https://doi.org/10.48047/AFJBS.6.16.2024.3246-3252

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

To Determine the Frequency of HELLP Syndrome among Women with Pregnancy Induced Hypertension

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Volume 6, Issue 16, Dec 2024

Received: 09 Nov 2024

Accepted: 29 Nov 2024

Published: 15 Dec 2024

doi:10.48047/AFJBS.6.16.2024.3246-3252

ABSTRACT

Introduction: Hypertensive disorders of pregnancy are a major cause of maternal and perinatal complications, ranking second only to embolism as a leading cause of maternal mortality. These conditions affect approximately 12% to 22% of pregnancies worldwide. This study aimed to provide localized evidence on the prevalence of HELLP syndrome in pregnancy-induced hypertension (PIH), including preeclampsia and eclampsia, to enhance awareness and improve clinical management among obstetricians.

Objective: To determine the frequency of HELLP syndrome among women with pregnancy-induced hypertension.

Methodology: The study design was cross-sectional study conducted at the Department of Obstetrics and Gynaecology, MTI-Lady Reading Hospital, Peshawar from July 31, 2021, to January 31, 2022. A comprehensive clinical evaluation and routine antenatal laboratory investigations were performed on all participants. Management of patients adhered to the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines for preeclampsia and eclampsia. Data collection and follow-up extended through delivery and the postpartum period to identify cases of HELLP syndrome.

Results: The frequency of HELLP syndrome was recorded in 90 out of 369 women (24.4%) with pregnancy-induced hypertension.

Conclusion: HELLP syndrome represents a severe manifestation of hypertensive disorders in pregnancy. This study highlights the importance of early identification and appropriate treatment to manage these cases effectively and reduce associated maternal and fetal risks.

Keywords: HELLP Syndrome, Pregnancy-Induced Hypertension, Preeclampsia, Eclampsia.

INTRODUCTION

Hypertensive disorders of pregnancy are a significant contributor to maternal and perinatal complications, ranking as the second leading cause of maternal mortality after embolism(1, 2). These disorders affect approximately 12% to 22% of all pregnancies globally. Among them, preeclampsia (PE) is a pregnancy-specific syndrome and a leading cause of both maternal and fetal morbidity and mortality. It is estimated that preeclampsia impacts around 8.37 million women worldwide annually(3). Eclampsia, a severe progression of preeclampsia, is characterized by high blood pressure (≥140/90 mmHg on two separate occasions at least four hours apart after 20 weeks of gestation) in a previously normotensive woman, accompanied by significant proteinuria (>300 mg in 24 hours) and seizures in women without a history of epilepsy(4). The condition is life-threatening and occurs two to ten times more frequently in developing countries compared to developed regions. In developed countries, the incidence of eclampsia is approximately 1 in 1,600 pregnancies, while in developing countries, it ranges from 1 in 100 to 1 in 1,700 pregnancies(5, 6).

HELLP syndrome, defined by hemolysis, elevated liver enzymes, and low platelet count, is considered a more severe manifestation of preeclampsia(7). However, its classification remains debated. Some experts argue that HELLP syndrome is a distinct disorder, given that 15% to 20% of cases occur without hypertension or proteinuria(8). Studies have shown higher maternal morbidity rates in cases of HELLP syndrome compared to severe preeclampsia, while others suggest no significant differences in maternal or perinatal outcomes between the two conditions(8).

The prevalence of HELLP syndrome varies in the literature(9). In some studies, approximately 4% of women with preeclampsia developed HELLP syndrome(10). Another study reported that 27.6% of eclamptic cases were complicated by HELLP syndrome(11). Furthermore, research has found that 4.28% of women with preeclampsia and 33.4% of women with eclampsia developed HELLP syndrome(12).

This study aims to determine the frequency of HELLP syndrome in women with pregnancy-induced hypertension (including preeclampsia and eclampsia) within a local population. The onset of pregnancy-induced hypertension, particularly eclampsia, is a strong predictor of adverse maternal and fetal outcomes, further exacerbated by complications such as HELLP syndrome. To date, there has been limited local research on the prevalence of HELLP syndrome in women with pregnancy-induced hypertension. This study seeks to address that gap by generating new, localized evidence, which will help inform clinical practices and policies to improve outcomes. The findings will be shared with local obstetricians to raise awareness and guide future recommendations for managing this critical condition.

