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Original Research Article

MATERNAL CHARACTERISTICS, CLINICAL PRESENTATION, AND BISHOP SCORE IN HELLP SYNDROME: INSIGHTS FROM A HOSPITAL-BASED PROSPECTIVE STUDY

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ABSTRACT

Background: HELLP syndrome an acronym for hemolysis, elevated liver enzymes, and low platelet count is widely regarded as a severe form of pre-eclampsia". This condition is life-threatening and represents a critical challenge for tertiary healthcare centers that frequently manage high-risk pregnancies. In a tertiary healthcare facility, the current study was conducted to assess the sociodemographic traits, gestational age at presentation, clinical complaints, blood pressure patterns, proteinuria, and Bishop scores of pregnant women with HELLP syndrome.

Materials and Methods: This prospective, hospital-based observational study was conducted in the Department of Obstetrics and Gynecology at Hi-Tech Medical College & Hospital from June 2022 to March 2025. Women aged 18–40 years with pregnancy ≥20 weeks and diagnosed with HELLP syndrome using the Mississippi classification were included. Detailed history, clinical examination, obstetric evaluation, laboratory investigations, and ultrasonography were performed. Data were analyzed to identify significant associations with maternal and perinatal outcomes.

Results: The majority of patients were between 21–30 years of age, primigravida, and from lower socioeconomic backgrounds. Most were referred cases with irregular antenatal check-ups. Abdominal pain, seizures, and headache were the most common presenting complaints, while pedal edema and visual disturbances were also noted. Severe hypertension (SBP ≥160 mmHg and DBP ≥110 mmHg) was observed in a substantial proportion. Bishop score assessment showed nearly 39% of women with a score >8, indicating favorable conditions for induction.

Conclusion: Understanding sociodemographic factors, gestational age, presenting symptoms, blood pressure, proteinuria, and Bishop score in HELLP syndrome is crucial for early identification and timely management. Recognizing these characteristics enables rapid intervention and tailored care, ultimately improving maternal and neonatal outcomes.

Keywords: HELLP syndrome; Preeclampsia; Eclampsia; Maternal morbidity; Perinatal outcome; Blood pressure; Proteinuria: Bishop score.

INTRODUCTION

HELLP syndrome an acronym for hemolysis, elevated liver enzymes, and low platelet count is widely regarded as a severe form of pre-eclampsia". This condition is life-threatening and represents a critical challenge for tertiary healthcare centers that frequently manage high-risk pregnancies.[1] It is characterized by rapid onset and progression, often complicating pregnancy with severe maternal and perinatal consequences. Due to this unpredictable course, early detection and timely intervention are paramount to reduce morbidity and mortality.[2,3]

The etiology of HELLP syndrome is multifactorial, and identifying its associated risk factors is essential for both prevention and management. Sociodemographic parameters, including maternal age, parity, socioeconomic background, and educational level, have been shown to influence the development and severity of the disorder.[1,2] Analyzing these determinants in women attending tertiary healthcare facilities provides important insights into disease patterns, particularly in resource-constrained settings where delayed diagnosis and referral often worsen outcomes.[3-5] Gestational age plays a crucial role in the clinical course of HELLP syndrome. Most cases are reported between 27 and 37 weeks of gestation, a period when maternal and fetal monitoring is critical. Recognizing this high-risk window enables healthcare providers to initiate closer surveillance and prepare for timely obstetric interventions when needed.[3,4] This is particularly important in settings where referral systems are overburdened, and access to advanced diagnostic facilities is limited.

