

EFFECT OF CLINICAL GUIDELINE-BASED FOLLOW-UP ON THE DEVELOPMENT OF POSTPARTUM PREECLAMPSIA AND ITS COMPLICATION

AISHA HASSAN MOHAMED

Assistant Lecturer, Maternal and Newborn Health Nursing, Faculty of Nursing, Cairo University, Egypt.

SHADIA ABDEL KADER HASSAN

Professor, Maternal and Newborn Health Nursing, Faculty of Nursing, Cairo University, Egypt.

ABEER SAAD ZAGHLOL

Professor, Maternal and Newborn Health Nursing, Faculty of Nursing, Cairo University, Egypt.

HAYTHAM BADRAN

Professor, Obstetrics and Gynecology Department, Faculty of Medicine, El-Fayoum University, Egypt.

AMAL SHAABAN ABDELMONEM

Assistant Professor, Maternity and Newborn Health Nursing, Faculty of Nursing, Cairo University, Egypt.

Abstract

Background: High blood pressure in the postpartum period is most commonly seen in women with antenatal hypertensive disorders, but it can develop de novo in the postpartum time frame. Whether postpartum preeclampsia or eclampsia represents a separate entity from preeclampsia or eclampsia with antepartum onset is unclear. The diagnosis of postpartum preeclampsia should be considered in women with new-onset hypertension 48 hours to 6 weeks after delivery. **Aim of the study:** to examine the effect of clinical guidelines-based follow up on developing of postpartum preeclampsia and its complications. **Design:** A time series quasi-experimental design was adopted in the current study. In the current study, the women with a history of antepartum preeclampsia or gestational hypertension were followed from the postpartum period until the 2 months through home visits as a recommendation of clinical NICE guidelines. **Setting:** The current study was conducted at two settings, the postpartum unit in the department of Obstetrics and Gynecology at El-Fayoum university hospital, and participant's home as well to perform the home visits follow up. **Participants:** A convenience sample of 80 women who attended the postpartum unit at El-Fayoum university hospital, and home visit follow-up were recruited For the study for nine months, the sample was one group who received protocol of care for postpartum preeclampsia according to the following inclusion criteria; women who have antepartum pre-eclampsia or gestational hypertension, while women with pre-gestational hypertension, and women with chronic hypertension, were excluded from the study. **Results:** The age range was 25 - 30 years old, 33.8 % of the age range were 30 - 35 years old, and 15% the age range were 35-40, the complications during postpartum 26.3% had uncontrolled blood pressure, 16.3% developed eclampsia, while HELLP syndrome was represented to 12.5% of the study sample, and 15% had Postpartum hemorrhage. There were highly statistically significant differences between the first home visit and fourth home visit after follow-up and implemented clinical guidelines regarding vital signs, systolic and diastolic respectively (p value= 0.001*, p value= 0.001*). 46.3% & 62.5% of women on the 1st home visit had blurred vision, and headache respectively, while on 4th home visit 0% of them have blurred vision and headache, there is statistically significant difference between both of them (P-value 0.001*). **Conclusion:** The current study concluded that postpartum preeclampsia women who applied clinical guidelines (NICE guidelines) were less likely develop postpartum preeclampsia and complications. **Recommendations:** Application of clinical guidelines (NICE guidelines) for all cases who

had preeclampsia should be included in health care system for all risky groups and to be apart from postpartum care.

Keywords: NICE Guidelines, Pregnancy, Postpartum Preeclampsia, Hypertension, New-Onset Postpartum Preeclampsia, Postpartum, Postpartum Eclampsia, Gestational Hypertension.

INTRODUCTION

Postpartum preeclampsia is a rare condition that can occur after a woman has given birth. Preeclampsia after delivery manifests as high blood pressure and high protein levels in the urine. Preeclampsia can develop spontaneously in the postpartum period; postpartum preeclampsia can appear within 48 hours of labor. Preeclampsia in the postpartum phase is most frequently found in women with prenatal hypertension problems. However, it might take up to six weeks following labor for the syndrome to manifest. Pre-eclampsia frequently returns after delivery and occasionally flares up at postpartum. Unfavorable effects may happen at this time in both cases (Redman, 2019).

Preeclampsia is one of the leading causes of maternal morbidity and mortality in the world, and most of the published literature has concentrated on its occurrence during the antepartum period. Preeclampsia in the postpartum period, however, is a less-studied condition, even though the incidence of newly onset postpartum hypertension is unknown but is estimated to occur in 0.3–28 percent of women. Most studies only include women who are readmitted for preeclampsia, eclampsia or the consequences of hypertension. In fact, over 50% of instances of eclampsia develop after delivery, and around 26% of seizures begin more than 48 hours after birth (ACOG, 2019).

Increased plasma volume, together with salt and water retention in the interstitial tissue, are characteristics of a healthy pregnancy. This is even more pronounced in women who are carrying multiple fetuses. In addition, during pregnancy, delivery, and the postpartum period, many women receive a lot of fluids intravenously. Additionally, large amounts of fluids are administered during cesarean section or regional analgesia-anesthesia. Acute or delayed mobilization of a significant amount of fluid into the intravascular space, particularly in conjunction with impaired renal function, can cause volume overload and hypertension in some women. Some drugs that constrict blood vessels are frequently used to treat pain in women who have undergone cesarean deliveries, episiotomies, or perineal lacerations. Typically, these women need to take significant doses of non-steroidal anti-inflammatory medications, including ibuprofen or indomethacin which are associated with vasoconstriction and sodium and water retention, both of which can result in severe hypertension (Skurnik, et al, 2017).

Multiple cohort studies have mentioned Risk factors for postpartum preeclampsia include older maternal age, age 35 has been repeatedly shown to be associated with an approximately increased risk for postpartum preeclampsia—black race, and maternal obesity—and in general, researchers have found similar overlap with risk factors for preeclampsia with antepartum onset. Preeclampsia occurs more frequently in women who have a history of hypertension illness in a prior pregnancy and appears to be

consistently linked to pre-pregnancy obesity. Furthermore, several studies have consistently found that compared to vaginal delivery, cesarean delivery increases the incidence of postpartum preeclampsia. There is apparently a link between higher rates of intravenous (IV) fluid infusion during labor and delivery and an increased risk of postpartum preeclampsia (Hauspurg, Lemon, & Quinn, 2019).

Moreover, preeclampsia in the postpartum period affects several categories of women, including those with prior chronic hypertension, prenatal hypertension, pre-eclampsia, and eclampsia, who are susceptible to preeclampsia in the postpartum period. Additionally, during the postnatal period, pre-eclampsia may make its initial appearance. Patients can be evaluated and treated similarly regardless of the underlying reasons and clinical presentation of these forms of hypertension. (Sharma, 2016, Mallapur, et al., 2017). Furthermore, postpartum preeclampsia can worsen quickly and cause life-threatening consequences like eclampsia, hypertension encephalopathy, pulmonary edema, or stroke if left untreated. Postpartum preeclampsia is frequently more dangerous than pre-eclampsia during pregnancy (Yifru B., 2015).

Preeclampsia can present for the first time postpartum, and for that reason, blood pressure measurement should continue to be part of the full postnatal check for all women, regardless of their history in pregnancy. Furthermore, The National Institute for Health and Care Excellence (NICE) recommends frequent postnatal BP monitoring for women with both pre-eclampsia (every 1–2 days for 2 weeks) and gestational hypertension (at least once between days 3 and 5). The guideline stipulates thresholds for the increase or commencement ($\geq 150/100$ mm Hg) and the reduction or cessation (consider $< 140/90$ mm Hg and reduce $< 130/80$ mm Hg) of antihypertensive medication after birth. However, little detail is provided about the frequency or proportion of dose reduction or how to manage multiple medications (NICE, 2019).

The American College of Obstetricians and Gynecologists advises that blood pressure be tested seven to ten days following delivery and again 72 hours later while still hospitalized (or with an equivalent degree of outpatient supervision) (sooner if a woman is symptomatic). In keeping with NICE, they suggest treating low blood pressure when it is 150/100 mm Hg, but they also note that this should be done in two measurements that are spaced 4-6 hours apart. They don't offer any recommendations for blood pressure thresholds for medication reduction, implying ambiguity over when to reduce or stop treatment. More than six weeks after delivery, hypertension is typically indicative of a pathology unrelated to pregnancy, such as essential hypertension or an underlying endocrine, neurological, or renal condition. (ACOG, 2013).

Furthermore, cardiovascular disease is more likely to develop in the future for all women who had any aspect of hypertension disease during pregnancy or the puerperium. Increased risk of cardiovascular disease, persistent hypertension, venous thromboembolism, and cerebrovascular illness are the linked negative effects that meta-analysis has shown. Currently, the obstetric team at discharge and the primary care doctor in the neighborhood have the chance to talk with women about their future risks

and make straightforward lifestyle adjustment recommendations to assist lower future risk. As a matter of common sense, losing weight, quitting smoking, eating less salt, and exercising regularly may be suggested. However, there is currently no proof that these actions can enhance these women's long-term outcomes (Graves & Davis 2018).