MATERIALS AND METHODS

The research followed a cross-sectional design. This study was conducted over a six-month period, from July 31, 2021, to January 31, 2022, in the Department of Gynecology and Obstetrics at Lady Reading Hospital, Peshawar. A sample size of 369 was determined using a 4% estimated proportion of HELLP syndrome among women with pregnancy-induced hypertension (PIH), a 95% confidence level, and a 2% margin of error, as per the WHO formula for descriptive studies. Participants were selected using a non-probability consecutive sampling technique.

The inclusion criteria: The study included women aged 15 to 45 years with singleton pregnancies who presented after the 20th week of gestation. Participants of any gravidity or parity diagnosed with PIH, including preeclampsia or eclampsia, were eligible.

The Exclusion criteria: The study excluded patients with a history of using Levothyroxine, women with multiple pregnancies, or those with significant medical conditions such as diabetes, metabolic disorders, obesity, severe anemia (Hb < 6 gm%), or malnourishment. Women with congenital fetal abnormalities detected via ultrasound or preexisting renal diseases were also excluded. These conditions were deemed potential confounders that could introduce bias, thereby necessitating their exclusion.

The study commenced after receiving approval from the hospital's ethical and research board. Pregnant women attending the outpatient department with singleton pregnancies and diagnosed with preeclampsia or eclampsia, as defined in the study's operational guidelines, were invited to participate. The purpose and benefits of the study were explained to each participant, along with the associated risks. Participants were assured that the study was solely for research and publication purposes. Written informed consent was obtained from those who agreed to participate.

Each participant underwent a comprehensive history review and clinical examination. Routine laboratory investigations, as per antenatal care protocols, were performed. Participants received standard treatment according to the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines for preeclampsia and eclampsia. They were instructed to return to the same hospital for follow-up or if complications arose. Contact details were recorded to ensure follow-up, and participants who were lost to follow-up were replaced to maintain the desired sample size.

Women were monitored until delivery and for six weeks postpartum to assess the occurrence of HELLP syndrome. All observations were overseen by an experienced obstetrician with at least five years of practice. Laboratory investigations were conducted in a single hospital laboratory under the supervision of a pathologist with a similar level of expertise. Data was meticulously recorded using a custom-designed proforma, ensuring the exclusion criteria were rigorously followed to control potential confounding factors and biases.

The collected data was analyzed using SPSS version 20. For numerical variables, including age, gravidity, parity, and BMI, the mean and standard deviation were calculated. Frequencies and percentages were determined for categorical variables such as the presence of HELLP syndrome. To assess potential effect modification, HELLP syndrome data was stratified based on age, gravidity, parity, presenting diagnosis, type of PIH, gestational diabetes mellitus (GDM), and BMI. A chi-square test was applied post-stratification, with a p-value of less than 0.05 considered statistically significant. The results were presented comprehensively in tables and graphs.

RESULT

The study involved 369 participants, with their ages ranging from 20 to 42 years and an average age of approximately 28.93 years. Gravidity varied from 2 to 5, with a mean of 3.32, while parity ranged between 1 and 4, averaging 2.32. The participants' average height was 5.496 feet, and their weight ranged from 58 to 76 kg, with a mean of 66.71 kg. Body Mass Index (BMI) was also recorded, ranging from 21.1 to 28.1 kg/m², with a mean of 24.28 kg/m². These statistics provide a baseline understanding of the demographic and physical characteristics of the study population.

TABLE: 1 Descriptive Statistics of Study (n=369)

Variables	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	20	42	28.93	5.267
Gravidity	2	5	3.32	1.166
Parity	1	4	2.32	1.166
Height (ft)	5.4	5.6	5.496	.0624
Weight (kg)	58	76	66.71	4.492
BMI (kg/m2)	21.1	28.1	24.280	1.6569

This table outlines the distribution of key variables among the participants. A majority, 60.4%, were aged between 15 and 30 years, while the remaining 39.6% were aged 31 to 45 years. Gestational diabetes mellitus (GDM) was present in 33.3% of participants, while 66.7% were not affected. Pregnancy-induced hypertension was predominantly associated with preeclampsia (68.0%) compared to eclampsia (32.0%). Additionally, HELLP syndrome was present in 24.4% of participants, with the remaining 75.6% not affected. This distribution highlights the prevalence of clinical conditions within the study cohort.