The clinical presentation of HELLP syndrome is notoriously nonspecific, further complicating timely recognition. Patients often complain of vague symptoms such as abdominal or epigastric pain, nausea, vomiting, headache, or visual disturbances, which may easily be misattributed to benign pregnancy-related conditions.[5] Careful evaluation of such complaints, especially in women with hypertensive disorders, can facilitate early suspicion and diagnostic work-up. Although hypertension is a common feature, HELLP may also occur in normotensive women.[6] Thus, blood pressure monitoring, while vital, should be complemented with biochemical investigations and careful clinical observation.[5,6] In addition to clinical and biochemical parameters, obstetric assessment tools such as the Bishop score provide valuable information in the management of HELLP syndrome. As a pre-labor scoring system, the Bishop score guides decisions regarding induction of labor and delivery planning. This is particularly relevant since expeditious delivery remains the definitive treatment for HELLP syndrome, and cervical readiness significantly influences both maternal and perinatal outcomes.[7] Several studies have highlighted the importance of systematically analyzing sociodemographic, clinical, and obstetric variables in women with HELLP syndrome to improve diagnostic accuracy and enhance clinical awareness.[8,9] By doing so, tertiary healthcare centers can refine case management strategies and ultimately contribute to better outcomes for both mother and child.[10-13] The present study was undertaken to evaluate the sociodemographic characteristics, gestational age at presentation, clinical complaints, blood pressure patterns, proteinuria, and Bishop scores in pregnant women diagnosed with HELLP syndrome in a tertiary healthcare facility.

MATERIALS AND METHODS

This was a prospective, hospital-based observational study conducted in the Department of Obstetrics and Gynecology at Hi-Tech Medical College & Hospital from June 2022 to March 2025. Women admitted with features of HELLP syndrome through the outpatient department or labor ward were enrolled using purposive sampling. Women aged 18–40 years with a pregnancy ≥20 weeks were included if they had preeclampsia or eclampsia complicated by HELLP syndrome, confirmed using the Mississippi classification. Diagnostic confirmation required evidence of hemolysis (peripheral smear showing schistocytes or raised indirect bilirubin/LDH >600 IU/L), liver dysfunction (AST/ALT ≥40 IU/L), and thrombocytopenia (platelet count <1.5 lakh/mm³). Patients with incomplete records or comorbidities, such as viral hepatitis, hematological disorders, chronic hypertension, renal disease, autoimmune conditions, or acute fatty liver disease during pregnancy, were excluded.

At admission, demographic details (age, socioeconomic status, residence) and presenting complaints were recorded. A detailed history included: Antenatal history: number/regularity of antenatal visits, bookings, or referral status. Obstetric history: parity, pregnancy outcomes, and complications in prior pregnancies. Current pregnancy: menstrual history (LMP, EDD), urinary complaints (frequency, dysuria, hematuria, oliguria), warning symptoms (headache, epigastric pain, visual disturbances, nausea/vomiting), and seizure history (onset, frequency, loss of consciousness, associated features). Past and family history: chronic illnesses (diabetes, hypertension, renal or liver disease, autoimmune disorders, APLA syndrome) and prior treatment received. All patients underwent general examination (height, weight, nutritional status, pallor, icterus, edema, blood pressure, pulse, temperature, respiratory rate, and consciousness level). Systemic examination included cardiovascular, respiratory, and neurological assessments. A urine dipstick test was performed for albuminuria. Obstetric assessment included uterine height, tenderness, contractions, fetal lie and presentation, engagement, and fetal heart rate monitoring. A per-vaginal examination was performed to evaluate cervical dilatation, effacement, position, station, and Bishop score, as well as pelvic adequacy and status of membranes. Baseline laboratory investigations included hemoglobin, total and differential leukocyte counts, platelet count, ESR, peripheral smear, blood group and Rh typing, random blood sugar, renal function tests (serum urea, creatinine, uric acid), liver function tests (AST, ALT, bilirubin, proteins), and serum electrolytes. Urine microscopy was performed for protein and sugar. All patients underwent obstetric ultrasonography, and Doppler studies were performed when intrauterine growth

restriction (IUGR) was suspected. The diagnosis of HELLP syndrome was established when patients demonstrated: Hemolysis (schistocytes/reticulocytosis, elevated indirect bilirubin, or LDH >600 IU/L) was the most common clinical manifestation. Patients also displayed liver dysfunction, with an AST/ALT level of less than 40 IU/L. Thrombocytopenia (platelet count <1.5 lakh/mm³). Additional findings such as elevated serum bilirubin and reduced hemoglobin were noted in some patients.

Statistical analysis: For "statistical analysis, all data were first entered into a Microsoft Excel spreadsheet and subsequently analyzed using SPSS software (version 27.0; SPSS Inc., Chicago, IL, USA). The results were presented through tables and figures to illustrate research findings and distribution patterns. Appropriate statistical tests, including multiple t-tests where applicable, were employed. A p-value of <0.05 was considered the threshold for statistical significance.

