Section: Obstetrics and Gynaecology

Original Research Article

# A CLINICAL STUDY OF HELLP SYNDROME AND ITS OUTCOME IN A TERTIARY CARE HOSPITAL

**B.Vijayah[1], V.Veenashri[2], Priyanka R[3]**

[1]Associate Professor, Department of Obstetrics and Gynaecology, Government Dindigul Medical College, Tamilnadu, India
[2]Assistant Professor, Department of Obstetrics and Gynaecology, Government Dindigul Medical College, Tamilnadu, India
[3]Senior Resident, Department of Obstetrics and Gynaecology, Government Dindigul Medical College, Tamilnadu, India

*Received* : 07/09/2026
*Received in revised form* : 04/10/2026
*Accepted* : 17/10/2026

*Keywords:*
*HELLP Syndrome, Liver Function Tests, Maternal Mortality, Pregnancy Complications, Thrombocytopenia.*

Corresponding Author:
**Dr. B.Vijayah,**
Email: vijilogudil@gmail.com

DOI: 10.47009/jamp.2026.8.5.164

Source of Support: Nil,
Conflict of Interest: None declared

*Int J Acad Med Pharm*
2026; 8 (5); 1040-1044

## ABSTRACT

**Background:** HELLP syndrome (Hemolysis, Elevated Liver enzymes, and Low Platelet count) is a severe obstetric complication associated with substantial maternal morbidity and mortality. Early recognition and timely intervention are crucial for improving maternal outcomes. **Materials and Methods:** This retrospective observational study was conducted in the Department of Obstetrics and Gynaecology of a tertiary care hospital. Medical records of 20 pregnant women diagnosed with HELLP syndrome according to the Tennessee classification were reviewed. Data regarding demographic characteristics, laboratory parameters, associated maternal conditions and complications, mode of delivery, and maternal outcomes were extracted and analysed using SPSS. Continuous variables were expressed as mean±standard deviation, and categorical variables as frequencies and percentages. **Result:** mean maternal age was 24.65±6.12 years, and the mean gestational age at presentation was 35.00±4.09 weeks. Multigravida women constituted 55.0% of cases, while 60.0% presented after 34 weeks of gestation. The mean hemoglobin level was 8.43±2.29 g/dL, mean platelet count was 57,050±22,444/mm³, mean SGOT was 125.26±274.23 IU/L, mean SGPT was 88.20±139.53 IU/L, and mean total bilirubin was 3.36±4.23 mg/dL. Caesarean section was the predominant mode of delivery (68.8%). Maternal discharge was achieved in 90.0% of patients, whereas maternal mortality occurred in 10.0%. Gestational hypertension (21.7%) and severe preeclampsia (13.0%) were the most common associated conditions. **Conclusion:** HELLP syndrome predominantly affected young women presenting in late pregnancy and was associated with characteristic hematological and biochemical abnormalities. Despite significant maternal morbidity, favourable outcomes were achieved in most patients following timely obstetric management.

## INTRODUCTION

HELLP syndrome is a serious and potentially life-threatening obstetric complication characterized by hemolysis, elevated liver enzymes, and low platelet count. First described by Weinstein in 1982, HELLP syndrome is now recognized as a severe variant of preeclampsia, although it may occasionally occur in the absence of classical features of hypertension and proteinuria. The syndrome usually develops during the third trimester of pregnancy but may also present in the postpartum period. Its unpredictable clinical course and rapid progression make early diagnosis and prompt management essential.[1-3]

The reported incidence of HELLP syndrome ranges from 0.5% to 0.9% of all pregnancies and occurs in approximately 10–20% of women with severe preeclampsia. The exact pathophysiology remains incompletely understood. However, widespread endothelial dysfunction, abnormal placentation, vasospasm, and activation of the coagulation cascade are believed to contribute to microangiopathic hemolysis, hepatic dysfunction, and thrombocytopenia. These pathological changes can result in significant maternal and fetal morbidity if not recognized and treated promptly.[4,5]

Women with HELLP syndrome may present with nonspecific symptoms such as malaise, nausea, vomiting, headache, epigastric or right upper quadrant pain, and visual disturbances. Because these manifestations can mimic other medical and surgical conditions, diagnosis may be delayed. Laboratory evaluation therefore plays a crucial role in establishing the diagnosis and assessing disease

severity. Abnormal haematological parameters, elevated liver enzymes, and deranged biochemical indices not only aid diagnosis but also provide valuable information regarding prognosis and clinical decision-making.[6-8]

