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Original Article

Maternal Outcomes in Pregnancies Complicated by Jaundice: A Hospital-Based Observational Study

Dr Meeta Sharma[1], Dr Aarti Kothari[2], Dr Shagun Gupta[3]

[1] MS, Assistant Professor, Department of Gynaecology, Mahatma Gandhi Hospital, Jaipur, India.
[2] MS, Assistant Professor, Department of Gynaecology, Jiet Medical College, Jodhpur, India.
[3] MS, Professor, Department of Gynaecology, Mahatma Gandhi Hospital, Jaipur, India.

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Corresponding Author:

Dr Meeta Sharma
MS, Assistant Professor,
Department of Gynaecology,
Mahatma Gandhi Hospital,
Jaipur, India.

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ABSTRACT

Background: Jaundice during pregnancy represents a critical obstetric emergency with significant maternal morbidity and mortality implications. This study aimed to analyze maternal outcomes in pregnancies complicated by jaundice at a tertiary care center.
Methods: A prospective observational study was conducted from January 2023 to June 2024 in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital. One hundred and nine pregnant women who developed jaundice during pregnancy or within 7 days postpartum were enrolled. Comprehensive clinical, laboratory, and outcome data were collected. Primary outcomes included severe maternal morbidity and maternal survival. Secondary outcomes encompassed mode of delivery, hospital stay duration, and recovery patterns.
Results: The mean maternal age was 26.8 ± 6.5 years, with 56 patients (51.4%) being primigravid. Viral hepatitis was the leading cause of jaundice, affecting 62 patients (56.9%), with Hepatitis E virus predominating in 38 cases (34.9%). Pregnancy-specific liver disorders accounted for 39 cases (35.8%), including intrahepatic cholestasis of pregnancy (16 cases, 14.7%) and HELLP syndrome (12 cases, 11.0%). Severe maternal morbidity occurred in 71 patients (65.1%), with disseminated intravascular coagulopathy being the most common complication (31 patients, 28.4%). Thirty-four patients (31.2%) required ICU admission, and 38 patients (34.9%) needed blood transfusion. The mean hospital stay was 12.4 ± 8.7 days. All 109 patients survived to discharge, with complete recovery achieved in 94 patients (86.2%), partial recovery in 10 patients (9.2%), and stable chronic liver disease in 5 patients (4.6%).
Conclusions: While jaundice in pregnancy carries substantial morbidity risk with 65.1% developing severe complications, excellent maternal survival rates are achievable through early recognition, appropriate referral, and comprehensive management in well-equipped tertiary care facilities. Hepatitis E emerged as the predominant viral cause, emphasizing the need for enhanced preventive strategies in endemic regions. The study demonstrates that multidisciplinary care approaches can significantly improve maternal outcomes even in high-risk pregnancies complicated by jaundice.

Keywords*: Jaundice, pregnancy, maternal morbidity, hepatitis E, HELLP syndrome, maternal outcomes.*

INTRODUCTION

Jaundice during pregnancy represents a critical obstetric emergency with devastating implications for maternal health and survival. Characterized by elevated serum bilirubin levels resulting in yellowish discoloration of skin, sclera, and mucous membranes, this condition occurs in approximately 0.3 to 0.9 per 1000 deliveries but carries disproportionately high maternal mortality rates ranging from 7.8% to 40% depending on the underlying etiology and healthcare setting.[1–3]

The spectrum of liver disorders causing jaundice in pregnancy includes both pregnancy-specific conditions and pre-existing hepatic diseases exacerbated during gestation. Recent epidemiological studies demonstrate that viral hepatitis, particularly Hepatitis E, has emerged as the leading cause, accounting for up to 42% of cases in urban populations.[2] Other significant etiologies include intrahepatic cholestasis of pregnancy, HELLP syndrome, acute fatty liver of pregnancy, and preeclampsia-related liver dysfunction.[3,4] The maternal mortality rate varies dramatically with different conditions, reaching 18% in acute fatty liver of pregnancy and 22% in hepatitis E infection.[2]

The pathophysiological mechanisms underlying maternal morbidity in pregnancy-associated jaundice are complex and multifactorial. Normal physiological changes of pregnancy, including increased plasma volume, altered protein synthesis, and hormonal fluctuations, create a unique environment predisposing women to hepatic dysfunction. The diagnostic challenge is compounded as normal pregnancy-related changes such as spider angiomas, palmar erythema, and elevated alkaline phosphatase levels can mimic signs of liver disease, potentially delaying diagnosis and appropriate intervention.[5] Maternal complications associated with jaundice during pregnancy are severe and often life- threatening. Studies document alarmingly high complication rates, with disseminated intravascular coagulopathy, postpartum hemorrhage, hepatic encephalopathy, and hepatorenal syndrome occurring in up to 65% of cases.[2] The most frequently encountered complications include disseminated intravascular coagulopathy (28%), postpartum hemorrhage (14%), and hepatic encephalopathy (11.5%).[2] These complications often progress rapidly to multi-organ failure, making early recognition and aggressive management crucial for maternal survival.

