

**EVALUATING THE RISK OF PRE-ECLAMPSIA IN PREGNANT WOMEN WITH HYPEREMESIS GRAVIDARUM IN THE SECOND TRIMESTER.**

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ABSTRACT

BACKGROUND: Hypertensive disorders of pregnancy, particularly pre-eclampsia, are a leading cause of maternal and neonatal mortality. Hyperemesis gravidarum HG in the second trimester has been linked to abnormal placentation, potentially increasing the risk of pre-eclampsia. **OBJECTIVE:** To determine the frequency of pre-eclampsia in patients diagnosed with hyperemesis gravidarum in the second trimester. **METHODS:** Using a descriptive cross-sectional research design, the study was conducted for six months at the Obstetrics and Gynecology Department of Lady Reading Hospital in Peshawar, Pakistan. During their second trimester, 100 pregnant women with hyperemesis gravidarum were enrolled. By assessing their demographic, medical, obstetric, and pre-eclampsia indicators, research data was gathered from pregnant women who were diagnosed with hyperemesis gravidarum in the second trimester. Analysis of the data was done using SPSS version 21. **RESULTS:** On average, each participant in this research was 27 years old standard deviation: 10.88. While 34% of research participants had already given birth twice, 66% had only experienced one pregnancy. Pregnancy duration for research participants was less than 12 weeks, with a standard variation of 5.94 weeks. In the second trimester, 47% of women who experienced hyperemesis gravidarum went on to develop pre-eclampsia. **CONCLUSION:** According to the study, pregnant women who have hyperemesis gravidarum during the second trimester are more likely to develop pre-eclampsia. These findings highlight the significance of regularly monitoring expectant mothers and initiating therapy for these individuals as soon as possible.

KEYWORDS: Pre-eclampsia, Hyperemesis Gravidarum, Pregnancy, Hypertension, Maternal Health.

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INTRODUCTION

Globally, pre-eclampsia and eclampsia are the main risk factors for disability and death among pregnant women and their unborn children¹. According to the World Health Organization, pre-eclampsia is a pregnancy complication in 2–8% of maternal cases and causes 10–15% of direct maternal fatalities globally WHO, 2023². At 20 weeks of pregnancy, gestational hypertension $\geq 140/90$ mmHg and proteinuria ≥ 0.3 g/24 h, which characterizes pre-eclampsia as a multi-system illness that becomes life-threatening when diagnosis and treatment are insufficient³. Pre-eclampsia remains a significant issue in locations with low healthcare resources despite advancements in contemporary prenatal care due to a combination of late medical evaluation, inadequate surveillance, and limited access to healthcare in developing nations^{4,5}. The Global Burden of Disease Study 2022 recorded 500,000 preterm births yearly because to pre-eclampsia thus stressing the significance of earlier diagnosis and particular medical care^{6,7}.

Hyperemesis gravidarum HG, the medical term for extremely persistent, severe nausea and vomiting during pregnancy, seriously impairs both the mother's and the fetus's development⁸. Hyperemesis gravidarum during pregnancy is more common in South Asian and Middle Eastern populations, with prevalence rates ranging from 0.3 to 2% American College of Obstetricians and Gynecologists ACOG, 2023⁹. Normal pregnancy-related nausea sensations are not the same as those of HG since the latter results in severe dehydration, nutritional issues, and electrolyte imbalances, necessitating

additional hospital treatment⁸. The primary causes of HG disease, according to research findings, include immunologic origin, genetic and hormonal mechanisms, hCG levels, and aberrant placental development. HG and pre-eclampsia may be related since both disorders have poor vascular remodeling and placental disruption¹⁰.