Table 2: Frequency of Demographic and Clinical Characteristics

Category	Frequency	Percent
Age Groups (15-30 Years)	223	60.4%
Age Groups (31-45 Years)	146	39.6%
Gestational Diabetes Mellitus (Yes)	123	33.3%
Gestational Diabetes Mellitus (No)	246	66.7%
Pregnancy Induced Hypertension (Preeclampsia)	251	68.0%
Pregnancy Induced Hypertension (Eclampsia)	118	32.0%
HELLP Syndrome (Yes)	90	24.4%

HELLP Syndrome (No)	279	75.6%

The stratification of HELLP syndrome reveals significant patterns across various variables. Among participants aged 15 to 30 years, 59 had HELLP syndrome, compared to 31 in the 31 to 45 years age group, though the difference was not statistically significant (P = 0.253). Regarding pregnancy-induced hypertension (PIH), HELLP syndrome was more common among participants with eclampsia (52 cases) than preeclampsia (38 cases), showing a statistically significant difference (P < 0.001). This indicates a stronger association between HELLP syndrome and eclampsia.

Among participants with GDM, 34 were affected by HELLP syndrome, while 89 were not. In those without GDM, 56 had HELLP syndrome, and 190 did not. The association between GDM and HELLP syndrome was not statistically significant (P = 0.304), suggesting that GDM might not directly influence the occurrence of HELLP syndrome.

When stratifying by gravidity, participants with fewer than three pregnancies had 60 cases of HELLP syndrome compared to 175 without, while those with three or more pregnancies showed 30 cases of HELLP syndrome and 104 without. The difference was not statistically significant (P = 0.499), indicating that gravidity did not have a strong influence on the likelihood of developing HELLP syndrome.

Similarly, parity showed no significant association with HELLP syndrome. Among participants with fewer than two previous births, 60 had HELLP syndrome, while 175 did not. In those with two or more previous births, 30 had HELLP syndrome, and 104 did not (P = 0.499). This suggests parity alone does not significantly impact the risk of HELLP syndrome.

BMI stratification revealed that 58 participants with a BMI of less than 25 kg/m² had HELLP syndrome, compared to 190 without. In participants with a BMI greater than 25 kg/m², 32 had HELLP syndrome, while 89 did not. This difference was not statistically significant (P = 0.521), indicating that BMI may not be a critical determinant for developing HELLP syndrome.

Table 2: Stratification of HELLP Syndrome by Key Variables

Category	HELLP Syndrome (Yes)	HELLP Syndrome (No)	Total	P Value
Age Groups (15-30 Years)	59	164	223	0.253
Age Groups (31-45 Years)	31	115	146	
PIH Type (Preeclampsia)	38	213	251	< 0.001
PIH Type (Eclampsia)	52	66	118	
Gestational Diabetes Mellitus (Yes)	34	89	123	0.304
Gestational Diabetes Mellitus (No)	56	190	246	
Gravidity (< 3)	60	175	235	0.499
Gravidity (> 3)	30	104	134	
Parity (< 2)	60	175	235	0.499
Parity (> 2)	30	104	134	
BMI (< 25 kg/m²)	58	190	248	0.521
BMI (> 25 kg/m²)	32	89	121	

