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Fetomaternal Outcome in Jaundice in Pregnancy

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ABSTRACT
Jaundice occurs in India between 0.4 and 0.9 times per 1000 live births. Jaundice is linked to 10% of maternal deaths during pregnancy and it has a dire prognosis for both the mother and the fetus. to evaluate the effects of jaundice on a pregnant patient's fetal and maternal outcomes in a tertiary care hospital. This study is observational in nature. It is held at Medical College & Hospital, Kolkata for a duration of one year. This study included sixty-five patients. This study included sixty-five patients. There have been 65 confirmed cases of jaundice interfering with pregnancy. Pregnancy-related jaundice affected 0.4 of every 1000 births. 38.5% of women are multigravida and 61.5% are primigravida. 55.9% of them were delivered via LSCS and 45.24% were delivered vaginally. There were 15 preterm babies and 44 term babies. 50.8% of those were boy and 49.2% of those were girls. Of the 24.61% rate of maternal complications, 8 cases involved mother death. 7.6% of IUD diagnoses and 91.5% of live births were recorded. Jaundice-related pregnancy complications are associated with higher rates of maternal death and morbidity in developing countries such as India. They have a significant impact on the outcomes of both the mother and the fetus. Therefore, it is essential to increase public awareness of the benefits of routine prenatal care, health education, early diagnosis and prompt treatment in order to improve many situations and offer favorable outcomes for the mother and the fetus.

INTRODUCTION

Jaundice occurs in India between 0.4 and 0.9 times per 1000 live births. Jaundice is linked to 10% of maternal deaths during pregnancy and it has a dire prognosis for both the mother and the fetus. One serious medical condition that is more prevalent in developing countries than in industrialized ones is pregnancy-related liver disease. The current study looks at the fetomaternal outcome and the etiology of jaundice-affected pregnancies. Abnormal liver test results happen in 3% to 5% of pregnancies for a variety of reasons. The clinical outcomes could be self-limiting or quickly fatal.

The main causes for abnormal liver tests in pregnant patients are:

- Liver disease associated with pregnancy. The most frequent causes of abnormal liver function tests during pregnancy are listed here. Pregnancy-specific liver diseases include the following five:
- Hyperemesis gravidarum (HG)
- Intrahepatic cholestasis of pregnancy (ICP)
- Preeclampsia
- Hemolysis elevated liver enzymes and low platelets (HELLP)
- Acute fatty liver of pregnancy (AFLP).

1. Recently developed liver diseases like severe viral hepatitis, drug-induced liver damage, or gallstones
2. Pre-existing chronic liver disease conditions, such as autoimmune hepatitis, cholestatic liver disease, Wilson disease and chronic viral hepatitis.
3. Physiologic changes during pregnancy - An abnormal liver function test resulting from pregnancy-related physiological changes without liver dysfunction follows a specific pattern.
4. Among the numerous issues mothers deal with are encephalopathy, disseminated intravascular coagulation, renal failure, shock, postpartum hemorrhage, pyrexia and death. Overly elevated serum bilirubin levels can cause intrauterine death and fetal asphyxia by constricting the placental arteries and producing a cardiotoxic effect. Furthermore, elevated bilirubin has a biological effect that makes the myometrium more sensitive to oxytocin and increases uterine contractility, which results in early labor.
5. A number of factors, such as poor hygiene, inadequate sanitation, malnutrition, anemia, delaying seeking medical attention, ignorance and delaying referrals to higher facilities, are responsible for the high rates of maternal death and morbidity in our country. A large number of patients arrive at the hospital in a moribund state, which prevents them from responding to treatment.

The frequency of viral hepatitis in pregnancy can be decreased by increasing public awareness, establishing hygienic conditions, securing clean drinking water, immunizing against the virus, improving prenatal care for early identification and developing hospitals with adequate critical care resources. This may lessen the mortality and morbidity of jaundice, which may cause pregnancy-related complications.

MATERIALS AND METHODS

Study Design: Observational Study.

Place of Study: Medical College and Hospital, College Square, Kolkata, West Bengal 700073.

Period of Study: 1 years.

Study Population: Jaundice in pregnancy can result from various causes, including liver diseases such as viral hepatitis, intrahepatic cholestasis of pregnancy (ICP), or other systemic conditions.

Sample Size: Sixty-five.

Case, control required or not: Not.