Postpartum PE or eclampsia may be associated with a higher risk of maternal morbidity than PE with antepartum onset. This emphasizes how important it is for patients, and healthcare professionals, both obstetrical and non-obstetrical, to promptly recognize symptoms and signals. The illness mechanism of delayed-onset postpartum preeclampsia has received little research attention, and postpartum preeclampsia has gone unacknowledged for far too long. For patient care, counseling, and anticipatory guidance prior to hospital discharge, as well as for the reduction of maternal morbidity and mortality in the postpartum period, it is essential to understand the etiology of the disease and each postpartum woman's risk of contracting it (Rana S, 2020).

Significance of the Study

Preeclampsia is one of the leading causes of maternal morbidity and mortality in the world. Most of the published literature has focused on its appearance during the antepartum period, which has translated into a decrease in the incidence of intrapartum eclampsia. Conversely, preeclampsia in the postpartum period is a less-studied condition, even though the reported prevalence of de-novo postpartum hypertension or preeclampsia ranges from 0.3% to 27.5% and that 0.3% of all postpartum visits to emergency departments are secondary to hypertension and preeclampsia (Clark, 2010). Despite the high incidence of eclampsia, pulmonary edema, stroke and thromboembolism in postpartum period; less attention has been given to postpartum preeclampsia, as there is paucity of data regarding incidence, risk factors, optimal treatment, and outcomes of hypertensive disorders diagnosed in the postpartum period, (Andrus, 2010).

There are limited studies, and a paucity of data regarding postpartum eclampsia and preeclampsia in Egypt, most studies had examined morbidity and mortality of antenatal preeclampsia, the results of current study will provide an evidence of the effectiveness of guidelines-based care in decreasing the occurrence of postpartum preeclampsia, improve the course of management and decrease maternal complications, this in turn will improve the quality of care provided to the women with postpartum preeclampsia. Moreover, the study will contribute to building a database for the prevalence of postpartum eclampsia in Egypt.

Aim of the Study

The aim of the current study was to examine the effect of clinical guidelines-based follow-up on the development of postpartum preeclampsia and its complications.

Research Hypothesis

The current study hypothesized the following:

Postpartum follow-up using clinical guidelines will minimize the development of postpartum preeclampsia and its complications.

Research Design

A time series quasi-experimental design was adopted for this current study, it is a design in which measurements of the same variables are taken at different points in time in one group.

Sample

A convenience sample of 80 women who attended the postpartum unit at El-Fayoum university hospital, and home visit follow-up were recruited For the study for nine months, the sample was only for one group who received protocol of care for postpartum preeclampsia according to the following inclusion criteria; women who have antepartum pre-eclampsia or gestational hypertension, while women with pre-gestational hypertension, and women with chronic hypertension, were excluded from the study.

Setting

The current study was conducted at two settings, the postpartum unit in the department of Obstetrics and Gynecology at El-Fayoum university hospital, and participant's home as well to perform the home visits follow up. It is one of the educational university hospitals in El- Fayoum and provides free obstetrics and gynecology health services, such as prenatal, antepartum, intrapartum, and postpartum care for both low-risk and high-risk pregnant women, as well as family planning guidance. Additionally, it provides care for women who express gynecological problems.

Tools for Data Collection

To fulfill the aim of the study, data was collected by utilizing the following designed tools during postpartum period for women who met the inclusion criteria. Tools included (1) an interviewing questionnaires schedule, (2) hospital postpartum assessment (3) a home visit follow up, and I (4) The National Institute for Clinical Excellence (NICE 2019).

1) Interviewing Questionnaires Sheet

This tool was designed by the investigator and composed of four parts; first part data related to socio-demographic characteristics, second part included data related to medical history, while third part includes Obstetric history, and last part represented data related to, present history.

(2) Hospital Postpartum Assessment Sheet

This tool was designed by the research investigator after an extensive literature review and encompassed items regarding initial postpartum assessment for women on 1st day after delivery to assessing vital signs, amount of lochia, voiding spontaneous and amount of urine checked for a patient on mgso4 and assess the fluid balance, prescribed medication, as well as lab investigations (urine analysis for protein, AST, ALT, PLT, HB,

HCT), and assessment of maternal complications. At the same time data related to maternal and neonatal before discharge.

(3) Home Visit Follow-Up Sheet

This tool was designed by the research investigator and divided into 2 sections. The first one entailed Blood pressure, protein in the urine, presence of headache, blurred vision, epigastric pain, dizziness, increasing body weight, and disturbed level of consciousness, the second part included; Lifestyle patterns including question concerning baseline data are physical exercise practiced and dietary patterns and healthy food.

(4) National Institute for Clinical Excellence (NICE, 2019) Follow-up

This guideline covers diagnosing and managing hypertension, including pre-eclampsia, during pregnancy, labor, and after birth. It also includes advice for women with hypertension who wish to conceive and women who have had a pregnancy complicated by hypertension. It aims to improve care during pregnancy, labor, and birth for women and their babies. These clinical guidelines follow up to include the frequency of blood pressure monitoring, thresholds for reducing or stopping treatment, indications for referral to primary care for blood pressure review, and self-monitoring for symptoms of severe preeclampsia. (NICE guideline June 2019).

Ethical Consideration

A primary approval to conduct the study was obtained by the research ethics committee of Faculty of Nursing, Cairo University in August 1st, 2021, and the final approval was granted for the study after data collection. Written informed consent was obtained from participants who accepted to participate in the study and met the inclusion criteria. The aim and nature of the study were explained to each participant and assurance that participation was voluntary and can be withdrawn at any time without affecting the care provided as well as, anonymity, privacy, and confidentiality were maintained.

Procedures

Official permission was obtained from the hospital as well as written informed consent from women who met the inclusion criteria, data was collected for nine months starting from 01/08/2021, conduction of the study included interviewing, assessment, implementation, and follow-up.

The research investigator conducted structured, in three steps to formulate this part. The first step was

A) Pre-assessment Data

Data was retrospectively collected for 3 months from the hospital and medical records to be utilized as a baseline data included the total number of women who develop postpartum preeclampsia, whether admitted to the hospital or not, how many of them develop complications and length of stay in the hospital if she admitted.

B. Interviewing

Research investigator attended the postnatal unit on admission (1st day after delivery), The interview was face-to-face and the question was asked in Arabic and recorded by the investigator, each woman who met the inclusion criteria was interviewed to collect baseline data about socio-demographic characteristics, medical history, family history, past obstetric history.

C. Assessment

The research investigator performed the initial assessment and postpartum follow up to maintain wellbeing of the mother.

C.1. Initial Assessment

The initial assessment was performed for each woman, during the first meeting by the investigator, on 1st day after delivery to obtain the data related to;

- 1) Vital signs
- 2) Anthropometric measurement,

Also, the researcher investigator asked the woman if she has any blurred vision or headache. At the same time deep tendon reflex was assessed deep tendon reflex by placed the woman in a seated position, and using a reflex hammer, to elicit an unconscious response, quickly strike several tendons with a reflex hammer held at the wrist. Near normal the reaction of 0 A minor but unmistakably present response (1+) is considered normal. A brisk response (2+) is considered normal. A very quick response (3+) is considered normal. A repeated reflex (4+) is considered abnormal.

Moreover, uterine condition was conducted to assessed contraction, level and position of the uterus; the height of the fundus should decrease of height by one finger breadth below the umbilicus each day post-delivery, then assessed the uterus if firm or boggy. Also, lochia was assessed for color, amount, odor, and the number of pads used, check for a hematoma. In addition, assess the urine output, through the indwelling catheter and measure the intake with output through a fluid balance chart. If the patient had a C-Section, inspect the dressing or incision at this time noting site, redness, discharge, and approximation of the incision if uncovered.

Assessment of patient medication as Mgso₄, the investigator assessed the vital signs, urine output and Deep Tendon Reflex (DTR) before each dose of Mgso₄, After starting administration of magnesium sulphate , signs of toxicity was assessed and monitored (i.e. hypotension, areflexia (loss of DTRs), the respiratory rate for 1 minute every one hour to assess respiratory depression, oliguria to assess urine output not less than 30 ml /hr., shortness of breath, chest pains, hypothermia, confusion). Then assessed another medication labetalol for the dose and how many times per day she received it.

On the other hand, the investigator checked the lab investigation for the women on the first day after delivery for AST, ALT, Platelet count, Hb, and HCT check if it was normal

or abnormal, then assess the protein in urine by taking the urine sample from the indwelling Cather by clamp it for 5-10 mints and collect the sample in urine container after that I put the strip on the urine, the color on the dipstick tells me the level of the protein as I compared with the color chart on the container if the color in the strip yellow means negative if state to be green this one will be + 1 if dark green it increased the protein level as +4 g/l, the initial assessment it was taken 40 minutes. Some of this data was obtained from woman's records and files.

E. Implementation

The discharge plan was carried out for each woman through meeting them before discharge in the postpartum unit, to assess the BP, protein in the urine, and lab investigation. Health education for woman and their family on how to measure Bp, urine dipstick, physical activity, home medication, and maintaining a healthy and lifestyle, healthy weight, as recommended in the NICE guideline. In addition, explained about danger signs (severe headache, blurred vision, swelling in hands or leg, epigastric pain), if she has any of these signs to report immediately to the nearest hospital. The instruction was given to reduce postpartum preeclampsia complications utilizing a written booklet that was prepared by the researcher contained the same information to be a reference for the woman (the booklet was in Arabic using clear and simple language and colored photos). This teaching session will take 1 hour approximately for each woman with a total of eighty hours for the study sample.