RESULTS

In the present investigation, age-wise distribution showed that 7 patients were aged ≤20 years, 39 patients belonged to the 21–30 years age group, and 19 patients were between 31–40 years, with the difference being highly significant ($p < 0.00001$). Regarding the type of case, 20 patients presented as direct admissions, whereas 45 were referred cases of HELLP syndrome, also yielding a statistically significant association ($p < 0.00001$). Analysis of antenatal care (ANC) practices revealed that 25 patients had undergone regular ANC, 34 had irregular follow-up, and 6 had not received any ANC, with this variation showing high statistical significance ($p < 0.00001$). Parity assessment indicated that 43 women were primigravida, 14 were second gravida, 7 were third gravida, and 1 were gravida four or higher, which was statistically significant at $p < 0.05$. Gestational age distribution at presentation demonstrated that 15 patients were between 28–32 weeks, 9 were 33–34 weeks, 13 were 35–36 weeks, 17 were 37–38 weeks, 9 were 39–40 weeks, and 2 were post-term pregnancies. This distribution was also significant ($p < 0.05$) [Table 1].

In the present study, 3 patients were identified as belonging to the high socio-economic group, 18 fell into the middle socio-economic group, and 44 were classified within the low socio-economic group. This distribution was statistically significant ($p < 0.05$). With regard to presenting complaints at admission, abdominal pain was the most frequent, reported in 32 patients. Seizures were observed in 24 cases, while 21 patients presented with headache. Other symptoms included bleeding per vaginum in 8 patients, visual disturbances in 7, and reduced fetal movements in 20 cases. Additionally, 2 patients had complaints of decreased urination, 7 experienced breathlessness, 9 reported generalized weakness, and 3 presented with hematuria. Vomiting was noted in 11 cases, leaking per vaginum in 4, irritability in 2, and giddiness in 3. Jaundice was documented in 9 patients, and pedal edema was found in 26 patients upon admission [Figure 1]

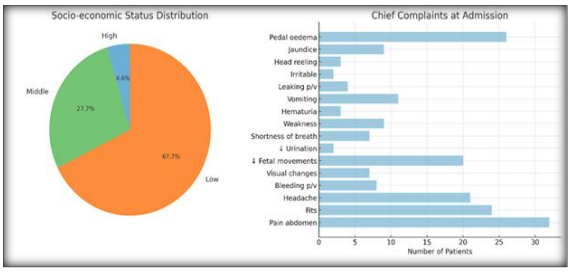

Figure 1: ?

Table 1: Clinical and Demographic Distribution of HELLP Syndrome Patients

Variable	Category	Number of Patients (n)	p-value
Age (years)	≤ 20	7	<0.00001
	21–30	39	
	31–40	19	
Type of Case	Direct	20	<0.00001
	Referred	45	
ANC Status	Regular ANC	25	<0.00001
	Irregular ANC	34	
	No ANC	6	
Gravidity	Primi-gravida	43	<0.05
	2nd Gravida	14	
	3rd Gravida	7	
	≥4th Gravida	1	
Gestational Age (weeks)	28–32	15	<0.05
	33–34	9	
	35–36	13	
	37–38	17	
	39–40	9	
	Post-term	2	

In the present study, "8 patients recorded systolic blood pressure values below 140 mmHg, 28 patients were within the range of 140–160 mmHg, and 29 patients had readings of ≥160 mmHg. This distribution was found to be statistically significant ($p < 0.05$). With respect to diastolic blood pressure,

17 patients (27.4%) had values <90 mmHg, 30 patients were in the range of 90–110 mmHg, and 18 patients had values ≥110 mmHg, which also showed statistical significance ($p < 0.05$) [Table 2]. Bishop scoring was assessed at the time of admission. Among the participants, 18 patients had a Bishop score ≤5, 22 patients had scores between 5 and 8, while 25 patients presented with scores greater than 8.

Table 2: Blood Pressure and Bishop Score Distribution of HELLP Syndrome Patients

Variable	Category	Number of Patients (n)	Percentage (%)	p-value
Systolic BP (mmHg)	<140	8	-	<0.05
	140–160	28	-	
	≥160	29	-	
Diastolic BP (mmHg)	<90	17	27.4	<0.05
	90–110	30	-	
	≥110	18	-	

DISCUSSION

HELLP syndrome is a rapidly evolving obstetric emergency with significant risks for both mother and fetus; early prediction and intervention are therefore vital. In the present work carried out at Hi-Tech Medical College & Hospital between June 2022 and March 2025, we sought to profile the maternal and fetal complications of HELLP syndrome and to identify factors associated with morbidity and mortality.