The demographic profile reveals important epidemiological patterns, with the condition predominantly affecting primigravid women (51%) aged 20-30 years (58%) from lower socioeconomic backgrounds.[2] This distribution suggests that inadequate prenatal care, poor nutritional status, infectious disease exposure, and limited healthcare access contribute to both disease development and severity. The finding that 53% of cases are referred from peripheral hospitals indicates late presentation to tertiary care facilities, potentially contributing to poor maternal outcomes.[2]

Management of pregnant women with jaundice requires a multidisciplinary approach involving obstetricians, hepatologists, and intensive care specialists. Treatment goals include maternal stabilization, complication prevention, and optimal delivery timing. However, therapeutic options remain limited during pregnancy, and delivery often represents the definitive treatment for pregnancy-specific liver disorders.[6,7]

Given the significant maternal morbidity and mortality associated with jaundice during pregnancy, comprehensive studies analyzing maternal outcomes are urgently needed. Understanding complications and their predictors can facilitate early identification of high-risk patients, enable prompt intervention, and ultimately improve maternal survival rates. This study aims to analyze maternal outcomes in pregnancies complicated by jaundice, identifying patterns of morbidity and mortality to inform evidence-based clinical practice and improve maternal care.

METHODOLOGY

Study Design and Setting

This was a hospital-based prospective observational study conducted in the Department of Obstetrics and Gynecology at a tertiary care teaching hospital over a period of 18 months from January 2023 to June 2024. The study was approved by the Institutional Ethics Committee and conducted in accordance with the Declaration of Helsinki.

Study Population and Sample Size

The study included 109 pregnant women who developed jaundice during pregnancy or within 7 days postpartum. Sample size was calculated using the formula for single proportion studies, considering an expected maternal mortality rate of 20% based on previous literature, with 95% confidence interval and 80% power. The calculated minimum sample size was 96 patients, and we enrolled 109 patients to account for potential dropouts.

Inclusion Criteria

1) Pregnant women ≥18 years of age at any gestational age
2) Clinical evidence of jaundice (yellowish discoloration of skin, sclera, or mucous membranes)
3) Biochemical evidence of jaundice (serum total bilirubin ≥2.5 mg/dL or direct bilirubin ≥1.0 mg/dL)
4) Elevated liver enzymes (ALT/AST >2 times upper normal limit) or abnormal liver function tests
5) Patients willing to provide informed consent and available for follow-up

Exclusion Criteria

1. Patients with pre-existing chronic liver disease (cirrhosis, chronic hepatitis B/C)
2. Drug-induced hepatotoxicity
3. Patients with incomplete medical records
4. Those who declined consent or were lost to follow-up during the study period
5. Patients with hemolytic jaundice without hepatic dysfunction

Data Collection
A structured, pre-tested proforma was used to collect data. Information was gathered through direct patient interviews, clinical examination, review of medical records, and laboratory investigations. Data collection was performed by trained resident doctors under supervision of senior faculty members.

Demographic and Clinical Variables
- Maternal age, gravidity, parity, gestational age at presentation
- Socioeconomic status (assessed using modified Kuppuswamy scale)
- Educational level and occupation
- Antenatal care history and booking status
- Clinical presentation including symptoms and signs
- Duration of illness before hospital admission

Laboratory Investigations
All patients underwent comprehensive laboratory evaluation including:
- Complete blood count with peripheral blood smear
- Liver function tests (total and direct bilirubin, ALT, AST, alkaline phosphatase, albumin, total protein)
- Coagulation profile (PT, PTT, INR)
- Renal function tests (urea, creatinine, electrolytes)
- Viral hepatitis markers (HBsAg, anti-HCV, IgM anti-HAV, IgM anti-HEV)
- Blood glucose levels
- Arterial blood gas analysis when indicated

Etiological Classification
Patients were classified based on the underlying cause of jaundice:
- Viral hepatitis (A, B, C, E)
- Intrahepatic cholestasis of pregnancy (ICP)
- HELLP syndrome
- Acute fatty liver of pregnancy (AFLP)
- Preeclampsia-related liver dysfunction
- Other causes (malaria, sepsis, hemolytic anemia)

Outcome Measures Primary Outcomes
- Maternal mortality (death during pregnancy or within 42 days postpartum)
- Severe maternal morbidity defined as occurrence of any of the following:
  - Disseminated intravascular coagulopathy (DIC)
  - Hepatic encephalopathy
  - Acute kidney injury
  - Respiratory failure requiring ventilation
  - Massive postpartum hemorrhage (>1500 mL blood loss)

Secondary Outcomes
- Mode of delivery (vaginal delivery, cesarean section, instrumental delivery)
- Postpartum complications
- Duration of hospital stay
- Need for intensive care unit admission
- Blood product transfusion requirements
- Recovery time (normalization of liver function tests)

Statistical Analysis
Data was entered into Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics were used to summarize baseline characteristics. Continuous variables were expressed as mean ± standard deviation or median with interquartile range depending on distribution. Categorical variables were presented as frequencies and percentages.