E.1. Feedback

By asking the woman, some questions to evaluate that woman had received and retained the important information and allowing time for her if she wants to ask a question for more clarification, the investigator will repeat the missed points. By the end of educational session each woman was told to communicate their questions and concerns to the investigator by phone on demand and arranged an appointment with her for the next home visit.

D. Follow-up

The research investigator followed the participants through visits their home. A total of four visits were conducted to each woman, on 5th day of the postpartum period, after two, after 6 weeks, and 4th visit after 2 months, according to NICE guidelines with a total of 320 visits.

At Each Visit, Women were questioned about her health and concern. The researcher ensured the woman has retained the previous information by asking the woman questions such as measure blood pressure monitor while she was seated and was reassured of the results, Temperature was assessed by using a thermometer. After from head to toe, ask the woman if she has any signs and symptoms of postpartum preeclampsia, such as a severe headache, Bullard vision, dizziness, or epigastric pain. Then, assess the woman's uterus and her bleeding by looking at the pad, determining her level of edema and deep tendon reflex, and determining her level of consciousness. Then the investigator

assesses the protein level and requested her to provide a urine sample so he could measure the protein content with a urine dipstick strip.

Laboratory follow-up Hematological biochemical monitoring, By the last visit blood investigation, was collected to measure ALT, AST, platelet count, and serum creatinine to compare the result with the first lab and 48 hours after birth before discharge if there was any abnormality after 2 months during postpartum it will be related to the renal problem.

Statistical Analysis

Data were statistically described in terms of mean standard deviation (\pm SD), or frequencies (number of cases) and percentages when appropriate. Because the group is large enough, a comparison of numerical variables between the groups was done using the student t-test for independent samples. For comparing categorical data, Chi-square (χ^2) test was performed. An exact test was used instead when the expected frequency is less than 5. Two-sided p-values less than 0.05 were considered statistically significant. Regression analysis, that allows to examine the relationship between two or more variables of interest. All statistical calculations were done using the computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 22 for Microsoft Windows.

RESULT

The findings of the current study were organized into four sections, the first section provides a description of socio-demographic characteristics, the second section focuses on the previous and current obstetric profile of the study sample, the third section of the study includes data related to, the initial and follow-up assessments of women and their fetuses during the postpartum period in the hospital, while the fourth section of the study focused on the home visits and follow-up after discharge from the hospital.

Table 1: Distribution of Age and Residence among the Studied Sample

	Items	No	%
Age in years	25- 30	41	51.2
	30-35	27	33.8
	35-40	12	15.0
Residence	Urban	20	25
	Rural	60	75
Occupation	Housewife	53	66.3
	Others	27	33.7
Educational level	Read and write	25	41.7
	Can't read and write	15	25
	Primary school	20	33.3
	secondary school	20	33.3
Income level	Enough	60	75
	Not enough	20	25

Table (1) shows that, 50% of the sample their age range was 25 - 30 years old, 31.7 % of the age range were 30 - 35 years old, and 18.3% the age range were 35-40. Moreover, all women are married, and 80% of the women in the study lived in rural areas, while 20% of them lived in urban areas. In relation to occupation, 66.6% were house life, while 33.3% of others.

Regarding the level of education, 33.3% of women in the study received secondary school education, 33.3% of women received primary school, 41.7% of women can read and write, while 25% of women cannot read and write. Moreover, 75% of women in the study have enough income, and 25% of them do not have enough income.

Table 2: Distribution of the Study Sample According to the Complications during Current Pregnancy (N=80)

Maternal complications	No	%
Gestational Hypertension		
yes	36	45
no	44	55
Preeclampsia		
yes	55	68.8
no	25	31.2
yes	11	13.8
no	69	86.3

N* Number are Mutually Exclusive

Table (2) showed that 48.3% of women in the study had Gestational Hypertension was represented by 43.3% of women in the study, and 39% of women have preeclampsia. Moreover, 13.8% of women have an antepartum hemorrhage.

Table 3: Maternal Complications Postpartum among the Studied Sample (N=80)

Maternal complications postpartum in the unit	No	%
Uncontrolled blood pressure	20	25
Eclampsia	10	12.5
HELLP syndrome	11	13.73
Pulmonary edema	1	1.2
Postpartum hemorrhage	9	11.2
No complications	38	47.3

N* Number are Mutually Exclusive

Regarding the complications during postpartum 25% have uncontrolled blood pressure, 12.5% have eclampsia, while HEELP syndrome was represented to 13.73% of the study sample.

Part Three: Hospital Postpartum Assessment

Table 4: Difference Between on Admission and before Discharge Regarding Systolic and Diastolic Blood Pressure and Pulse Assessment among the Studied Sample (n=80)

Items	On admission = 0		Before discharge = 1		p-value
	Mean	SD	Mean	SD	
Systolic BP	178.31	19.44	143.50	10.3	<0.001*
Diastolic Bp	96.59	11.02	83.96	6.37	<0.001*
Plus	82.10	10.28	80.91	11.49	1.000

Table 4 represented the difference between on-admission and before-discharge regarding systolic and diastolic assessment among the sample group, with a statistically significant difference, the mean systolic BP. on admission was 178.3 ± 19.44 , and before discharge 143.50 ± 10.3 , t-test revealed a high statistically significant difference between both (t-test = 14.16, p-value = 0.001). Also, for diastolic Bp on admission 96.59 ± 11.02 , and before discharge 83.96 ± 6.37 , the t-test revealed a high statistically significant difference between both. These differences in complying with monitoring the vital signs on admission time and before discharge.

Table 4a: The Difference between On-Admission and before Discharge Physical Assessment Finding as Follows (N=80)

Items	On admission		Before discharge		p-value
	No	%	No	%	
Blurred vision	67	83.8	17	21.3	<0.001*
Headache	62	77.5	31	38.8	<0.001*
Uterus					
Contracted	74	92.5	77	96.3	0.508
Soft	6	7.5	3	3.8	
Abdomen					
Tender /soft	34	42.5	39	48.8	0.225
Distended	46	57.5	41	51.2	
Type of lochia					
Rubra	80	100.0	80	100.0	-
Serosa	0	0.0	0	0.0	

Table (4a) shows that, the difference between on-admission and before discharge regarding physical assessment among the study sample, was 83.8% of women on admission have blurred vision, 21.3% before discharge, there was a statistically significant difference between admission and before discharge ($X^2=43.24$ p-value .001), and 77.5% of women had headaches on admission, while before discharge 38.8% of women had a headache. There was a statistically significant difference between admission and before discharge ($X^2=16.29$ p-value .001).

Regarding the uterus assessment on admission, 92.5% of women had contracted uterus, 7.5% of them had soft uterus, while before discharge 96.3% with a contracted uterus and

3.8% had soft uterus, there was no statically significant difference between admission and discharge regarding to uterine assessment ($X^2 = 2.143$ P-value= .508).

Table 4-d: Difference between On-Admission and before Discharge Regarding Physical Assessment (edema level) among the Studied Sample (N=80)

Items	On admission = 0		Before discharge =1		p-value
	No.	%	No.	%	
Edema level					
0	0	0.0	3	3.8	<0.001*
1+	28	35.0	53	66.2	
2+	26	32.5	24	30.0	
3+	26	32.5	0	0.0	
Deep tendon reflex					
Hyperreflexia	23	28.8	15	18.75	0.728
Normal	57	71.3	65	81.25	
Protein in urine					
No	5	6.3	41	51.2	<0.001*
Yes	75	93.7	39	48.8	

N* Number are Mutually Exclusive.

Regarding the edema level during the physical assessment, 35%, 32.5%&32.5% of women had edema on admission with 1+, 2+ &3+ respectively, while before discharge for edema level 1+,2+, and 3+ as 66.2%,30%, and 0 respectively, there was a statistically significant difference between admission and before discharge.

For deep tendon, reflex 28.8 had hyperreflexia on admission, 71.3 with normal reflex, while before discharge 18.7% of women had hyperreflexia and 81.2% with normal reflex. there was no statistically significant difference between admission and before discharge related to deep tendon reflex.

Moreover, 93.7% of women had protein in urine on admission48.8% of them had protein in urine before discharge. There was a statistically significant difference between admission and before discharge. Related to protein in urine.

Table 4-e: Difference between on Admission and before Discharge Regarding Physical Assessment among the Studied Sample (N=80)

Items	On admission = 0		Before discharge = 1		p-value
	No.	%	No.	%	
Medications					
MgSO4	80	100.0	0	0	0001*
labetalol	60	75	60	75	-

N* Numbers are Mutually Exclusive.

Table 4f showed that, on admission 100% of women receiving Mgso4 Iv for treatment of preeclampsia, and 75% of them receiving labetalol IV with Mgso4, while before discharge no one of them taken Mgso4 but75% of them on labetalol but converted to tablet. There was statistically significant difference between them.