In our study, most patients were between 21 and 30 years of age, with a mean age of 26.77 ± 5.04 years. This is comparable with findings from Abdullahi et al, who reported a mean maternal age of 28.0 ± 6.6 years in women with HELLP syndrome in Uganda, with a predominance in the 20–30 year range.[1] Similar trends have been reported in Indian studies, where the majority of cases fall in the 20–25-year-old age group.[2,3]

We also found that the majority of cases were referrals, with irregular antenatal checkups being the most common. This finding is in line with observations from Abdullahi et al., where referral from peripheral centers was significantly associated with severe presentations of HELLP.[1] Inadequate or irregular antenatal care has repeatedly been associated with worse maternal outcomes in hypertensive disorders of pregnancy.[4]

In our sample, 67.7% were primigravida, which is consistent with prior studies showing primigravidity as an important risk factor.[2-5] We also documented that the majority belonged to lower socioeconomic classes, a factor strongly linked to delayed care-seeking and higher maternal morbidity.[6]

Our patients presented across a wide gestational spectrum, from 28 weeks to post-term. The majority, however, clustered between 32 and 38 weeks. Chidanandaiah et al, reported similar findings, observing that most cases presented between 33 and 37 weeks.[2] More than 60% of HELLP cases presented after 34 weeks, as reported by Abdullahi et al.[1] Thus, while HELLP can develop at any time in the third trimester, clinicians should maintain vigilance even at earlier gestational ages.

In our cohort, abdominal pain was the most frequent presenting symptom, followed by seizures, headache, reduced fetal movements, and pedal edema. Other symptoms included visual changes, vomiting, jaundice, and hematuria. This pattern is consistent with prior literature, where abdominal or right upper quadrant pain, nausea, and malaise are frequently reported.[7,8] Yimlefack et al, reported headache as the most common symptom (93.8%), with epigastric pain also being strongly associated with HELLP.[9] Similarly, Kaur et al, observed headache and malaise as dominant complaints in antepartum HELLP.[3]

These findings emphasize that HELLP often presents with nonspecific symptoms, which can delay diagnosis if clinical suspicion is not maintained.

A significant proportion of our patients presented with severe hypertension, with systolic ≥160 mmHg in 29 cases and diastolic ≥110 mmHg in 18 cases. This aligns with Celik et al., who reported a mean systolic BP of 161.6 mmHg and a mean diastolic BP of 98.5 mmHg in HELLP patients.[10] Similarly, a Tunisian study by Abroug et al, reported higher mean proteinuria and blood pressure among HELLP cases compared with preeclampsia controls.[11] These findings confirm that although HELLP is frequently associated with severe hypertension, some patients may present with modest elevations, and clinicians should not rely solely on blood pressure to exclude the diagnosis.

In our study, 38.7% of patients had a Bishop score greater than 8, suggesting relatively favorable conditions for induction in a subset of women. Although literature on Bishop scores in HELLP is limited, cervical readiness plays a role in determining the mode of delivery once maternal stabilization is achieved. Reporting such findings may assist in refining obstetric management strategies in HELLP cases.

Our findings underline the importance of strengthening antenatal care services, early recognition of warning symptoms, and timely referral systems. Since HELLP can present across gestational ages and with varied symptom profiles, obstetricians must maintain a high index of suspicion. Recent advances in predictive models

using clinical and laboratory parameters may help improve early identification.[12,13]

CONCLUSION

Effective diagnosis and management in tertiary healthcare centers rely on understanding the sociodemographic characteristics, gestational age, presenting problems, blood pressure, proteinuria, and Bishop score in pregnant women with HELLP syndrome. Early identification of high-risk patients via demographic profile, careful symptom monitoring, and vigilant examination of clinical parameters can aid in rapid therapy, reducing poor maternal and neonatal outcomes. The identification of these characteristics allows doctors to improve their treatment approach by tailoring treatments more accurately to the needs of women with HELLP syndrome, thereby improving patient outcomes.

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