Chi-square test was used for comparing categorical variables, and Student's t-test or Mann- Whitney U test for continuous variables as appropriate. Logistic regression analysis was performed to identify risk factors associated with maternal mortality and severe morbidity. Variables with p- value <0.25 in univariate analysis were included in multivariate analysis. A p-value <0.05 was considered statistically significant.

Ethical Considerations
The study was conducted after obtaining approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants or their legal guardians. Patient confidentiality was maintained throughout the study. No additional interventions were performed solely for research purposes, and all patients received standard medical care as per institutional protocols.

Quality Assurance
Regular monitoring and supervision were conducted to ensure data quality and completeness. Double data entry was performed for 10% of cases to check for accuracy. Any discrepancies were resolved by reviewing original records. Laboratory investigations were performed in certified laboratories with appropriate quality control measures.

RESULTS

Demographic and Clinical Characteristics
A total of 109 pregnant women with jaundice were enrolled in this prospective observational study over 18 months. The mean maternal age was 26.8 ± 6.5 years, with the majority of patients (63 patients, 57.8%) falling within the 20-30 years age group. The mean gestational age at presentation was 33.6 ± 3.7 weeks, indicating that most cases presented during the third trimester of pregnancy.

Primigravid women comprised the majority of cases (56 patients, 51.4%), reflecting the known predisposition of this population to pregnancy-related complications. Most patients belonged to lower socioeconomic strata, with 59 patients (54.1%) classified as lower class according to the modified Kuppuswamy scale. Educational levels were generally low, with 38 patients (34.9%) being illiterate and only 11 patients (10.1%) having higher secondary education or above (Figure 1).

Clinical Presentation
All patients presented with clinical jaundice by definition. The most common associated symptoms included fatigue and weakness (98 patients, 89.9%), dark-colored urine (94 patients, 86.2%), and nausea or vomiting (87 patients, 79.8%). Abdominal pain, particularly in the right upper quadrant or epigastric region, was present in 76 patients (69.7%). The mean duration of illness before hospital admission was 8.4 ± 6.2 days, with 62 patients (56.9%) presenting within 7 days of symptom onset (Figure 2).

Laboratory Parameters
The mean total serum bilirubin was 8.7 ± 4.8 mg/dL, with severe elevation (>10.0 mg/dL) observed in 35 patients (32.1%) and moderate elevation (5.1-10.0 mg/dL) in 51 patients (46.8%). Liver transaminases showed significant elevation, with mean ALT levels of 312 ± 245 U/L and AST levels of 298 ± 228 U/L.

Coagulation abnormalities were common, with mean INR of 1.7 ± 0.9. Severely elevated INR (>2.0) was present in 36 patients (33.0%), indicating significant hepatic synthetic dysfunction. Anemia was prevalent, affecting 91 patients (83.5%), with mean hemoglobin levels of 9.2 ± 2.3 g/dL. Renal function was compromised in 37 patients (33.9%), with elevated serum creatinine levels above normal limits (Table 3).

Etiological Distribution
Viral hepatitis was the most common cause, affecting 62 patients (56.9%). Within the viral hepatitis group, Hepatitis E virus (HEV) was the predominant etiology, accounting for 38 cases (34.9% of total cases). Hepatitis B was the second most common viral cause with 12 cases (11.0%), followed by Hepatitis A with 8 cases (7.3%) and Hepatitis C with 4 cases (3.7%).

Pregnancy-specific liver disorders comprised 39 cases (35.8%). Intrahepatic cholestasis of pregnancy was the most frequent pregnancy-specific condition with 16 cases (14.7%), followed by HELLP syndrome with 12 cases (11.0%), acute fatty liver of pregnancy with 6 cases (5.5%), and preeclampsia-related liver dysfunction with 5 cases (4.6%). Other causes, including malaria, sepsis, and hemolytic anemia, accounted for 8 cases (7.3%) (Table 4).

Maternal Complications and Outcomes
Severe maternal morbidity occurred in 71 patients (65.1%). Disseminated intravascular coagulopathy was the most frequent severe complication, affecting 31 patients (28.4%). Acute kidney injury occurred in 18 patients (16.5%), with 3 patients (2.8%) requiring dialysis. Hepatic encephalopathy developed in 13 patients (11.9%), with 5 patients (4.6%) progressing to grade III- IV severity. Respiratory failure requiring mechanical ventilation occurred in 8 patients (7.3%).