Table 4-f: Difference between on Admission and before Discharge Regarding Physical Assessment (lab investigation) among the Studied Sample (N=80)

Items	On admission = 0		Before discharge = 1		t	p-value
	Mean	SD	Mean	SD		
AST	13.75	7.60	12.73	10.06	16.17	0.322
ALT	22.13	14.40	18.80	5.64	13.74	0.001*
HP	11.14	1.28	11.32	1.26	77.5	0.777
HTC	33.04	3.68	33.52	3.86	80.3	0.988

N* Numbers are Mutually Exclusive

Table 4f represented that, difference between on-admission and before-discharge regarding lab investigation among the sample group, with no statistically significant difference, the mean AST on admission was 13.75 ± 7.60 , and before discharge 12.73 ± 10.06 , t-test revealed (t-test = 16.17, p-value = 0.322).while the ALT on admission 22.13 ± 14.40 , and before discharge was 18.80 ± 5.65 , with a statistically significant difference between both, t- test revealed that (t-test = 13.74, p-value = 0.001).

Regarding to hemoglobin the mean on admission was 11.14 ± 1.28 , and before discharge was 11.32 ± 1.26 , with no statistically significant difference between both (t-test 77.5, p-value=0.777). While for hematocrit, the mean on admission was 33.04 ± 3.68 , and before discharge was 33.52 ± 3.86 . There was no statistically significant difference between both, t-test revealed that (t-test 80.3, p-value 0.988).

Home Visit Assessment.

Table 5: Difference between before Discharge and 1at Home Visit Regarding Systolic and Diastolic Blood Pressure and Pulse

Items	Before discharge = 1		1 st home visit = 2		p-value
	Mean	SD	Mean	SD	
Systolic BP	143.50	10.3	141.11	9.82	0.127
Diastolic Bp	83.96	6.37	84.55	7. 11	1.000
Plus	80.91	11.49	81.89	11.71	1.000

Table (5) revealed that there were statistically significant differences the first visit and before discharge regarding vital signs, the mean of Systolic BP for before discharge was 143.50 ± 10.3 , first home visit was 141.11 ± 9.82 , and student t- test revealed no statistical significance difference between both (t- test 2.957, p value= 01.27). while the mean of Diastolic Bp for before discharge was 83.96 ± 6.37 , first home visit was 83.96 ± 6.370 and student t- test revealed no statistical significance difference between both (t- test 0.362, p value= 1.000).

Furthermore, the mean plus was 80.91 ± 11.49 & 81.89 ± 11.71 among the study sample during before discharge, and first home visit, the student t-test revealed no statistical significance difference between both (t- test -1082, p value= 1.000).

Table 5-a: Difference between on Admission and before Discharge Regarding Physical Assessment among the Studied Sample (N=80)

Items	Before discharge = 1		1 st home visit = 2		p-value
	No	%	No	%	
Blurred vision	17	21.3	37	46.3	0.001*
Headache	31	38.8	50	62.5	0.003*

N* Number are Mutually Exclusive

Table 5.a represented that, the difference between before discharge and first home visit regarding physical assessment among the study sample, 21.3% before discharge, while 46.3% in the 1st home visit, there was a statistically significant difference between admission and before discharge ($X^2=43.24$ p- value .001), and 38.8% of women had headaches before discharge, while 62.5% of women had a headache on the 1st home visit. There was a statistically significant difference between before discharge and 1st home visit ($X^2=16.29$ p-value .003).

Table 5-d: Difference between before Discharge and First Home Visit for Physical Assessment (edema level) among the Studied Sample (N=80)

Items	Before discharge = 1		1 st home visit = 2		p-value
	No.	%	No.	%	
Edema level					
0	3	3.8	13	16.3	<0.001*
1+	53	66.2	67	83.8	
2+	24	30.0	0	0.0	
3+	0	0.0	0	0.0	
Deep tendon reflex					
Hyperreflexia	15	18.75	0	0	<0.001*
Normal	65	81.25	80	100	
Protein in urine					
No	41	51.2	72	90	<0.001*
Yes	39	48.8	8	10	

Table 5-d showing that, the edema level during physical assessment, was 66%, 30%&0% of women had edema before discharge with 1+, 2+ &3+ respectively, while during the first home visit edema level for 1+,2+, and 3+ was 83.8%,0%, and 0% respectively, there was highly statistically significant difference between before discharge and during first home visit.

For deep tendon, reflex 18.75% had hyperreflexia before discharge, 81.25% with normal reflex, while during the first home visit 0% of women had hyperreflexia and 100% with normal reflex. There was a statistically significant difference between before discharge and first home visit related to deep tendon reflex.

Furthermore, 48.8% of women had protein in urine before discharge and 10 % of them had protein in urine during first home visit. There was a statistically significant difference between before discharge and in the first home visit.

Table 6: Difference between 1st and 2nd Home Visit Regarding Systolic and Diastolic Blood Pressure and Pulse

Items	1 st home visit = 2		2 nd home visit = 3		p-value
	Mean	SD	Mean	SD	
Systolic BP	141.11	9.82	143.88	10.61	0.187
Diastolic Bp	84.55	7.11	84.65	7.01	1.000
Plus	81.89	11.71	80.91	11.49	1.000

Table (4b) revealed that, there were statistically significant differences the first visit and second home visit regarding vital signs, the mean of Systolic BP for first visit was 141.11 ± 9.82 , second home visit was 143.88 ± 10.61 , and student t- test revealed no statistical significance difference between both (t- test 2.957, p value= 0.187). while the mean of Diastolic Bp for first home visit was 84.55 ± 7.11 , second home visit was 84.65 ± 6.370 and student t- test revealed no statistical significance difference between both (t- test 0.362, p value= 1.000)

Moreover, the mean plus was 81.89 ± 11.71 & 80.91 ± 11.49 among the study sample during first home visit and before discharge, the student t-test revealed no statistical significance difference between both (t- test -1082, p value= 1.000).

Table 6-a: Difference between 1st and 2nd Home Visit Regarding Physical Assessment among the Studied Sample (N=80)

Items	1 st home visit = 2		2 nd home visit = 3		p-value
	No	%	No	%	
Blurred vision	37	46.3	31	38.8	0.461
Headache	50	62.5	38	47.5	0.067

Table 6-a revealed that,46.3% of women on the 1st home visit have blurred vision, while on the 2nd home visit 38.8% of them have blurred vision, there is no statistical significant difference between them (P-value 0.461), and 62.5% of women have headache during the 1st home visit ,while 47.5% of them had headache on the 2nd home visit . There was no statistically significant difference between them (P-value0.067).

Table 6-d: Difference between On-Admission and before Discharge Regarding Physical Assessment among the Studied Sample (N=80)

Items	1 st home visit = 2		2 nd home visit = 3		p-value
	No.	%	No.	%	
Edema level					
1+	67	83.8	22	27.5	<0.001*
2+	0	0.0	0	0.0	
3+	0	0.0	0	0.0	
Deep tendon reflex					
Hyperreflexia	0	0	0	0	0.250
Normal	80	100	80	100	
Protein in urine					
No	72	90	70	87.5	<0.001*
Yes	8	10	10	12.5	

Table 6-d showing that, the edema level during physical assessment, was during the first home visit edema level for 1+,2+, and 3+ was 83.8%,0%, and 0% respectively, while in the 2nd home visit edema level for 1+ was 27.5% There was highly statistically significant difference between before discharge and during first home visit.

For deep tendon during the first and second home visit 0% of women had hyperreflexia and 100% with normal reflex, there was no statistically significant difference between both of them. Furthermore, 10 % of them had protein in urine during first home visit, while in the 2nd visit was 12.5% of them had protein in urine. There was a statistically significant difference between 1st and 2nd home visit.

Table 6-f: Difference between 1st a& 2nd Home Visit Regarding Lifestyle among the Studied Sample (N=80)

Items	1 st home visit = 2		2 nd home visit = 3		p-value
	No.	%	No.	%	
Type of diet					
Normal (healthy)	49	61.3	62	77.5	0.037*
Poor	31	38.7	18	22.5	
Physical activity					
Normal	43	53.8	80	100.0	<0.001*
With assistant	37	46.2	0	0.0	
Adequate Sleep pattern					
No	42	52.5	18	22.5	<0.001*
Yes	38	47.5	62	77.5	
Breastfeeding					
No	29	36.3	17	21.3	0.001*
Yes	51	63.8	63	78.8	
Bottle-feeding					
No	42	52.5	60	75.0	0.006*
Yes	38	47.5	20	25	
Revisit hospital					
No	70	87.5	74	92.5	1.000
Yes	10	12.5	6	7.5	
Length of stay incase admission					
No	77	96.3	76	95.0	
Within 24 hours	0	0.0	4	5.	
2days	1	1.3	0	0.0	
3days	2	2.5	0	0.0	

N* Numbers are Mutually Exclusive

Table 6-f revealed that, Type of diet in the 1st home visit was 61.3% of women had normal diet with low salt while 38.7% eating poor diet as not healthy food. In the 2nd home visit 77.55% had normal healthy diet and 22.5% of them had poor diet. There was no statistically significant difference between them.

Moreover, physical activity in the 1st visit was 53.8% of women had normal activity while 46.2% of them work with assistant. During the 2nd home visit 100% of them doing normal activity. There was a statistically significant difference between them.

Regarding sleep pattern, 47.5% of women had adequate sleep hours in the 1st visit, 2nd visit was 77.5% of them had adequate sleep pattern. There was a statistically significant difference between them.