HELLP syndrome is associated with a wide spectrum of maternal complications, including disseminated intravascular coagulation, postpartum hemorrhage, acute renal failure, placental abruption, pulmonary edema, and maternal death. The condition also influences obstetric management, often necessitating early termination of pregnancy, with cesarean section being frequently performed depending on maternal and fetal status. Despite advances in critical care and obstetric practice, HELLP syndrome continues to contribute substantially to adverse maternal outcomes, particularly in resource-limited settings.[9,10]

Understanding the clinical characteristics, laboratory profile, associated complications, and maternal outcomes of HELLP syndrome is important for improving recognition and management of affected women. However, variations in presentation and outcomes have been reported across different populations and healthcare settings. Therefore, the present study was undertaken to evaluate the clinical profile, laboratory parameters, associated maternal complications, mode of delivery, and maternal outcomes among patients diagnosed with HELLP syndrome admitted to a tertiary care hospital.

**Aim:** To evaluate the clinical profile, laboratory parameters, associated maternal complications, mode of delivery, and maternal outcomes among patients diagnosed with HELLP syndrome admitted to a tertiary care hospital.

## MATERIALS AND METHODS

This retrospective observational study was conducted in the Department of Obstetrics and Gynaecology of a tertiary care hospital. The study included patients diagnosed with HELLP syndrome who were admitted during the study period. Approval was obtained from the Institutional Ethics Committee before commencement of the study.

**Study Population and Sampling:** The study population comprised all pregnant women diagnosed with HELLP syndrome and admitted to the Department of Obstetrics and Gynaecology during the study period. A purposive sampling technique was employed, and all eligible cases fulfilling the inclusion criteria were included. A total of 20 patients constituted the study sample.

**Inclusion Criteria**

Pregnant women with a gestational age of ≥20 weeks diagnosed with HELLP syndrome and fulfilling the diagnostic criteria based on the presence of hemolysis, elevated liver enzymes, and thrombocytopenia (platelet count <100,000/mm³) were included in the study. Only patients with complete medical records available for review were considered eligible.

**Exclusion Criteria**

Patients with pre-existing liver disease, viral hepatitis, chronic renal disease, and causes of thrombocytopenia and deranged liver function tests unrelated to HELLP syndrome were excluded

**Methods:** After obtaining institutional permission and ethical approval, medical records of eligible patients were reviewed using a predesigned proforma. Data collected included maternal age, gravidity, previous delivery history, gestational age at presentation, hemoglobin level, platelet count, serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), total bilirubin levels, mode of delivery, maternal outcomes, and associated maternal conditions. Information regarding associated maternal conditions and comorbidities documented during hospitalization was also extracted from the medical records.

HELLP syndrome was diagnosed according to the Tennessee classification based on evidence of hemolysis, elevated liver enzymes, and thrombocytopenia (platelet count <100,000/mm³) documented in the medical records. The maternal outcomes assessed included discharge status and maternal mortality. Associated maternal conditions, comorbidities, maternal complications, and mode of delivery were also documented.

**Statistical Analysis:** Data were presented as mean, standard deviation, frequency and percentage. Data analysis was performed using IBM-SPSS version 21.0 (IBM-SPSS Science Inc., Chicago, IL).

## RESULTS

The mean age of the patients was 24.65 ± 6.12 years. Multigravida women constituted 55.0%, while 45.0% were primigravida. Previous obstetric history was documented in 11 patients and was absent in 9 patients. The mean gestational age at presentation was 35.00 ± 4.09 weeks. Most patients (60.0%) presented after 34 weeks of gestation, whereas 25.0% presented between 30–34 weeks, 5.0% between 28–30 weeks, and 10.0% before 28 weeks [Table 1].

**Table 1: Demographic and Obstetric Profile of Patients**

| Variable | Category | Value |
|---|---|---|
| Age (years) | Mean ± SD | 24.65 ± 6.12 |
| Gravida | Primi | 9 (45.0%) |
| | Multi | 11 (55.0%) |
| Previous Obstetric History | Previous Abortion (G2A1) | 1 (5.0%) |
| | LSCS | 9 (45.0%) |
| | NVD | 1 (5.0%) |


ISSN (O): 2687-5365; ISSN (P): 2753-6556

| | | |
|---|---|---|
| | Nil | 9 (45.0%) |
| Gestational Age (weeks) | Mean ± SD | 35.00 ± 4.09 |
| Gestational Age Category | < 28 weeks | 2 (10.0%) |
| | 28–30 weeks | 1 (5.0%) |
| | 30–34 weeks | 5 (25.0%) |
| | > 34 weeks | 12 (60.0%) |

Most patients had hemoglobin levels above 8 g/dL, platelet counts between 50,000 and 100,000/mm³, SGOT levels below 40 IU/L, and total bilirubin levels between 1 and 2 mg/dL [Table 2].