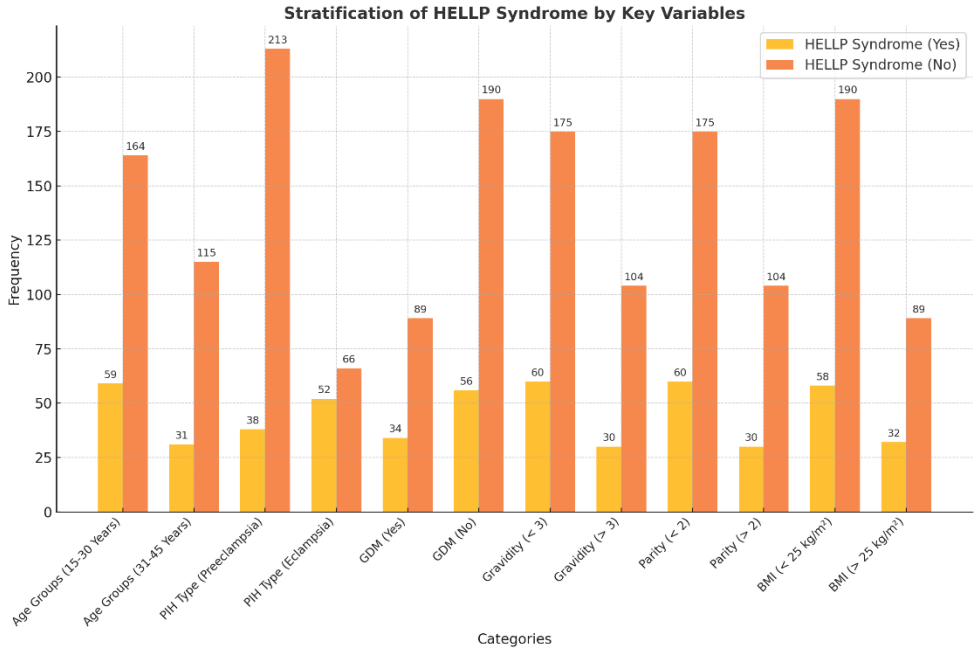

Figure 1: shows HELLP syndrome distribution across key variables. Women aged 15–30 years had more cases (59) than those aged 31–45 years (31). HELLP syndrome was significantly associated with eclampsia (52 cases) compared to preeclampsia (38 cases). Other factors, such as gestational diabetes (34 cases with GDM vs. 56 without), gravidity, parity, and BMI, showed no significant differences. The findings emphasize the strong link between HELLP syndrome and severe PIH, particularly eclampsia, highlighting the need for close monitoring in these patients.

DISCUSSION

Hypertensive disorders of pregnancy (HDP) remain a major cause of maternal and perinatal morbidity, ranking as the second leading cause of maternal mortality after embolism. These conditions affect approximately 12% to 22% of pregnancies globally, with preeclampsia being a significant contributor to maternal and fetal complications(13, 14). An estimated 8.37 million women worldwide are affected by preeclampsia each year (15, 16). In this study, we found a mean age of participants to be 28.93 years, with gravidity averaging 3.32, parity 2.32, and BMI 24.28 kg/m². Most participants (60.4%) were aged between 15 and 30 years.

Gestational diabetes mellitus (GDM) was present in 33.3% of the participants, while 68% were diagnosed with preeclampsia and 32% with eclampsia. Notably, HELLP syndrome, a severe complication of HDP, was observed in 24.4% of participants. This aligns with previous studies reporting rates ranging from 4% to 27.6%, with HELLP being more prevalent in eclamptic patients (11).

HELLP syndrome, characterized by hemolysis, elevated liver enzymes, and low platelet count, is often considered a severe form of preeclampsia. However, some evidence suggests it may represent a distinct disorder due to its occurrence in patients without hypertension or proteinuria. Studies have highlighted the higher maternal morbidity associated with HELLP compared to severe preeclampsia(17, 18). Laboratory findings in HELLP include abnormal peripheral smears, raised liver enzymes, and low platelet counts, emphasizing the importance of prompt diagnosis and management.

Management involves stabilizing the mother by controlling blood pressure, preventing seizures, and ensuring optimal timing for delivery. Early delivery remains the definitive treatment. Magnesium sulfate is widely used to prevent eclamptic seizures, while corticosteroids and experimental therapies such as plasmapheresis and complement inhibitors like eculizumab are under investigation(19). Despite advancements, there is no specific cure for HELLP syndrome beyond delivery, underscoring the importance of ongoing research.

Long-term, HELLP syndrome can have significant maternal health implications. It increases the risk of chronic hypertension, cardiovascular disease, and metabolic disorders (20, 21). Psychological effects, including anxiety and depression, are also more common in affected women, particularly those planning

future pregnancies. Recurrence rates for HELLP syndrome are low at 7.2%, but the overall risk of hypertensive disorders in subsequent pregnancies is significantly higher.

This study provides critical local evidence about the magnitude of HELLP syndrome in pregnancy-induced hypertension, emphasizing the need for increased awareness among healthcare providers. Our findings highlight the catastrophic potential of HELLP, which can rapidly progress to multiorgan failure, even in seemingly low-risk pregnancies. Early diagnosis, evidence-based management, and comprehensive postpartum care are essential to improve outcomes for affected women.

CONCLUSION

HELLP syndrome is one of the severe hypertensive disorders in pregnancy and therefore, we remarkably identified cases of HELLP syndrome and administered proper treatment to our patients with a complicated clinical course. Thus, we were able to get local evidence which surely helped local obstetricians not only to make them aware about the perils of this problem by generating future recommendations but also robustly manage such patients in our local population.