Breast feeding m, mostly of women especially the primipara using breast and bottle feeding after delivery. In the 1st home visit 63.85% of women giving breast feeding while, in the 2nd visit was 78.8%. And for bottle feeding was 47.5% using with breast feeding in the 1st home visit, then was 25% of them using bottle feeding. There was a statistically significant difference between them.

Regarding the women who revisit the hospital for checkup, in the 1st home visit 12.5% of them visit the hospital, while 7.5% during the 2nd home visit had visited the hospital for checkup. For the women who visit the hospital 1.3% of them stay for 2 days and 2.5% stay for 3 days. While during 2nd home visit 5% of them stay only 24 hours for observations.

Table 7: Difference between 2nd Visit and 3rd Home Visit Regarding Systolic and Diastolic Blood Pressure and Pulse

Items	2 nd home visit = 3		3 rd home visit = 4		p-value
	Mean	SD	Mean	SD	
Systolic BP	143.88	10.61	137.16	9.60	<0.001*
Diastolic Bp	84.65	7.01	83.00	6.07	0.123
Plus	80.91	11.49	82.39	11.65	1.000

Table (7) showed that, there were statistically significant differences the second visit and third home visit regarding vital signs, the mean of Systolic BP for second home visit was 143.88 ± 10.61 , third home visit was 137.16 ± 9.60 , and student t- test revealed statistical significance difference between both (t- test 2.957, p value= 0.001). while the mean of Diastolic Bp for second home visit was 84.65 ± 7.01 , third home visit was 83.00 ± 6.07 and student t- test revealed no statistical significance difference between both (t- test 0.362, p value= 0.123). Furthermore, the mean plus was 80.91 ± 11.49 & 82.39 ± 11.65 among the study sample during first home visit and before discharge, the student t-test revealed no statistical significance difference between both (t- test -1.082, p value= 1.000).

Table 7-a: Difference between on Admission and Before Discharge Regarding Physical Assessment among the Studied Sample (N=80)

Items	2 nd home visit = 3		3 rd home visit = 4		p-value
	No	%	No	%	
Blurred vision	31	38.8	2	2.5	<0.001*
Headache	38	47.5	2	2.5	<0.001*

Table 7-c showed that, 38.8% of women on the 2nd home visit have blurred vision, while on 3rd home visit 2.5% of them have blurred vision, there is statistical significant difference between them (P-value 0.001), and 47.5% of them had headache on the 2nd

home visit, while 2.5% of women have headache during the 3rd home visit, there was statistical significant difference between them (P-value0.001*).

Table 7-d: Difference between 2nd Home Visit and 3rd home Visit Regarding Physical Assessment (edema level) among the Studied Sample (n=80)

Items	2 nd home visit = 3		3 rd home visit = 4		p-value
	No.	%	No.	%	
Edema level					
1+	22	27.5	6	7.5	0.001*
2+	0	0.0	0	0.0	
3+	0	0.0	0	0.0	
Deep tendon reflex					
hyperreflexia	0	0	0	0	1.000
Normal reflex	80	100	80	100	
Protein in urine					
No	70	87.5	79	98.8	<0.001*
Yes	10	12.5	1	1.2	

Table 7-d showing that, the edema level during physical assessment, was 27.5%, 0%&0% of women had edema in the 2nd home visit with 1+, 2+ &3+ respectively, while during the third home visit edema level for 1+, 2+, and 3+ was 7.5 %,0%, and 0% respectively, there was highly statistically significant difference between both of them regarding edema level. For deep tendon, reflex 0% had hyperreflexia and 100% with normal reflex, during 2nd and 3rd home visit. There was no statistically significant difference between second and third home visit.

Table 7-f: Difference between 2nd Home Visit and 3rd Home Visit Regarding Physical Assessment among the Studied Sample (n=80)

Items	2 nd home visit = 3		3 rd home visit = 4		p-value
	No.	%	No.	%	
Type of diet					
Normal	62	77.5	80	100.0	<0.001*
Poor	18	22.5	0	0.0	
Physical activity					
Normal	80	100.0	80	100.0	-
With assistant	0	0.0	0	0.0	
Adequate Sleep pattern					
No	18	22.5	3	3.8	<0.001*
Yes	62	77.5	77	96.3	
Breast feeding					
No	17	21.3	17	21.3	1.000
Yes	63	78.8	63	78.8	
Bottle feeding					
No	52	65.0	55	68.8	0.250
Yes	28	35.0	25	31.3	
Revisit hospital					
No	74	92.5	78	97.5	0.289
Yes	6	7.5	2	2.5	

Length of stay in case admission					
No	74	92.5	78	97.5	
Within 24 hours	4	5.0	0	0.0	
2days	2	2.5	1	1.3	
3days	0	0.0	1	1.3	

Table (7-f) revealed that, Type of diet in the 2nd home visit was 77.5% of women had normal diet with low salt while 22.5% eating poor diet as not healthy food. In the 3rd home visit 100.0% had normal healthy diet and 0% of them had poor diet. There was a statistically significant difference between them p value (<0.001*).

Moreover, physical activity in the 2nd and 3rd home visit was 100% of women had normal activity. While sleep pattern, 77.5% of women had adequate sleep hours in the 2nd home visit, 3rd home visit was 96.3% of them had adequate sleep pattern. There was no statistically significant difference between them p value (1.000). regarding to breast feeding, mostly of women especially the primipara have breast feeding 78.8% after delivery in the 2nd home visit, and 35.0% of women giving bottle feeding, while in the 3rd home visit was 78.8% for breast feeding, and for bottle feeding was 31.3% using bottle feeding. There was a statistically significant difference between them.

Regarding the women who revisit the hospital for checkup, in the 2nd home visit 5.0% of them visit the hospital and stay for 24 hours, while 2.5% had visit to the hospital for checkup and stay for 2days. During 3rd home visit for the women who visit the hospital 1.3% of them stay for 2 days and 0% stay for 3 days.

Table 8: Difference between 3rd Visit and 4th Home Visit Regarding Systolic and Diastolic Blood Pressure and Pulse

Items	3 rd home visit = 4		4 th home visit = 5		p-value
	Mean	SD	Mean	SD	
Systolic BP	137.16	9.60	130.36	8.87	<0.001*
Diastolic Bp	83.00	6.07	80.88	4.97	0.002*
Plus	82.39	11.65	80.69	11.86	0.753

Table (8) represented that there were statistically significant differences the third visit and fourth home visit regarding vital signs, the mean of Systolic BP for third visit was 137 ± 9.60, fourth home visit was 130.36 ± 8.87, and student t- test revealed highly statistical significance difference between both (t- test 2.957, p value= 0.001*). while the mean of Diastolic Bp for third home visit was 83.00 ± 6.07, fourth visit was 80.88 ± 4.97 and student t- test revealed statistical significance difference between both (t- test 0.362, p value= 0.002*).

The mean plus was 82.39 ± 11.65 & 80.69 ± 11.86 among the study sample during third and fourth home visit, there is was no statistical significance difference between both (t- test -1082, p value= 0.753).

Table 8-a: Difference between 3rd Home Visit 4th Home Visit and Regarding Physical Assessment among the Studied Sample (N=80)

Items	3 rd home visit = 4		4 th home visit = 5		p-value
	No	%	No	%	
Blurred vision	2	2.5	0	0.0	0.500
Headache	2	2.5	0	0.0	0.500

Table 8-a showed that, 2.5% of women on the 3rd home visit have blurred vision, while on 4th home visit 0 the of them have blurred vision, there is no statistical significant difference between them (P-value 0.500), and 2.5% of them had headache on the 3rd home visit, while during the 4th home visit no one have headache, there was no statistical significant difference between them (P-value 0.500). Regarding the uterine assessment 100% on the 3rd home visit and 4th home visit of women had contracted uterus as normal. The abdominal assessment on the 3rd home visit and 4th home visit had normal abdomen without any complications or problem, while 100% of them during 3rd and 4th home visit had Alba.

Table 8-d: Difference between on Admission and Before Discharge Regarding Physical Assessment among the Studied Sample (N=80)

Items	3 rd home visit = 4		4 th home visit = 5		p-value
	No.	%	No.	%	
Edema level					
0	74	92.5	75	93.8	1.000
1+	6	7.5	5	6.3	
2+	0	0.0	0	0.0	
3+	0	0.0	0	0.0	
Deep tendon reflex					
Normal reflex	77	96.3	80	100.0	0.250
Hyperreflexia	3	3.7	0	0.0	
Protein in urine					
No	79	98.8	65	81.2	<0.001*
Yes	1	1.2	15	18.8	
Pass urine spontaneously					
No	0	0.0	0	0.0	
Yes	80	100.0	80	100.0	

Table 8-d showing that, the edema level during physical assessment, was 92.5%, 7.5%, 0% & 0% of women had edema in the 3rd home visit with 0, 1+, 2+ & 3+ respectively, while during 4th home visit edema level for 0, 1+, 2+, and 3+ was 93.8%, 6.3%, 0%, and 0% respectively, there was no statistically significant difference between 3rd home visit and 4th home visit.

