores with a mean of  $20.97\pm 2.25$ , and post-intervention scores with a mean of  $23.88\pm 3.02$  and 4 weeks follow up with a mean of  $23.59\pm 3.29$ . Additionally, there were statistically significant differences in all preeclampsia self-care practice items throughout the study ( $p<0.000$ ). the majority of women (82%) had inadequate self-care practice level before intervention, while after intervention this level of practice were changed as 93% and 89% had adequate self-care practice post intervention and 4 weeks follow up respectively with a statistical significance difference ( $<0.000$ ).

This result was supported by **Rasouli et al., (2019)** who studied "Effect of self-care before and during pregnancy to prevention and control preeclampsia in high-risk women, Iran" indicated that making lifestyle changes, having a healthy diet, learning stress management, performing exercise and physical activities, taking antioxidants, dietary supplements and calcium and adherence to aspirin and heparin regimens are recommended for monitoring and preventing preeclampsia.

The previously mentioned results displayed that knowledge that women were taught during educational sessions through

application of continuous care model played a prominent role in encouraging and motivating women to change their self-care practices. This reflected that continuous care model was very effective in promoting the pregnant women's self-care practices regarding preeclampsia. in addition, there were other studies confirm that continuous care model was very effective in promoting self-care in other diseases such as **Allahyari et al., (2017)** who conducted a study under a title "Effect of Continuous Care Model on Self-care Behaviors in Patients with Diabetes" emphasized that after applying the continuous care model, mean self-care scores of patients in the control and intervention groups were 36.42 and 39.32, respectively, which did not show any significant differences ( $P=0.28$ ). After the intervention, the mean self-care scores of the control and intervention groups were 37.95 and 55.22, respectively, indicating significant intergroup differences ( $P=0.001$ ). So, the continuous care model can be used as an effective method to promote self-care behaviors in diabetic patients.

As regards **correlation** coefficient between total knowledge, total self-care reported practices of the studied sample at pre, immediately and one month post-intervention phases. The result of current study clarified that a highly significant statistical positive correlation between total knowledge and total self-care reported practices regarding preeclampsia at pre-intervention and post-intervention phase ( $P\leq 0.001$ ). From researcher point of view that adequate knowledge about self-reported care practices increased awareness may lead to the ability of women to improve self-care behaviors contribute to improved quality of life.



This result of current study agreed with **Mohamed et al., (2022)** pointed out that there was high statistical significant correlation between study group regarding self-care guideline and total knowledge score pretest and posttest with p-value (0.010, 0.000).

**Conclusion:**

Based on the results of the present study, it was concluded that; continuous care model had a positive effect on knowledge and self-care among women with preeclampsia. There was a marked improvement in knowledge and self-care reported practices of studied sample regarding preeclampsia after implementation of the continuous care model with highly statistically significant difference at pre, immediately post and one month post-intervention phases. Moreover, there was a highly statistically significant positive correlation between total knowledge and total self-care reported practices regarding preeclampsia at pre-intervention and post-intervention phases. Therefore, the study aim was achieved and study hypotheses were supported.

**Recommendations:**

- The continuous care model should be integrated as a nursing intervention for promoting women's self-care practices in preeclampsia care.
- Educational program for women to raise their awareness regarding knowledge of preeclampsia at antenatal care for preventing and controlling preclampsia.

**Recommendations for further studies:**

- Educational program for women to raise their level of knowledge and preventive health behaviors of high risk during pregnancy

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## تأثير تطبيق نموذج الرعاية المستمرة على الرعاية الذاتية للسيدات اللاتي تعانين من تسمم الحمل

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يعتبر تسمم الحمل أثناء الحمل واحدة من المشاكل الرئيسية في البلدان النامية التي تسبب وفيات الأمهات والولادة المبكرة في جميع أنحاء العالم. لذا هدفت هذه الدراسة إلى تقييم تأثير تطبيق نموذج الرعاية المستمرة على الرعاية الذاتية للسيدات اللاتي تعانين من تسمم الحمل. و تم استخدام تصميم شبه تجريبي. وقد أجريت الدراسة في العيادة الخارجية لأمراض النساء والتوليد بمستشفى جامعة بنها. حيث تم اخذ عينة هادفة من 75 امرأة تسمم الحمل. و أظهرت نتائج الدراسة الحالية وجود تحسن ملحوظ في المعلومات وممارسات الرعاية الذاتية للعينة المدروسة فيما يتعلق بتسمم الحمل بعد تطبيق نموذج الرعاية المستمرة مع وجود فرق معتد به إحصائيًا وكان هناك ارتباط إيجابي ذي دلالة إحصائية بين إجمالي المعرفة وإجمالي ممارسات الرعاية الذاتية المبلغ عنها فيما يتعلق بتسمم الحمل في مرحلتي ما قبل التدخل وما بعد التدخل. كما كان لتطبيق نموذج الرعاية المستمرة تأثير إيجابي على المعلومات والرعاية الذاتية بين النساء المصابات بتسمم الحمل، لذلك تم دعم فرضيات الدراسة. واوصت الدراسة بأنه يجب دمج نموذج الرعاية المستمرة كتدخل ترميضي لتعزيز ممارسات الرعاية الذاتية للسيدات في رعاية تسمم الحمل.