Current study is intensively investigating the relationship between HG and hypertension disorders associated with pregnancy¹¹. Pregnant women who needed to be admitted to the hospital because to HG were nine times more likely to have hypertensive disorders. Data demonstrated that increased levels of anti-angiogenic components causing endothelial dysfunction and hypertension were related with extended first-trimester hyperemesis¹². Studies reveal a biological connection between placental insufficiency and the mother's developing cardiovascular problems and hyperemesis¹³. There is little data collecting on the relationship between HG and pre-eclampsia, especially from South Asian populations, according to scholarly literature. Despite significant maternal nutritional inadequacies that result in anemia and delayed prenatal treatment, it is uncertain how much HG contributes to hypertension disorders. It is important to comprehend the relationship between hypersensitive gastritis and pregnancy in order to improve risk assessment during pregnancy, therapeutic monitoring, and effective issue solving¹⁴.

The aim of the study is to determine the prevalence of pre-eclampsia in women who acquire HG during the second trimester, as well as the critical risk factors

and the necessity of advanced prenatal treatment.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in the Obstetrics and Gynecology Department of Lady Reading Hospital, Peshawar, Pakistan, over a period of six months, from March 2023, to December 2023. Professionals used the selection criteria to include 100 pregnant women who were diagnosed with HG during the second trimester. Pregnant women aged 18-35 years with hyperemesis gravidarum confirmed in the second trimester via ultrasound. Gestational age <22 weeks based on last menstrual period LMP was included in our study. Multiple pregnancies and Chronic hypertension, molar pregnancy, hyperthyroid disorders, psychiatric illness, pre-existing diabetes, and gastrointestinal disorders was excluded from our study.

Patients' demographic, obstetric, and medical histories were recorded, including BMI, gestational age, and parity. Pre-eclampsia diagnosis was based on blood pressure $\geq 140/90$ mmHg and proteinuria $\geq 0.3\text{g}/24\text{hrs}$ after 20 weeks of gestation.

Data were analyzed using SPSS version 21. Mean $\pm$ SD was calculated for numerical variables, and frequency/percentages for categorical variables. Chi-square test was applied for stratified analysis, considering p-value ≤ 0.05 as statistically significant.

RESULTS

In the second trimester, 100 pregnant women with a diagnosis of hyperemesis gravidarum HG participated in the study. 38% of participants were between the ages of 31 and 35, while 62% of participants

were between the ages of 18 and 30. Participants' average age was 27 years SD ± 10.88 , suggesting that most of the women with HG in this research were in their prime reproductive years. Regarding parity, 34% of the individuals were multiparous had prior pregnancies, whereas 66% of the patients were primiparous had their first pregnancy. This implies that HG could be more common in pregnancies that are the first time around. In terms of gestational age, 61% of participants were between 12 and 22 weeks gestation, whereas 39% were in the first 11 weeks of pregnancy. The majority of HG cases continued into the second trimester, when symptoms should lessen but frequently stay severe in afflicted people, as seen by the mean gestational age of 12 weeks SD ± 5.94 . In terms of gravidity, 36% of individuals were multigravida had previously been pregnant, whereas 64% of participants were primigravida first-time pregnant. These results support recent research that found HG is more common in first-time moms by revealing that a significant percentage of women with HG had never experienced pregnancy. According to the BMI categorization, 29% of the individuals were overweight or obese, whereas 71% of them were underweight or normal weight, with a BMI of ≤ 25 kg/m². Given that the majority of the women with HG in this research were either underweight or of normal weight, this distribution supports the idea that severe nausea and vomiting can lead to both nutritional shortages and weight loss as shown in table 1.

of Second Trimester Hyperemesis Gravidarum in Pregnant Women

Table 1: Frequency Distribution of Clinical and Demographic Characteristics

Variable	Frequency n%
Age Group	
18–30 years	6262%
31–35 years	3838%
Mean age was 27 years with SD ± 10.88	
Parity	

Primiparous	6666%
Multiparous	3434%
Gestational Age Weeks	
1–11 weeks	3939%
12–22 weeks	6161%
Mean gestational age was 12 weeks with SD $\pm$ 5.94	
Gravidity	
Primigravida	6464%
Multigravida	3636%
Body Mass Index BMI	
≤ 25 kg/m ²	7171%
> 25 kg/m ²	2929%

In the second trimester of pregnancy, the prevalence of pre-eclampsia in women with hyperemesis gravidarum HG was investigated. Of the 100 people, 47% had pre-eclampsia, as shown in figure 1, whereas 53% did not. Considering that more than half of the women who experienced HG in the second trimester were at risk of pre-eclampsia, our findings suggest that severe nausea and vomiting during pregnancy may be associated with hypertension disorders. Preventing problems in HG patients requires early screening, continuous monitoring, and timely blood pressure management, as seen by the high frequency of pre-eclampsia in our research group.