For deep tendon, reflex 3.7% had hyperreflexia during 3rd home visit, 96.3% with normal reflex, while during the 4th home visit 0% of women had hyperreflexia and 100% with normal reflex. There was no statistically significant difference between 3rd and 4th home visit related to deep tendon reflex.

Table 9: Difference between 1st Home Visit and 4th Home Visit Regarding Systolic and Diastolic Blood Pressure and Pulse

Items	1 st home visit = 2		4 th home visit = 5		p-value
	Mean	SD	Mean	SD	
Systolic BP	141.11	9.82	130.36	8.87	<0.001*
Diastolic Bp	84.55	7.11	80.88	4.97	<0.001*
Plus	81.89	11.71	80.69	11.86	0.317

Table (9) revealed that there were statistically significant differences the first visit and fourth home visit regarding vital signs, the mean of Systolic BP for first visit was 141.11 ± 9.82 , fourth home visit 130.36 ± 8.87 , and student t- test revealed highly statistical significance difference between both (t- test 2.957, p value= 0.001*). while the mean of Diastolic Bp for first home visit was 84.55 ± 7.11 , fourth home visit was 80.88 ± 4.97 and student t- test revealed highly statistical significance difference between both (t- test 0.362, p value= 0.001*).

Regarding the mean plus was 81.89 ± 11.71 & 80.69 ± 11.86 among the study sample during first and fourth home visit, the student t-test revealed no statistical significance difference ($X^2=0.835$ P-value 0.225).

Table 9-a: Difference between on Admission and before Discharge Regarding Physical Assessment among the Studied Sample (N=80)

	1 st home visit = 2		4 th home visit = 5		p-value
	No	%	No	%	
Blurred vision	37	46.3	0	0.0	<0.001*
Headache	50	62.5	0	0.0	<0.001*

Table (9-a) revealed that, 46.3% & 62.5% of women on the 1st home visit had blurred vision, and headache respectively, while on 4th home visit 0% the of them have blurred vision and headache, there is statistically significant difference between them (P-value 0.001*).

Table 9-b: Difference between 1st Home Visit and 4th Home Visit Regarding Physical Assessment among the Studied Sample (N=80)

Items	1 st home visit = 2		4 th home visit = 5		p-value
	No.	%	No.	%	
Edema level					
0	13	16.3	75	93.8	<0.001*
1+	67	83.8	5	6.3	
2+	0	0.0	0	0.0	
3+	0	0.0	0	0.0	
Deep tendon reflex					
Normal	80	100.0	80	100.0	-
Hyperreflexia	0	0.0	0	0.0	
Protein in urine					
No	4	5.0	65	81.2	<0.001*
Yes	76	95.0	15	18.8	

Table (9-b) showing that, the edema level during physical assessment, was 16.3%, 83.8%, 30% & 0% of women had edema during 1st home visit for 0, 1+, 2+ & 3+ respectively, while during the 4th home visit edema level for 0, 1+, 2+, and 3+ was 93.8, 6.3%, 0%, and 0 respectively, there was highly statistically significant difference between both of them. For deep tendon, reflex 100% of women had normal reflex during first and 4th home visit, there was no statistically significant difference between both of them.

Regarding to protein in urine there was statistically significant difference between 1st and 4th home visits. As 76% of women had protein in urine in the first home visit, while 18.8% of them during 4th home visit had protein in urine.

Table 9-e: Difference between 1st Home Visit and 4th Home Visit Regarding Physical Assessment among the Studied Sample (N=80)

Items	1 st home visit =2		4 th home visit = 5		p-value
	No.	%	No.	%	
Type of diet					
Normal	49	61.3	80	100.0	<0.001*
Poor	31	38.7	0	0.0	
Physical activity					
Normal	43	53.8	80	100.0	<0.001*
With assistant	37	47.2	0	0.0	
Adequate Sleep pattern					
No	42	52.5	3	3.8	<0.001*
Yes	38	47.5	77	96.3	
Breastfeeding					
No	29	36.3	17	21.3	1.000
Yes	51	63.8	63	78.8	
Bottle feeding with breast F.					
No	42	52.5	55	68.8	0.250
Yes	38	47.5	25	31.3	
Revisit hospital					
No	75	93.8	80	100.0	0.025*
Yes	5	6.3	0	0.0	
Length of stay incase admission					
No	77	96.3	80	100.0	
Within 24 hours	0	0.0	0	0.0	
2days	1	1.3	0	0.0	
3days	2	2.5	0	0.0	

Table 9-e revealed that, Type of diet in the 1st home visit was 61.3% of women had normal diet with low salt while 38.7% eating poor diet as not healthy food. In the 4th home visit 100% had normal healthy diet. There was a statistically significant difference between them.

Moreover, physical activity in the 1st visit was 53.8% of women had normal activity while 47.2% of them work with assistant. During the 4th home visit 100% of them doing normal activity. There was a statistically significant difference between them.

Regarding sleep pattern, 47.5% of women had adequate sleep hours in the 1st visit, while 4th visit was 96.3% of them had adequate sleep pattern. There was a statistically significant difference between them.

Breastfeeding: most women, especially those in their primiparas, use their breasts while nursing their newborns. Sixty-eight percent of women breastfed during the first home visit; this percentage increased to 78.8% by the fourth visit. Of the women who used bottles, forty-seven percent did so during the first visit and thirty-three percent did so during the fourth. Between them, there was no statistically significant difference.

On the other hand, of the women who return to the hospital for a check-up, 6.3% visited the hospital during their first home visit, whereas 0% visited the hospital during their fourth home visit. 1.3% and 2.5%, respectively, of the women who come to the hospital stay for two and three days. On the fourth home visit, none of them are admitted to the hospital. Between them, there was no statistically significant difference.

Table 9-f: Difference between before Discharge and 4th Home Visit Regarding Physical Assessment among the Studied Sample (N=80)

Items	Before discharge = 1		4 th home visit = 5		p-value
	Mean	SD	Mean	SD	
Lab investigation					
AST	12.73	10.06	10.25	3.35	0.105
ALT	18.80	5.64	15.90	4.09	<0.001*
HP	11.32	1.26	11.67	0.96	0.046*
HTC	33.52	3.86	34.89	2.72	0.014*

Table 9-f represented that, difference between before-discharge and 4th home visit regarding lab investigation among the sample study, with no statistically significant difference, the mean of AST before discharge was 12.73 ± 10.06 and 4th home visit was 10.25 ± 3.35 , t-test revealed (t-test = 16.17, p-value = 0.105).while the ALT before discharge was 18.80 ± 5.65 , while during the 4th visit the mean was 15.90 ± 4.09 , with a statistically significant difference between both, t- test revealed that (t-test = 13.74, p-value = <0.001*).

Regarding to hemoglobin the mean before discharge was 11.32 ± 1.26 , and during 4th home visit the mean was 11.67 ± 0.96 , with no statistically significant difference between both (t-test 77.5, p-value=0.046). For hematocrit, the mean before discharge was 33.52 ± 3.86 and the 4th home visit there was no statistically significant between both, t-test revealed that (t-test 80.3, p-value 0.014).

Table 10: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (Uncontrolled Blood Pressure)

(Uncontrolled blood pressure) On admission = 0	B	SE	P value	OR	95% CI	
					LL	UL
Age	0.762	0.391	0.051*	2.144	0.997	4.610
Systolic BP	-0.007	0.017	0.685	0.993	0.961	1.027
Diastolic Bp	0.043	0.032	0.019*	1.044	0.981	1.111
Plus	0.042	0.033	0.210	1.043	0.977	1.113
(Uncontrolled blood pressure) On admission = 0	B	SE	P value	OR	95% CI	
Blurred vision	1.291	1.097	0.002*	3.638	0.423	31.256
Headache	1.808	0.989	0.016*	6.096	0.878	42.314
Edema level (3+)	0.057	0.412	0.890	0.945	0.421	2.119
Protein in urine	0.325	0.254	0.012*	2.365	0.235	3.296
Deep tendon reflex (hyperreflexia)	-0.083	0.710	0.907	0.920	0.229	3.703
(Uncontrolled blood pressure) On admission = 0	B	SE	P value	OR	95% CI	
AST	0.011	0.066	0.013*	0.989	0.868	1.126
ALT	-0.009	0.035	0.002*	0.991	0.925	1.062
HP	0.001	0.817	0.999	1.001	0.202	4.964
HTC	-0.347	0.343	0.312	0.707	0.361	1.386
PLT	0.002	0.006	0.001*	0.998	0.987	1.009

B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Among risk factors that can develop postpartum complications on admission, table (1) represented that, (B 0.762, 95% CI 0.997-4.610) for age that mean with increasing the women age it will increase the risk for uncontrolled blood pressure for the study sample as P-value (0.051) was in the border line for affected the complications. (B. -0.007, 95%CI 0.961-1.027), (B. 0.43, 95% CI 0.981-1.111) for systolic and diastolic BP respectively, this mean the UN controlled systolic BP and diastolic can effect on postpartum complications as p value was (0.019) for diastolic BP.