**Table 2: Clinical and Laboratory Profile of Patients with HELLP Syndrome**

| Variable | Category | n (%) | Mean ± SD |
|---|---|---|---|
| Hemoglobin (g/dL) | ≤ 6 | 5 (27.8%) | 8.43 ± 2.29 |
| | 6–8 | 4 (22.2%) | |
| | > 8 | 9 (50.0%) | |
| Platelet Count (/mm³) | < 50,000 | 6 (30.0%) | 57,050 ± 22,444.02 |
| | 50,000–100,000 | 14 (70.0%) | |
| SGOT (IU/L) | < 40 | 11 (57.9%) | 125.26 ± 274.23 |
| | 40–100 | 4 (21.1%) | |
| | > 100 | 4 (21.1%) | |
| SGPT (IU/L) | — | — | 88.20 ± 139.53 |
| Total Bilirubin (mg/dL) | < 1 | 5 (27.8%) | 3.36 ± 4.23 |
| | 1–2 | 6 (33.3%) | |
| | 2–5 | 4 (22.2%) | |
| | > 5 | 3 (16.7%) | |

Eighteen patients were discharged, while two patients (10.0%) expired. Among the recorded deliveries, LSCS was performed in 68.8%, normal labour occurred in 25.0%, and vacuum-assisted delivery in 6.3% [Table 3].

**Table 3: Maternal Outcome and Mode of Delivery in HELLP Syndrome**

| Variable | Category | n (%) |
|---|---|---|
| Maternal Outcome | Discharged | 18 (90.0%) |
| | Expired | 2 (10.0%) |
| Mode of Delivery | LN | 4 (25.0%) |
| | LSCS | 11 (68.8%) |
| | Vacuum | 1 (6.3%) |

Associated maternal conditions included GHTN in 21.7% (5 cases), severe preeclampsia in 13.0% (3 cases), ITP and PPH in 8.7% (2 cases each), and AFLP, hematuria, hysterectomy, severe anemia, and twin pregnancy in 4.3% (1 case each). No associated condition was observed in 26.1% (6 cases) [Table 4].

**Table 4: Associated Maternal Conditions in Patients with HELLP Syndrome**

| Category | n (%) |
|---|---|
| AFLP | 1 (4.3%) |
| GHTN | 5 (21.7%) |
| Hematuria | 1 (4.3%) |
| ITP | 2 (8.7%) |
| PPH | 2 (8.7%) |
| Hysterectomy | 1 (4.3%) |
| Severe Anemia | 1 (4.3%) |
| Severe Preeclampsia | 3 (13.0%) |
| Twins | 1 (4.3%) |
| Nil | 6 (26.1%) |

## DISCUSSION

The present study evaluated the clinical profile, laboratory characteristics, associated maternal conditions and complications, mode of delivery, and maternal outcomes among women with HELLP syndrome admitted to a tertiary care hospital. HELLP syndrome predominantly affected young women presenting in late pregnancy and was characterized by thrombocytopenia and varying degrees of liver enzyme abnormalities. Caesarean section was the predominant mode of delivery, and although maternal mortality was observed in 10.0% of patients, the majority of women (90.0%) were successfully discharged following appropriate management.

In our study, HELLP syndrome was predominantly observed among young women, with a slightly higher proportion of multigravida patients. Most cases presented during the later weeks of pregnancy, and over half of the patients had a history of previous delivery. In comparison, Mekonnen et al. reported that 51.4% of women with HELLP syndrome were aged 25–34 years, 62.9% were primiparous, and


ISSN (O): 2687-5365; ISSN (P): 2753-6556

82.9% were diagnosed during the third trimester.[11] Similarly, Klikpézo et al. reported a mean maternal age of 27.14 ± 5.33 years and a mean gestational age of 32.63 ± 3.75 weeks, with a predominance of primigravida women.[12] Sahoo et al. reported that 61.3% of women with HELLP syndrome were aged 21–30 years, 67.7% were primigravida, and the majority of cases presented between 28 and 38 weeks of gestation.[13] These findings indicate that HELLP syndrome predominantly affects young women and is more commonly encountered during the later stages of pregnancy, irrespective of variations in parity across different populations.