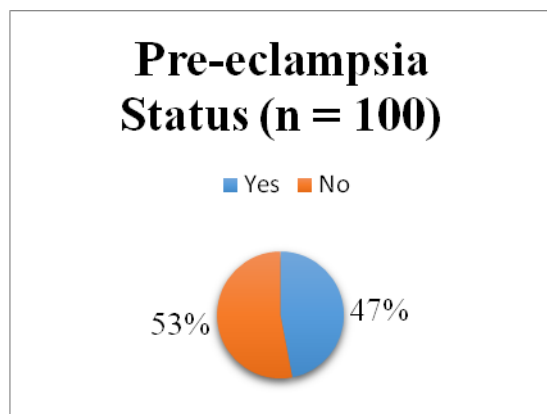


Figure1: Prevalence of Pre-eclampsia in Second Trimester Pregnant Women with Hyperemesis Gravidarum

The prevalence of pre-eclampsia in pregnant women with hyperemesis gravidarum HG according to body mass index BMI, gravidity, age, parity, and

gestational age. Of the 47 women with pre-eclampsia, 18 were between the ages of 31 and 35, and 29 were between the ages of 18 and 30. In the same way, of the 53 women who did not develop pre-eclampsia, 20 were older 31–35 years and 33 were younger 18–30 years. The study found no significant correlation between maternal age and the risk of pre-eclampsia, as indicated by the p-value of 0.9539. Of the women with pre-eclampsia, 16 were multiparous had prior pregnancies, and 31 were primiparous first pregnancy. Eighteen were multiparous and thirty-five were primiparous among those who did not develop pre-eclampsia. Parity did not substantially alter the risk of pre-eclampsia in HG patients, as indicated by the p-value 0.9932. Pre-eclamptic women ranged in gestational age from 1 to 11 weeks for 18 and 12 to 22 weeks for 29 of them. Thirty-two were in the 12- to 22-week range, and twenty-one were in the 1–11-week range in the group without pre-eclampsia. According to the p-value 0.8921, there was no discernible link between HG patients' gestational age and the onset of pre-eclampsia. The gravidity show that 30 of the women with pre-eclampsia were primigravida, meaning they were pregnant for the first time, and 17 were multigravida, meaning they had previously been pregnant. Similarly, 34 primigravida and 19 multigravida were found in the non-pre-eclamptic group. Gravidity was not a significant factor in determining the risk of pre-eclampsia among women with

HG, according to the p-value 0.9733. The majority of pre-eclamptic patients 33 out of 47 had a BMI of less than 25 kg/m², while 14 had a BMI of more than 25 kg/m². Of the group that was not pre-eclamptic, 15 had a BMI greater than 25 kg/m², and 38 had a BMI less than 25 kg/m². In HG individuals, there is not a

significant association between BMI and pre-eclampsia risk, according to the p-value 0.8702. Overall, the results indicate that there was no statistically significant correlation between the incidence of pre-eclampsia in women with HG and age, parity, gestational age, gravidity, or BMI as shown in table 2.

Table 2: Association of Pre-eclampsia with Maternal Age, Parity, Gestational Age, Gravidity, and Body Mass Index in Pregnant Women with Hyperemesis Gravidarum

Variable	Pre-eclampsia n = 47	No Pre-eclampsia n = 53	P-value
Age Group			
18–30 years	29	33	0.9539
31–35 years	18	20	
Parity			
Primiparous	31	35	0.9932
Multiparous	16	18	
Gestational Age Weeks			
1–11 weeks	18	21	0.8921
12–22 weeks	29	32	
Gravidity			
Primigravida	30	34	0.9733
Multigravida	17	19	
BMI kg/m ²			
≤25 kg/m ²	33	38	0.8702
>25 kg/m ²	14	15	