In relation to the relative signs and symptoms among preeclampsia complications occurred during postpartum there was statistically significant difference between signs and symptoms and uncontrolled blood pressure on admission. (B 0.1.291, 95% CI 0.423-31.256) for blurred vision, and, (B 1.808, 95% CI 0.878-42.314) for headache, and. (B 0.325, 95% CI 0.253- 3.296) for protein in urine, which means with present of signs and symptoms will increase risk for postpartum complications as P value was (0.002, 0.016 &

0.012). Regarding to Edema level was (B -0.057, 95% CI 0.421-2.119), and for Deep tendon Reflex was (B-0.083, 95% CI 0.229-3.703), this means decrease the edema level and deep tendon reflex it will not affect the complications.

Moreover, regarding to lab investigation was (B-0.011, 95% CI 0.868-1.126), (B-0.009 95% CI 0.925-1.062), (B 0.001, 95% CI 0.202-4.964), (B-0.347, 95% CI 0.361-1.386), and (B-0.002, 95% CI 0.987-1.009), there was statistical significant difference for lab investigation that mean the lab result will increase the risk of postpartum preeclampsia complications among study sample.

Table 11: Multivariate Analysis Bainary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (Uncontrolled Blood Pressure)

(Uncontrolled blood pressure) 1 st home visit = 2	B	SE	P value	OR	95% CI	
					LL	UL
Age	0.698	0.392	0.075	2.009	0.932	4.333
Systolic BP	0.121	0.058	0.036*	1.128	1.008	1.263
Diastolic Bp	0.163	0.081	0.043*	0.850	0.725	0.995
Plus	0.043	0.033	0.200	1.044	0.978	1.114
Blurred vision	-0.051	0.961	0.958	0.950	0.145	6.246
Headache	-1.778	1.046	0.089	0.169	0.022	1.312
Edema level	-0.786	1.186	0.507	0.456	0.045	4.657
Protein in urine (Yes)	-3.519	1.972	0.002*	0.030	0.001	1.413
Deep tendon reflex (hyperreflexia)	0.233	0.369	0.659	0.320	1.236	3.692
Type of diet (Poor)	-0.780	1.009	0.440	0.458	0.063	3.312
Readmission	1.326	0.365	0.235	1.269	1.536	0.236
Length of stay incase admission (yes)	1.216	3.479	0.727	3.374	0.004	3.087

B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Table (11) showed that, during the 1st home visit the vital signs was (B 0.121, 95% CI 1.008-1.263), for systolic BP, (B 0.163, 95% CI 0.725-0.995) for diastolic BP, (B 0.043 95% CI 0.978-1.114) for Pulse, and (B-3.519, 95% CI 0.001-1.413) for protein in urine, there was statistical significant difference for vital signs and uncontrolled blood pressure, that is mean with increasing the systolic and diastolic during 1st home visit the study sample will increase the risk of postpartum preeclampsia complications.

Regarding to signs and symptoms on the first home visit was (B -0.051, 95% CI 0.145-6.246) for blurred vision, (B -1.778, 95% CI 0.022- 1.312) for headache, (B- 0.786, 95% CI 0.045-4.657) for edema level and (B-0.780,95% CI 0.63-3.312) for Type of diet , which mean that in favor for the study sample with implemented the guideline during follow up

of care leading to decreased the risk decreased the postpartum complications. Also, this will reflect reduce the readmission rate to hospital for uncontrolled blood pressure.

Table 12: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (Uncontrolled Blood Pressure)

(Uncontrolled blood pressure) 4 th home visit = 5	B	SE	P value	OR	95% CI	
					LL	UL
Age	0.362	0.324	0.264	1.436	0.761	2.709
Systolic BP	0.000	0.032	0.998	1.000	0.939	1.065
Diastolic Bp	-0.087	0.070	0.217	0.917	0.799	1.052
Plus	0.016	0.026	0.545	1.016	0.965	1.069
Edema level	0.323	1.262	0.798	1.381	0.116	16.395
Protein in urine (Yes)	-1.440	1.024	0.160	0.237	0.032	1.762
AST	0.113	0.128	0.379	1.119	0.871	1.439
ALT	-0.137	0.117	0.245	0.872	0.693	1.098
HP	-0.493	0.651	0.449	0.611	0.170	2.189
HTC	0.149	0.222	0.501	1.161	0.752	1.792
PLT	-0.005	0.007	0.439	0.995	0.981	1.008

B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Table (12) revealed that there was no statistically significant difference between them at the fourth home visit assessment for age was (B 0.362, 95% CI 0.761- 2.709), for systolic (B 0.00, 95% CI 0.939-1.065), (B -0.087 95% CI 0.799-1.052) for diastolic, while for Plus was (B 0.016 95% CI 0.965-1.069). In addition, during the fourth home visit, the following lab investigations and signs and symptoms were recorded(B 0.323 95% CI 0.116-16.395) for edema level, (B-1.440 95% CI 0.032-1.762) for protein level in urine, (B 0.113 95% CI 0.871-1.439) for AST, (B -0.137 95% CI 0.693 -1.098) and for PLT (B -0.005 95% CI 0.981-1.008), which is mean with applied the clinical guidelines during the home visit there was a reduce postpartum preeclampsia complications.

ECLAMPSIA

Table 13: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (ECLAMPSIA)

(ECLAMPSIA) On admission = 0	B	SE	P value	OR	95% CI	
					LL	UL
Age	-0.920	0.604	0.128	0.399	0.122	1.302
Systolic BP	0.004	0.025	0.008*	1.004	0.956	1.055
Diastolic Bp	0.056	0.039	0.011*	1.058	0.981	1.141

Plus	-0.026	0.037	0.476	0.974	0.906	1.047
Blurred vision	-1.504	1.032	0.145	0.222	0.029	1.679
Headache	-0.194	1.055	0.016*	0.824	0.104	6.519
Edema level (3+)	-0.880	0.610	0.149	0.415	0.126	1.371
Deep tendon reflex (Absent)	1.023	1.015	0.313	2.782	0.381	20.317
AST	0.239	0.086	0.006*	1.270	1.073	1.504
ALT	-0.099	0.038	0.009*	0.905	0.840	0.976
HP	-0.137	0.733	0.851	0.872	0.207	3.669
HTC	0.134	0.217	0.538	1.143	0.747	1.749
PLT	0.005	0.007	0.508	1.005	0.991	1.018

B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

According to Table (13), the following values were obtained during the examination of factors that may affect postpartum depression associated to preeclampsia (B -0.920 95% CI 0.122-1.302) for age , (B 0.004, 95% CI 0.956- 1.055) for systolic BP , (B 0.056, 95% CI 0.981-1.141) for diastolic BP. there was statistical significant difference between vital signs and eclampsia which is mean with uncontrolled blood pressure it can affect postpartum complications for eclampsia.

Moreover, signs and symptoms was (B -1.504 95% CI 0.029-1.679) for blurred vision, (B-0.194, 95% CI 0.104-6.519) for headache, and for edema level was (B -0.880 95% CI 0.126-1.371). There was statistically significant difference between both of them. For lab investigations there was statistically significant difference for ASL, ALT and develop eclampsia with P Value (0.0006* & 0.009*) respectively.

Table 14: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (ECLAMPSIA)

(ECLAMPSIA) 1 st home visit = 2	B	SE	P value	OR	95% CI	
					LL	UL
Age	-0.935	0.599	0.119	0.393	0.121	1.271
Systolic BP	-0.022	0.089	0.810	0.979	0.821	1.166
Diastolic Bp	-0.046	0.119	0.697	0.955	0.756	1.206
Plus	0.111	0.057	0.053	1.118	0.999	1.251
Blurred vision	1.486	1.346	0.001*	4.421	0.316	61.814
Headache	-0.642	1.387	0.011*	0.526	0.035	7.970
Edema level (3+)	1.428	1.570	0.363	4.172	0.192	90.460
Protein in urine (Yes)	-1.605	3.337	0.631	0.201	0.000	139.06
Type of diet (Poor)	0.807	1.480	0.586	2.242	0.123	40.802
Adequate Sleep pattern (Yes)	3.187	1.266	0.012*	24.214	2.024	289.67

Revisit hospital (Yes)	-1.914	2.768	0.489	0.147	0.001	33.506
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B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Table (14) represented that the risk factor that can affect the postpartum complication for eclampsia during 1st home visit was (B -0.935, 95% CI 0.121-1.271) for age, (B -0.022, 95% CI 0.821-1.166) for systolic BP, (B -0.046, 95% 0.756-1.206) for diastolic |BP. And for Plus was (B 0.111, 95% CI 0.999-1.251), which is mean with controlled vital signs it will reduce the postpartum complications for eclampsia.

In relation to signs and symptoms, there was statistically significant difference between them and develop eclampsia during postpartum, (B 1.486, 95% CI 0.316 – 61.814) for blurred vision, (B -0.642, 95% 0.035-7.970) and headache, with (p value – 0.001* & 0.011*) respectively. Regarding to other signs there was no statistical significant between then and risk of developing postpartum complications, for edema level (B 1.0428, 95% CI 0.192-90.460), (B -1.605, 95% CI 0.000- 139.06) for protein level in urine, (B 0.807, 95% CI 0.123-40.802) for type of diet as explained for her, which mean with the follow up according to clinical guidelines implemented will not develop postpartum preeclampsia complications, but within adequate Sleep pattern and stress can be a risk of developing complication as eclampsia as there was significant difference between them.