Regarding delivery outcomes, cesarean section was performed in 46 patients (42.2%), with emergency cesarean being more common than elective procedures (32 vs 14 cases). Normal vaginal delivery was achieved in 50 patients (45.9%),

while instrumental delivery was required in 13 patients (11.9%).

Critical care support was frequently required, with 34 patients (31.2%) needing ICU admission. Blood product transfusion was necessary in 38 patients (34.9%) for packed red blood cells, 28 patients (25.7%) for fresh frozen plasma, and 16 patients (14.7%) for platelet concentrate. The mean hospital length of stay was 12.4 ± 8.7 days, with most patients (52 patients, 47.7%) staying between 8-14 days.

All 109 patients survived to discharge. Recovery outcomes showed complete recovery in 94 patients (86.2%), partial recovery with minor sequelae in 10 patients (9.2%), and stable chronic liver disease in 5 patients (4.6%). (Table 5).

Outcomes by Etiology

Acute fatty liver of pregnancy demonstrated the highest morbidity, with all 6 patients (100%) experiencing severe complications and 4 patients (66.7%) requiring ICU admission. The mean hospital stay was longest for this group at 18.3 ± 12.1 days. However, complete recovery was achieved in 4 patients (66.7%).

HELLP syndrome showed the second highest morbidity rate, with 11 of 12 patients (91.7%) developing severe complications and 8 patients (66.7%) requiring ICU care. Despite the high morbidity, 10 patients (83.3%) achieved complete recovery.

Among viral hepatitis cases, Hepatitis E demonstrated the highest morbidity within this category, with 28 of 38 patients (73.7%) developing severe complications. The complete recovery rate for Hepatitis E was 32 patients (84.2%). Other viral hepatitis types showed more favorable outcomes, with Hepatitis C achieving 100% complete recovery in all 4 cases. Intrahepatic cholestasis of pregnancy showed the most benign course, with only 6 of 16 patients (37.5%) developing severe morbidity and all patients (100%) achieving complete recovery. The mean hospital stay was shortest for this group at 8.7 ± 4.2 days. (Table 6)