In our study, haematological abnormalities, particularly thrombocytopenia, were common among patients with HELLP syndrome, while varying degrees of liver enzyme abnormalities were observed. In comparison, Klikpézo et al. reported a mean hemoglobin level of 8.15 ± 2.04 g/dL, with 63.51% of women having hemoglobin levels between 7 and 10 g/dL. ASAT levels greater than 100 IU/L were observed in 70.27% of cases, while ALAT levels ≥40 IU/L were noted in 79.73% of women.[12] Similarly, Sahoo et al. reported a mean hemoglobin level of 9.16 ± 2.36 g/dL and a mean platelet count of 55,969.35 ± 27,475/µL. Platelet counts below 50,000/µL were observed in 48.4% of patients, while AST levels ≥70 IU/L and ALT levels ≥70 IU/L were reported in 90.3% and 74.2% of cases.[13] Furthermore, Arusi et al. observed that thrombocytopenia and elevated liver enzymes were associated with severe maternal morbidity among women with HELLP syndrome.[14] These findings suggest that hematological abnormalities and hepatic dysfunction are common features of HELLP syndrome and may reflect disease severity.

In our study, most patients had a favourable maternal outcome following treatment, and caesarean section was the predominant mode of delivery. Associated maternal conditions and complications were observed in a proportion of patients. Hypertensive disorders, including gestational hypertension and severe preeclampsia, constituted the most frequent associated conditions, whereas postpartum haemorrhage and hematuria represented maternal complications. In comparison, Klikpézo et al. reported a favourable maternal outcome in 94.59% of women, a maternal mortality rate of 5.41%, and a caesarean section rate of 81.67%. Eclampsia was the most frequent maternal complication (22.97%), while 45.95% of women had no associated complications.[12] Similarly, Sahoo et al. reported that 67.7% of women underwent vaginal delivery, while eclampsia (33.8%) and postpartum haemorrhage (24.1%) were the most common maternal complications, with a maternal mortality rate of 29.0%.[13]

Ernawati et al. reported that 87.2% of women with HELLP syndrome underwent caesarean section, while maternal death occurred in 3.7% of cases; eclampsia, postpartum haemorrhage, and emergency hypertension were also reported.[7] Li and Yang reported an overall caesarean section rate of 80.0%, with eclampsia occurring in 6.0% of cases and no maternal deaths observed.[15] These findings suggest that, despite variations in maternal complications and mode of delivery across different populations, timely recognition and appropriate obstetric management can contribute to favourable maternal outcomes in women with HELLP syndrome.

Overall, the findings of the present study highlight the heterogeneous clinical spectrum of HELLP syndrome, ranging from varying laboratory abnormalities to diverse maternal complications and obstetric interventions. The differences observed across studies suggest that the presentation and outcomes of HELLP syndrome may vary between populations and healthcare settings.

**Limitations:** The study was limited by its retrospective design, small sample size, and single-centre setting, which may limit the generalizability of the findings. Incomplete availability of certain clinical and laboratory variables restricted comprehensive analysis and may have affected the assessment of less frequent maternal conditions and complications. Larger prospective multicentre studies are warranted to validate these findings.

## CONCLUSION

HELLP syndrome predominantly affected young women presenting in late pregnancy and was associated with characteristic hematological and biochemical abnormalities. Maternal complications were observed in a subset of patients, with caesarean section being the commonest mode of delivery. Despite the severity of the condition, most patients had favourable maternal outcomes following appropriate management and supportive care.

## REFERENCES


1. Khalid F, Mahendraker N, Tonismae T. HELLP syndrome. StatPearls, Treasure Island (FL): StatPearls Publishing; 2026. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560615/ (Accessed on 13 June 2026)
2. Vera-Ponce VJ, Loayza-Castro JA, Ballena-Caicedo J, Valladolid-Sandoval LAM, Zuzunaga-Montoya FE, Gutierrez De Carrillo CI. Global prevalence of preeclampsia, eclampsia, and HELLP syndrome: a systematic review and meta-analysis. Front Reprod Health 2025;7:1706009. https://doi.org/10.3389/frph.2025.1706009.
3. 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. Am J Obstet Gynecol 2021;225:538.e1-538.e19. https://doi.org/10.1016/j.ajog.2021.04.261.
4. Petca A, Miron BC, Pacu I, Dumitrașcu MC, Mehedințu C, Șandru F, et al. HELLP syndrome-holistic insight into pathophysiology. Medicina (Kaunas) 2022;58:326. https://doi.org/10.3390/medicina58020326.
5. Gardikioti A, Venou T-M, Gavriilaki E, Vetsiou E, Mavrikou I, Dinas K, et al. Molecular advances in preeclampsia and HELLP syndrome. Int J Mol Sci 2022;23:3851. https://doi.org/10.3390/ijms23073851.