REFERENCES

1. Malhamé I, Nerenberg K, McLaughlin K, Grandi SM, Daskalopoulou SS, Metcalfe A. Hypertensive Disorders and Cardiovascular Severe Maternal Morbidity in the US, 2015-2019. JAMA Network Open. 2024;7(10):e2436478-e.
2. ALI KA. FACTORS CONTRIBUTING TO MANAGEMENT OF HYPERTENSIVE DISORDERS IN PREGNANCY, IN KILIFI COUNTY REFERRAL HOSPITAL: Pwani University; 2022.
3. Alemayehu A, Demissie A, Ibrahim I, Geremew A, Mohammed F, Gudeta M, et al. Burden, risk factors, and maternal postpartum and birth outcomes of hypertensive disorder of pregnancy in Ethiopia, 2024: A systematic review and meta-analysis. SAGE Open Medicine. 2024;12:20503121241274741.
4. Tanner MS, Davey M-A, Mol BW, Rolnik DL. The evolution of the diagnostic criteria of preeclampsia-eclampsia. American Journal of Obstetrics and Gynecology. 2022;226(2):S835-S43.
5. Nupur A, Dash S, Nanda SS, Mishra B. DELIVERY IN ECLAMPSIA: CAESAREAN VS VAGINAL DELIVERY.
6. Rizi SS, Wiens E, Hunt J, Ducas R. Cardiac physiology and pathophysiology in pregnancy. Canadian Journal of Physiology and Pharmacology. 2024;102(10):552-71.
7. Lisonkova S, Bone JN, Muraca GM, Razaz N, Wang LQ, Sabr Y, et al. Incidence and risk factors for severe preeclampsia, hemolysis, elevated liver enzymes, and low platelet count syndrome, and eclampsia at preterm and term gestation: a population-based study. American Journal of Obstetrics and Gynecology. 2021;225(5):538. e1-. e19.
8. Giannubilo SR, Marzioni D, Tossetta G, Ciavattini A. HELLP syndrome and differential diagnosis with other thrombotic microangiopathies in pregnancy. Diagnostics. 2024;14(4):352.
9. Mossayebi MH, Iyer NS, McLaren Jr RA, Moussa HN, Sibai BM, Al-Kouatly HB. HELLP syndrome at< 23 weeks' gestation: a systematic literature review. American Journal of Obstetrics and Gynecology. 2023.
10. Gardikioti A, Venou T-M, Gavriilaki E, Vetsiou E, Mavrikou I, Dinas K, et al. Molecular advances in preeclampsia and HELLP syndrome. International Journal of Molecular Sciences. 2022;23(7):3851.
11. Wassie AY, Anmut W. Prevalence of eclampsia and its maternal-fetal outcomes at Gandhi memorial hospital, Addis Ababa Ethiopia, 2019: retrospective study. International Journal of Women's Health. 2021:231-7.
12. Morikawa M, Mayama M, Saito Y, Nakagawa-Akabane K, Umazume T, Chiba K, et al. Pregnancy Hypertension.
13. Chang K-J, Seow K-M, Chen K-H. Preeclampsia: Recent advances in predicting, preventing, and managing the maternal and fetal life-threatening condition. International journal of environmental research and public health. 2023;20(4):2994.

14. Kokori E, Aderinto N, Olatunji G, Komolafe R, Babalola EA, Isarinade DT, et al. Prevalence and materno-fetal outcomes of preeclampsia/eclampsia among pregnant women in Nigeria: a systematic review and meta-analysis. European Journal of Medical Research. 2024;29(1):482.
15. Giorgione V, Ridder A, Kalafat E, Khalil A, Thilaganathan B. Incidence of postpartum hypertension within 2 years of a pregnancy complicated by pre-eclampsia: a systematic review and meta-analysis. BJOG: An International Journal of Obstetrics & Gynaecology. 2021;128(3):495-503.
16. Abdel-Wahab Afifi Araby Ali O, Kamal Ali F, Mohamed Salama A, Mansour Abdel Azeem Barakat F. Effect of Progressive Muscle Relaxation Techniques on Physiological Parameters, Psychological Factors and Sleep Quality among Pregnant Women with Preeclampsia. Egyptian Journal of Health Care. 2024;15(2):125-48.
17. Huang H, Liu B, Gao X, Wang Y. Clinical classification, pregnancy outcomes and risk factors analysis of severe preeclampsia complicated with HELLP syndrome. Frontiers in Surgery. 2022;9:859180.
18. Raina SK, Callins K. Commentary on distinct obstetrical characteristics and maternal mortality in patients with HELLP syndrome vs severe preeclampsia. American Journal of Obstetrics & Gynecology. 2024.
19. De Oliveira L, Korkes H, de Rizzo M, Siaulys MM, Cordioli E. Magnesium sulfate in preeclampsia: Broad indications, not only in neurological symptoms. Pregnancy Hypertension. 2024;36:101126.
20. Giorgione V, Jansen G, Kitt J, Ghossein-Doha C, Leeson P, Thilaganathan B. Peripartum and long-term maternal cardiovascular health after preeclampsia. Hypertension. 2023;80(2):231-41.
21. Bovee EM, Gulati M, Maas AH. Novel cardiovascular biomarkers associated with increased cardiovascular risk in women with prior preeclampsia/HELLP syndrome: a narrative review. European Cardiology Review. 2021;16.