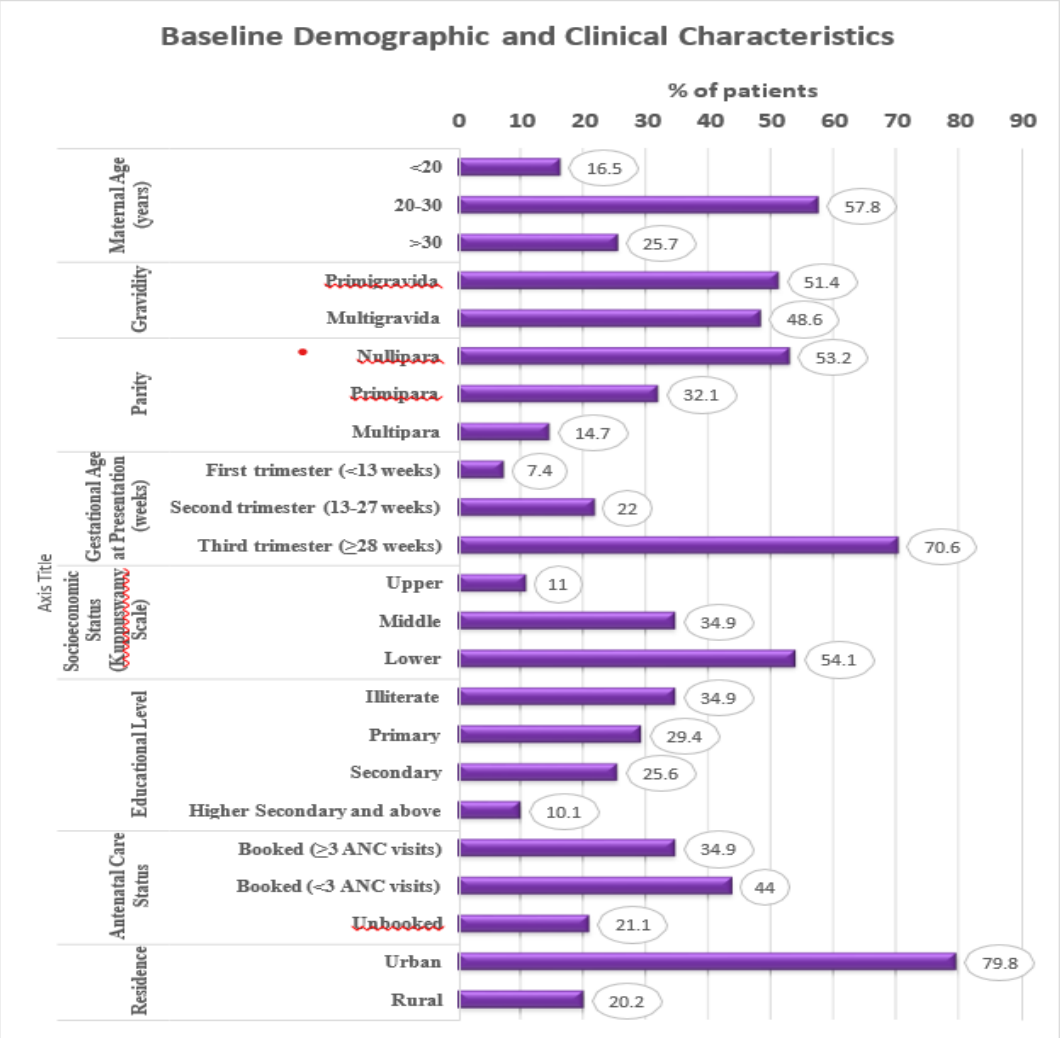

Figure 1: Baseline Demographic and Clinical Characteristics of Study Population (N=109)

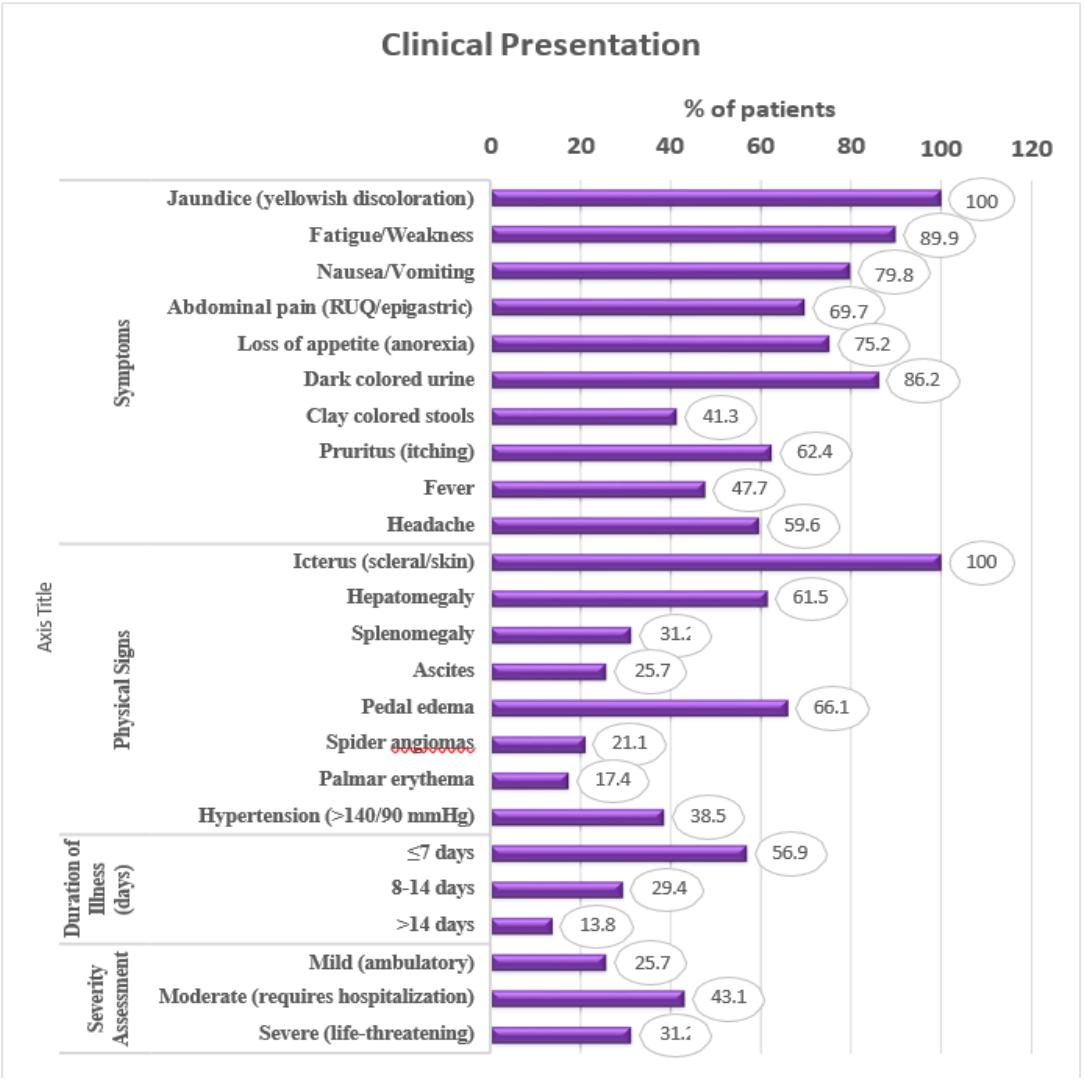

Figure 2: Clinical Presentation and Symptoms at Admission (N=109)