Table 15: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (ECLAMPSIA)

(ECLAMPSIA) 4 th home visit = 5	B	SE	P value	OR	95% CI	
					LL	UL
Age	-0.227	0.607	0.708	0.797	0.243	2.618
Systolic BP	-0.185	0.068	0.007*	0.831	0.728	0.950
Diastolic Bp	0.086	0.096	0.373	1.089	0.902	1.315
Plus	0.006	0.041	0.887	1.006	0.927	1.091
Protein in urine (Yes)	0.973	1.622	0.549	2.645	0.110	63.481
AST	0.347	0.233	0.138	1.414	0.895	2.235
ALT	-0.384	0.246	0.120	0.681	0.420	1.104
HP	0.895	1.092	0.413	2.447	0.288	20.821
HTC	0.103	0.317	0.745	1.109	0.595	2.065
PLT	0.003	0.012	0.781	1.003	0.979	1.028

B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Table (15) revealed that during the 4th home visit assessment there was statistically significant difference between systolic BP and developing eclampsia during postpartum, for systolic (B -0.185, 95% CI 0.728-0.950), while for age was (B -0.227, 95% CI 0.243 – 2.618), and 0.086 95% CI 0.902-1.315) for diastolic, (B 0.016 95% CI 0.965-1.069) for pulse.

Moreover, for signs and symptoms and lab investigations during 4th home visit was (B 0.973, 95% CI 0.110-63.481) for protein level in urine, (B 0.347 95% CI 0.895-2.235) for AST, (B -0.384 95% CI 0.420-1.104) and for PLT (B 0.003, 95% CI 0.979-1.028), which is mean with applied the clinical guidelines during the home visit there was a reduce the risk of postpartum preeclampsia complications.

HELLP syndrome

Table 16: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (HELLP Syndrome)

(HELLP syndrome) On admission = 0	B	SE	P value	OR	95% CI	
					LL	UL
Age	0.238	0.350	0.497	1.269	0.639	2.521
Systolic BP	-0.029	0.022	0.183	0.971	0.930	1.014
Diastolic Bp	0.039	0.040	0.329	1.040	0.962	1.124
Plus	-0.082	0.044	0.062	0.921	0.845	1.004
Blurred vision	-0.740	0.969	0.445	0.477	0.071	3.184
Headache	2.059	1.170	0.078	7.835	0.792	77.552
Deep tendon reflex (hyperreflexia)	-0.052	0.735	0.944	0.949	0.225	4.010
AST	0.040	0.075	0.594	1.041	0.898	1.206
ALT	0.011	0.037	0.768	1.011	0.941	1.086
HP	0.738	0.713	0.301	2.092	0.517	8.470
HTC	-0.318	0.253	0.209	0.727	0.443	1.195
PLT	0.006	0.006	0.363	1.006	0.993	1.018

B: Unstandardized Coefficients

SE: Standard Error

OR: Odd's Ratio

LL: Lower limit

UL: Upper Limit

*: Statistically significant at $p \leq 0.05$

Table (16) showed that, there was no statistical significant difference between the vital signs and maternal complications related to HELLP syndrome, for systolic (B -0.029 95%

CI 0.930-1.014), and (B 0.039, 95% CI 0.962-1.124) for diastolic, (B -0.082, 95% CI 0.845-1.004) for pulse. While for age was (B 0.238, 95% CI 0.639 -2.521).

Related to risk factors for HELLP. Syndrome, for blurred vision was (B -0.740, 95% CL 0.071- 3.184), headache was (B 2.059, 0.792-77.552), and (B-0.052, 95% CL 0.225-4.010). Related to lab instigations also there was no statistically significant for it and risk factors, which is mean with control blood pressure and signs and symptoms there was reduce for HELLP syndrome during admission.

Table 17: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (HELLP Syndrome)

(HELLP syndrome) 1 st home visit = 2	B	SE	P value	OR	95% CI	
					LL	UL
Age	0.222	0.467	0.635	1.249	0.500	3.121
Systolic BP	-0.020	0.081	0.806	0.980	0.836	1.150
Diastolic Bp	0.002	0.119	0.989	1.002	0.793	1.265
Plus	0.071	0.049	0.144	1.074	0.976	1.181
Blurred vision	1.886	1.387	0.174	6.590	0.435	99.895
Headache	-2.254	1.375	0.101	0.105	0.007	1.556
Edema level (3+)	0.079	1.117	0.944	1.082	0.121	9.668
Type of diet (Poor)	3.029	1.682	0.072	20.678	0.765	559.18
Physical activity (With assistant)	-3.947	1.745	0.024*	0.019	0.001	0.590
Adequate Sleep pattern (Yes)	1.774	0.955	0.063	5.897	0.906	38.363
Revisit hospital (Yes)	-21.357	162.18	0.999	0.000	0.000	0.000

Table (17) represented that the risk factor that can affect the postpartum complication for HELLP syndrome during 1st home visit was (B 0.222, 95% CI 0.500-3.121) for age, (B -0.020, 95% CI 0.836-1.150) for systolic BP, (B 0.002, 95% 0.793-1.265) for diastolic |BP, and for Plus was (B 0.111, 95% CI 0.976-1.181) , which is mean with controlled vital signs it will reduce the postpartum complications for eclampsia.

In relation to signs and symptoms, there was no statistical significant difference between them and develop eclampsia during postpartum, (B 1.886, 95% CI 0.435– 99.895) for blurred vision, (B -2.254, 95% 0.007-1.556) and headache, (B 0.079, 95% CI 0.121 – 9.668) for edema level, (B 3.029, 95% CI 0.765- 55.918) for type of diet as explained for her, which mean with the follow up according to clinical guidelines implemented will not develop postpartum preeclampsia complications.

Table 18: Multivariate Analysis Binary Logistic Regression for Factor Affecting Maternal Complications Postpartum in the Unit (HELLP Syndrome)

(HELLP syndrome) 4 th home visit = 5	B	SE	P value	OR	95% CI	
					LL	UL
Age	0.704	0.420	0.094	2.021	0.887	4.608
Systolic BP	-0.080	0.049	0.102	0.923	0.839	1.016
Diastolic Bp	0.147	0.092	0.110	1.158	0.967	1.386
Plus	0.013	0.035	0.720	1.013	0.945	1.085
Protein in urine (Yes)	-0.717	1.422	0.614	0.488	0.030	7.928

AST	0.043	0.191	0.824	1.044	0.717	1.518
ALT	-0.306	0.169	0.070	0.736	0.529	1.025
HP	-0.063	1.019	0.951	0.939	0.127	6.921
HTC	0.155	0.360	0.666	1.168	0.576	2.366
PLT	-0.011	0.011	0.293	0.989	0.968	1.010

Table (18) revealed that during the 4th home visit assessment there was no statistically significant difference between vital signs and developing HELLP syndrome during postpartum, for systolic (B -0.080, 95% CI 0.839-1.016), while for age was (B 0.704, 95% CI 0.887 – 4.608), and (B 0.147, 95% CI 0.967-1.386) for diastolic, and (B 0.013, 95% CI 0.945-1.085) for pulse.

Moreover, for signs and symptoms and lab investigations during 4th home visit was (B -0.717, 95% CI 0.030-7.928) for protein level in urine, (B 0.043, 95% CI 0.717-1.518) for AST, (B -0.306 95% CI 0.529- 1.025) and for PLT (B -0.011, 95% CI 0.968-1.010), which is mean with applied the clinical guidelines during the home visit there was a reduce the risk of postpartum preeclampsia complications.

DISCUSSIONS

The aim of this study was the aim of the current study is to examine the effect of clinical guidelines-based follow up on developing of postpartum preeclampsia and its complications. To answer the research question, the discussion of the study findings is presented in the following frame of reference: Section I: Factors that might develop postpartum preeclampsia; Section II: complications of postpartum preeclampsia

Section I:

Factors that Might Develop Post-Partum Preeclampsia:

The result of the present study revealed that, age, parity, preeclampsia during pregnancy, uncontrolled blood pressure and eclampsia during pregnancy that affect maternal outcome and develop postpartum preeclampsia. These results are in harmony with the study done by Napoli et al. (2020) to assess the late postpartum preeclampsia and complications. They found that, analysis revealed that antenatal preeclampsia, gestational hypertension, preeclampsia in a prior pregnancy, body mass index (BMI) > 30, African American race and cesarean delivery were all predictive of late postpartum preeclampsia. Asian ethnicity was protective. Final analysis using logistic regression concluded that African American race, cesarean delivery, BMI and hypertensive disease during the incident pregnancy were all significant predictors of late postpartum disease.

CONCLUSION

According to evidences, preeclampsia is not just a transient health problem; rather it causes short term and long-term complications, which affect women's life for years after delivery. Although it seems the problem is solved by the end of pregnancy, the follow-up of subjects should not be stopped after delivery. The results of this study offer a rich

source of information for the required interventions to promote the health of women with preeclampsia history.

RECOMMENDATIONS

Based on the findings of this study, the following are recommended:

1. Designing an intervention program to promote the health of women with history of preeclampsia during postpartum period
2. Applying postpartum lifestyle interventions on women who have preeclampsia history as a strategy to prevent future cardiovascular disease and promote their health
3. Use of telemedicine or remote health care interventions to facilitate care in the postpartum.

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