ISSN (O): 2687-5365; ISSN (P): 2753-6556

6. Adorno M, Maher-Griffiths C, Grush Abadie HR. HELLP syndrome. Crit Care Nurs Clin North Am 2022;34:277–88. https://doi.org/10.1016/j.cnc.2022.04.009.
7. Ernawati E, Akbar MIA, Aryananda RA, Bachnas MA, Irwinda R, Dewantiningrum J, et al. HELLP syndrome as a major contributor to adverse maternal and neonatal outcomes among preeclamptic women: findings from a multicenter retrospective cohort study. BMC Pregnancy Childbirth 2025;25:1345. https://doi.org/10.1186/s12884-025-08600-1.
8. Giannubilo SR, Marzioni D, Tossetta G, Ciavattini A. HELLP syndrome and differential diagnosis with other thrombotic microangiopathies in pregnancy. Diagnostics (Basel) 2024;14:352. https://doi.org/10.3390/diagnostics14040352.
9. Abdullahi FM, Tornes YF, Migisha R, Kalyebara PK, Tibaijuka L, Ngonzi J, et al. HELLP syndrome and associated factors among pregnant women with preeclampsia/eclampsia at a referral hospital in southwestern Uganda: a cross-sectional study. BMC Pregnancy Childbirth 2024;24:626. https://doi.org/10.1186/s12884-024-06835-y.
10. Mossayebi MH, Iyer NS, McLaren RA Jr, Moussa HN, Sibai BM, Al-Kouatly HB. HELLP syndrome at <23 weeks' gestation: a systematic literature review. Am J Obstet Gynecol 2023;229:502-515.e10. https://doi.org/10.1016/j.ajog.2023.04.046.
11. Mekonnen S, Fisseha H, Getinet T. Assessment of clinical characteristics and outcomes of liver diseases unique to pregnancy at a tertiary hospital in Ethiopia: A retrospective cohort study. Int J Hepatol 2022;2022:9894407. https://doi.org/10.1155/2022/9894407.
12. Klikpézo R, Obossou AAA, Ahouingnan YA, Badariatou S, Edayé BJ-D, Dettin E, et al. HELLP syndrome: Frequency and prognosis at the departmental and university hospital center of borgou and alibori from 2019 to 2023. Open J Obstet Gynecol 2026;16:502–14. https://doi.org/10.4236/ojog.2026.163049.
13. Sahoo A, Palo I, Mohapatra S, Behera A, Resident P. Feto-maternal outcome in hellp syndrome in a tertiary care system n.d. Int. J. Pharm. Clin. Res 2024; 16(9); 1612-1622. Available from: https://impactfactor.org/PDF/IJPCR/16/IJPCR,Vol16,Issue9, Article217.pdf
14. Arusi M, Gudu W, Haile K, Abdulkadir A, Fessehaye A, Wabe Y. Pregnancy outcome of hemolysis elevated liver enzymes and low platelet count syndrome at Saint Paul's hospital millennium medical college, Addis Ababa, Ethiopia: A retrospective cross sectional study 2022. Available from: https://meddocsonline.org/annals-of-epidemiology-and-public-health/pregnancy-outcome-of-hemolysis-elevated-liver-enzymes-and-low-platelet-count-syndrome-at-saint-paul-s-hospital-millennium-medical-college-addis-ababa-ethiopia-a-retrospective-cross-sectional-study.pdf
15. Li B, Yang H. Comparison of clinical features and pregnancy outcomes in early- and late-onset preeclampsia with HELLP syndrome: a 10-year retrospective study from a tertiary hospital and referral center in China. BMC Pregnancy Childbirth 2022;22:186. https://doi.org/10.1186/s12884-022-04466-9.


ISSN (O): 2687-5365; ISSN (P): 2753-6556