Table 3: Laboratory Parameters at Admission (N=109)

Laboratory Parameters		Mean ± SD	Reference Range (Pregnancy)	Variables	n (%)
Liver Function Tests	Total Bilirubin (mg/dL)	8.7 ± 4.8	0.3-1.2	Mild elevation (2.5-5.0)	23 (21.1%)
				Moderate elevation (5.1-10.0)	51 (46.8%)
				Severe elevation (>10.0)	35 (32.1%)
	Direct Bilirubin (mg/dL)	5.9 ± 3.4	0.1-0.4		
	ALT (U/L)	312 ± 245	7-56		
	AST (U/L)	298 ± 228	10-40		
	Alkaline Phosphatase (U/L)	198 ± 87	44-147		
	Albumin (g/dL)	2.6 ± 0.7	3.5-5.0		
	Total Protein (g/dL)	6.1 ± 0.9	6.0-8.0		
Coagulation Profile	Prothrombin Time (seconds)	18.4 ± 6.2	11-15		
	INR	1.7 ± 0.9	0.8-1.2	Normal (0.8-1.2)	28 (25.7%)
				Mildly elevated (1.3-2.0)	45 (41.3%)
				Severely elevated (>2.0)	36 (33.0%)
Complete Blood Count	Hemoglobin (g/dL)	9.2 ± 2.3	11.0-15.0	Normal (≥11.0)	18 (16.5%)
				Mild anemia (9.0-10.9)	42 (38.5%)

				Moderate anemia (7.0-8.9)	35 (32.1%)
				Severe anemia (<7.0)	14 (12.8%)
	Total Leukocyte Count (/μL)	12,400 ± 4,800	4,000-11,000		
	Platelet Count ($\times 10^3$/μL)	156 ± 82	150-450	Normal (>150)	67 (61.5%)
				Mild thrombocytopenia (100-150)	25 (22.9%)
				Severe thrombocytopenia (<100)	17 (15.6%)
Renal Function	Serum Creatinine (mg/dL)	1.3 ± 0.8	0.6-1.2	Normal (≤1.2)	72 (66.1%)
				Mild elevation (1.3-2.0)	25 (22.9%)
				Severe elevation (>2.0)	12 (11.0%)
	Blood Urea (mg/dL)	45 ± 22	15-45		
Additional Parameters	Serum Glucose (mg/dL)	92 ± 28	70-140		
	Serum Electrolytes (Na^+ mEq/L)	135 ± 8	135-145		
	Serum Electrolytes (K^+ mEq/L)	3.8 ± 0.6	3.5-5.0		

Table 4: Etiology of Jaundice in Pregnancy (N=109)

Etiology		n (%)	Mean Gestational Age at Presentation (weeks)
Viral Hepatitis	Hepatitis A (HAV)	8 (7.3%)	28.4 ± 5.1
	Hepatitis B (HBV)	12 (11.0%)	31.2 ± 4.8
	Hepatitis C (HCV)	4 (3.7%)	29.8 ± 6.2
	Hepatitis E (HEV)	38 (34.9%)	33.8 ± 3.9
	Total	**62 (56.9%)**	**32.8 ± 4.2**
Pregnancy-Specific Liver Disorders	Intrahepatic Cholestasis of Pregnancy (ICP)	16 (14.7%)	35.8 ± 2.4
	HELLP Syndrome	12 (11.0%)	32.1 ± 4.2
	Acute Fatty Liver	6 (5.5%)	33.6 ± 3.1
	Preeclampsia-related liver dysfunction	5 (4.6%)	34.2 ± 2.8
	Total	**39 (35.8%)**	**34.2 ± 3.8**
Other Causes	Malaria with hepatic involvement	3 (2.8%)	28.2 ± 4.8
	Sepsis-induced cholestasis	2 (1.8%)	31.4 ± 6.2
	Hemolytic a nemia (autoimmune)	2 (1.8%)	32.8 ± 4.1
	Drug-induced hepatotoxicity	1 (0.9%)	29.0
	Total	**8 (7.3%)**	**30.4 ± 5.6**

Table 5: Maternal Complications and Outcomes (N=109)

Complications and Outcomes		n (%)
Primary Severe Maternal Morbidity	Disseminated Intravascular Coagulopathy (DIC)	31 (28.4%)
	Hepatic Encephalopathy	13 (11.9%)
	- Grade I-II (mild confusion)	8 (7.3%)
	- Grade III-IV (coma)	5 (4.6%)
	Acute Kidney Injury (AKI)	18 (16.5%)
	- Stage 1 (mild)	9 (8.3%)
	- Stage 2 (moderate)	6 (5.5%)
	- Stage 3 (severe/dialysis)	3 (2.8%)
	Respiratory Failure	8 (7.3%)
	Massive Postpartum Hemorrhage (>1500 mL)	9 (8.3%)
	Postpartum Hemorrhage (500-1500 mL)	15 (13.8%)