DISCUSSION

Research findings show pre-eclampsia develops commonly after hyperemesis gravidarum HG occurs in the second trimester because 47% of affected pregnant women experience pre-eclampsia later during pregnancy. The findings highlight the need for prompt risk identification strategies and close surveillance of affected pregnant women because HG may possibly contribute toward vascular instability and hypertension in pregnancy. The statistical analysis revealed no significant connection between age, parity, gestational age, gravidity, and BMI regarding pre-eclampsia occurrence. Research indicates that other natural biological processes affecting endothelial tissues and placental functions should be prioritized when

studying hypertension development in HG patients.

According to Koudijs *et al.* 2016, Research indicates that HG may be the source of placental issues that result in pre-eclampsia. According to research, women with hypertension are more likely to develop pre-eclampsia and give birth to smaller, shorter-lived kids ¹⁵.

The association between pre-eclampsia and hypersensitive stomach symptoms has been consistently shown in several studies in this area. According to a Norwegian cohort study by Fossum *et al.* 2019, the incidence of pre-eclampsia was 1.6 times higher in HG patients than in women without the disease ¹⁶. The idea that placental abnormalities and the hormonal imbalances that HG patients experience are the causes of pre-eclampsia is

supported by research. According to a meta-analysis by Hasija et al. 2021 published in the British Journal of Obstetrics and Gynecology, women who have HG in the second trimester are more likely to experience hypertensive problems later in pregnancy of 160 high-risk women, 72 45% had hypertensive problems during pregnancy¹⁷.

HG raises the risk of cardiovascular problems after pregnancy, according to Cécile et al., 2023, This study examined the effects of HG alone and in combination with pre-eclampsia on future risks for cardiovascular disease across a 22-year cohort study that involved over 1.4 million women in Quebec. It was shown that women with HG plus pre-eclampsia had the highest risk of cardiovascular hospitalization HR = 3.54, followed by those with pre-eclampsia alone HR = 2.58 and those with HG alone HR = 1.46. The study found that women with HG had higher incidences of cardiomyopathy, heart failure, and valve issues in addition to heart failure, highlighting the fact that pregnancy difficulties might manifest early indicators of long-term cardiac weakness¹⁸. Pre-eclampsia and GDM are separate risk factors for later cardiovascular disease CVD, and having both during pregnancy is a significant risk factor for later CVD, according to Hildén et al., 2023. BMI had no effect on the association between pre-eclampsia and CVD. To enhance women's long-term health, high-risk women urgently require access to effective CVD prevention programs¹⁹. Similarly Bergman et al., 2024 Pre-eclampsia is not more common in women with heart failure. Regardless of any established risk factors, women who had valvular heart disease before becoming pregnant are more likely to experience premature pre-eclampsia²⁰.

This study mainly examined the early concerns of pre-eclampsia, although vascular dysfunction that begins during pregnancy continues to affect people for years after giving birth, increasing the risk

of cardiovascular events in the future. In order to preserve proper health, women who need cardiovascular screening and prolonged patient monitoring should begin screening after receiving a diagnosis of HG or pre-eclampsia.

The findings of the study show why pregnant women with HG need special care when it comes to early identification and appropriate management of hypertension. Since HG is a major predictor of pre-eclampsia, all patients should have frequent blood pressure checks and urine protein screenings during prenatal care at comprehensive levels. The harmful symptoms of hyperemesis gravidarum and related medical issues may be lessened with proper fetal monitoring, nutritional assistance, and enough hydration.

Despite earlier studies' emphasis on food therapy, research shows that HG patients require improved management techniques that include cardiovascular risk assessment and hypertension testing. Future research must examine the possible effects of both short-term and long-term HG repercussions of rapid medicinal therapies along with dietary changes.

CONCLUSION

According to this study, pre-eclampsia is significantly more common 47% in pregnant women who experience hyperemesis gravidarum during the second trimester. These results highlight the necessity of early detection, careful observation, and prompt action in these situations in order to enhance the outcomes for both the mother and the fetus.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

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