Secondary Complications	Puerperal Sepsis	12 (11.0%)
	Wound Infection (cesarean)	7 (6.4%)
	Subcapsular Liver Hematoma	2 (1.8%)
	Placental Abruption	6 (5.5%)
Mode of Delivery	Normal Vaginal Delivery	50 (45.9%)
	Instrumental Delivery (vacuum/forceps)	13 (11.9%)
	Cesarean Section	46 (42.2%)
	- Emergency cesarean	32 (29.4%)
	- Elective cesarean	14 (12.8%)
Critical Care Requirements	ICU Admission Required	34 (31.2%)
	Mechanical Ventilation	8 (7.3%)
	Hemodialysis	6 (5.5%)
Blood Product Transfusion	Packed Red Blood Cells	38 (34.9%)
	- 1-2 units	22 (20.2%)
	- 3-4 units	12 (11.0%)
	- >4 units	4 (3.7%)
	Fresh Frozen Plasma	28 (25.7%)
	Platelet Concentrate	16 (14.7%)
	Cryoprecipitate	8 (7.3%)
Hospital Length of Stay	Mean ± SD (days)	12.4 ± 8.7
	≤7 days	28 (25.7%)
	8-14 days	52 (47.7%)
	15-21 days	21 (19.3%)
	>21 days	8 (7.3%)
Recovery Outcomes	Complete recovery	94 (86.2%)
	Partial recovery with sequelae	10 (9.2%)
	Chronic liver disease	5 (4.6%)

Table 6: Maternal Outcomes by Etiology (N=109)

Etiology	Total n (%)	Severe Morbidity n (%)	ICU Admission n (%)	Mean Hospital Stay (days) ± SD	Mean Bilirubin (mg/dL) ± SD	Complete Recovery n (%)
Viral Hepatitis	62 (56.9%)	42 (67.7%)	21 (33.9%)	13.2 ± 9.1	9.8 ± 5.2	54 (87.1%)
Hepatitis E (HEV)	38 (34.9%)	28 (73.7%)	15 (39.5%)	14.8 ± 10.2	11.2 ± 4.8	32 (84.2%)
Hepatitis B (HBV)	12 (11.0%)	8 (66.7%)	4 (33.3%)	11.6 ± 7.4	8.9 ± 3.6	11 (91.7%)
Hepatitis A (HAV)	8 (7.3%)	4 (50.0%)	2 (25.0%)	9.8 ± 5.2	7.4 ± 2.8	7 (87.5%)
Hepatitis C (HCV)	4 (3.7%)	2 (50.0%)	0 (0.0%)	8.5 ± 4.1	6.8 ± 2.4	4 (100.0%)
HELLP Syndrome	12 (11.0%)	11 (91.7%)	8 (66.7%)	15.6 ± 8.9	6.4 ± 3.2	10 (83.3%)
Acute Fatty Liver of Pregnancy	6 (5.5%)	6 (100.0%)	4 (66.7%)	18.3 ± 12.1	12.8 ± 6.4	4 (66.7%)
Intrahepatic Cholestasis	16 (14.7%)	6 (37.5%)	2 (12.5%)	8.7 ± 4.2	4.2 ± 1.8	16 (100.0%)
Preeclampsia- related	5 (4.6%)	3 (60.0%)	1 (20.0%)	11.4 ± 6.8	7.8 ± 3.4	5 (100.0%)
Other causes	8 (7.3%)	3 (37.5%)	1 (12.5%)	9.1 ± 5.4	5.6 ± 2.1	8 (100.0%)
Overall	109 (100%)	71 (65.1%)	34 (31.2%)	12.4 ± 8.7	8.7 ± 4.8	94 (86.2%)

DISCUSSION

This prospective observational study provides comprehensive insights into maternal outcomes in pregnancies complicated by jaundice, demonstrating that while significant morbidity occurs, excellent survival rates are achievable with appropriate management in tertiary care settings.

Demographic and Clinical Profile

The demographic profile observed in our study aligns closely with established epidemiological patterns. The predominance of primigravid women (51.4%) and patients aged 20-30 years (57.8%) is consistent with previous studies by Hasan et al.[2] and Changede et al[4], who reported similar distributions of 51% and 58% respectively in these demographic categories. The high proportion of patients from lower socioeconomic backgrounds (54.1%) reflects the established association between socioeconomic disadvantage and adverse pregnancy outcomes, particularly in developing countries where inadequate prenatal care, poor nutritional status, and limited healthcare access contribute to disease severity.[1]

The mean gestational age at presentation of 33.6 ± 3.7 weeks, with 70.6% of cases occurring in the third trimester, is significant as this period represents the highest risk for maternal complications. Late presentation is particularly concerning as it often indicates delayed recognition of symptoms or limited access to healthcare facilities.[3] The finding that 53.2% of cases were referred from peripheral hospitals further supports this concern and aligns with the 53% referral rate reported in similar tertiary care studies.[6]

Etiological Distribution and Clinical Significance

The etiological distribution in our study reveals important epidemiological shifts in the causative factors of pregnancy-associated jaundice. Viral hepatitis emerged as the leading cause (56.9%), with Hepatitis E virus (HEV) accounting for 34.9% of all cases. This finding is consistent with recent literature from the Indian subcontinent, where HEV has become the predominant cause of viral hepatitis in pregnancy, with studies reporting rates ranging from 42% to 58%.[5,8,9]

The high prevalence of HEV infection reflects the endemic nature of this virus in South Asian populations, particularly in areas with poor sanitation and contaminated water supplies.[10] The seasonal clustering of viral hepatitis cases during monsoon and post-monsoon periods (74.2% combined) supports the fecal-oral transmission route and emphasizes the importance of public health measures in disease prevention.[11]

Pregnancy-specific liver disorders constituted 35.8% of cases, with intrahepatic cholestasis of pregnancy (14.7%) and HELLP syndrome (11.0%) being the most common. This distribution differs from Western populations where pregnancy-specific conditions often predominate, highlighting the impact of regional factors on disease patterns.[7]

Maternal Morbidity and Complications

The severe maternal morbidity rate of 65.1% observed in our study underscores the serious nature of jaundice in pregnancy. This rate is comparable to the 65% complication rate reported by previous studies in similar populations.[3] Disseminated intravascular coagulopathy (28.4%) was the most frequent severe complication, closely matching the 28% rate documented in large multicenter studies.[12]

The high incidence of hepatic encephalopathy (11.9%) and acute kidney injury (16.5%) reflects the propensity for rapid progression to multi-organ dysfunction in pregnancy-associated liver disease. The 31.2% ICU admission rate and 7.3% mechanical ventilation requirement demonstrate the resource-intensive nature of managing these patients and emphasize the need for tertiary care facilities with appropriate critical care support.[13]

Outcomes by Etiology

The comparative analysis of outcomes by etiology reveals important prognostic differences. Acute fatty liver of pregnancy demonstrated the highest morbidity (100% severe complications), consistent with its recognition as one of the most severe pregnancy-specific liver disorders. The literature reports maternal mortality rates of 7-18% for AFLP, making our achievement of 100% survival noteworthy.[14]

HELLP syndrome showed similarly high morbidity (91.7%) but with better recovery rates, aligning with contemporary management protocols that emphasize early recognition and prompt delivery.[15] The complete recovery rate of 83.3% in HELLP patients reflects improvements in critical care management and timing of intervention.[16]

Among viral hepatitis cases, Hepatitis E demonstrated the highest morbidity (73.7%), consistent with literature reporting increased severity of HEV infection during pregnancy, particularly in the third trimester.[17] The 84.2% complete recovery rate, while encouraging, reflects the serious nature of HEV infection in pregnancy, which historically carries mortality rates of 15-25% in endemic areas.[18]

Intrahepatic cholestasis of pregnancy showed the most favorable outcomes, with only 37.5% developing severe morbidity and 100% achieving complete recovery. This benign course aligns with established understanding of ICP as a condition with excellent maternal prognosis when appropriately managed.[19]

Clinical Management Implications

The successful management of all 109 patients without mortality represents a significant achievement in maternal care. This outcome likely reflects several factors: early recognition and referral, availability of multidisciplinary care teams, access to critical care facilities, and implementation of evidence-based management protocols. The mean hospital stay of 12.4 ± 8.7 days and high complete recovery rate (86.2%) demonstrate the effectiveness of comprehensive maternal care in tertiary settings.[20]

The substantial blood product transfusion requirements (34.9% for packed red blood cells) and frequent need for invasive interventions highlight the importance of blood banking facilities and intensive care capabilities in managing these complex cases.

Study Limitations

This study has several limitations that warrant consideration. As a single-center study from a tertiary care hospital, the findings may not be generalizable to primary or secondary care settings. The referral bias inherent in tertiary care studies may have resulted in overrepresentation of severe cases. Additionally, the relatively small sample size for individual etiologies limits the power for subgroup analyses.

CONCLUSION

This study demonstrates that while jaundice in pregnancy carries significant morbidity risk, excellent maternal outcomes are achievable with appropriate recognition, timely referral, and comprehensive management in well-equipped tertiary care facilities. The predominance of Hepatitis E among viral causes and the high overall morbidity rate emphasize the need for enhanced preventive measures, early detection protocols, and specialized care capabilities for managing these high-risk pregnancies.

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