Study variables:

- **Maternal Variables:**
- Age of the mother
- Gestational age at onset of jaundice
- Gravida
- Parity
- Maternal medical history
- Maternal obstetric history
- Maternal socioeconomic status
- Maternal nutritional status
- Maternal access to healthcare services
- Maternal compliance with treatment protocols
- Maternal complications
- **Fetal Variables:**
- Fetal gestational age at diagnosis of maternal jaundice
- Fetal growth parameters
- Fetal well-being indicators
- Fetal anomalies or genetic disorders
- Fetal distress during labor
- Neonatal outcomes
- Neonatal complications
- **Pregnancy Variables:**
- Gestational age at delivery
- Mode of delivery
- Indications for delivery
- Use of obstetric interventions
- Maternal and fetal response to treatment for jaundice
- Timing and effectiveness of treatment modalities

- Maternal and fetal mortality rates
- **Laboratory and Diagnostic Variables:**
- Liver function tests
- Coagulation profile
- Viral serology
- Imaging studies to assess liver and fetal status

Inclusion criteria: Pregnant women affected by elevated liver parameters and viral positivity treated in Medical College and Hospital, Kolkata.

Exclusion criteria: Normal antenatal women.

RESULT AND DISCUSSIONS

Booking Status: In our study, 63(96.9%) patients were Booked and 2(3.1%) patients were Not booked in Booking status. this was not statistically significant (p<0.00001) (Table 1).

Referral: In our study, 60(92.3%) patients were Referred and 5(7.7%) patients were Self in reference status. In our study, 2(3.3%) patients had Elective LSCS, 28 (47.4%) patients had Emergency LSCS, 1 (1.6%) patient was Emergency hysterectomy, 24 (40.5%) patients were Vaginal Delivery with episiotomy, 2(3.6%) patients had RPT LSCS and 1 (1.6%) patient was Spontaneous expulsion in Mode of delivery. In our study, 2(3.1%) patients had AFLP diagnosis, 17 (26.2%) patients had Emergency HELLP diagnosis, 5(7.7%) patients were HELLP with SPE diagnosis, 2 (3.1%) patients were HELLP with viral infection HELLP with viral infection and 26 (40.0%) patients were Viral infection in diagnosis. this was not statistically significant (p<0.00001)

Term of the Baby: In our study, 15 (25.5%) patients had Preterm baby and 44 (74.5%) patients had Term baby.

Birth State of the Baby: In our study, 54 (87.2%) baby were Born alive 5 (8.0%) baby were Still born and 3 (4.8%) baby were Aborted.

Table 1: Distribution of the booking status and reference status of the patients in the study Population

Parameter	Number (n)	Percentage	p-value
Booking status			<0.00001
Booked	63	96.9	
Not booked	2	3.1	
Referral			
Referred	60	92.3	
Self	5	7.7	

Table 2: Frequency distribution of mode of delivery done in the study population

Mode of delivery	Number (n)	Frequency (%)	p-value
Elective LSCS	2	3.3	<0.00001
Emergency LSCS	28	47.4	
Emergency Hysterotomy	1	1.6	
Vaginal Delivery with episiotomy	24	40.5	
RPT LSCS	2	3.6	
Spontaneous expulsion	1	1.6	
Vacuum	1	1.6	

Sex of the Baby: In our study, 29 (49.2%) baby were Girl and 30 (50.8%) baby were Boy.

Nicu Admission: In our study, 15 (25.4%) baby required NICU admission.

In our study, 54 (91.5%) baby were Born Alive and 5 (8.5%) baby were Died (IUD + Perinatal).

In our study, 39 (60.0%) patients were No associated disorders, 1 (1.5%) patient had Acute kidney injury, 2 (3.1%) patients had Gestational diabetes mellitus, 2 (3.1%) patients had Gestational diabetes mellitus with gestational hypertension 12 (18.5%) patients had Gestational hypertension, 3 (4.6%) patients had Gestational hypertension with severe anemia, 4 (6.2%) patients had Hypothyroidism, 1 (1.5%) patient had Nephrotic syndrome and 4 (1.5%) patients had Splenomegaly. this was not statistically significant (p<0.00001)

Icterus: In our study, 21 (32.3%) patients had Present (+) Icterus and 44 (67.68%) patients had Present (+++) Icterus.

Pallor: In our study, 30 (46.1%) patients had Pallor Present (+).

Pedal Edema: In our study, 20 (30.7%) patients had Pedal edema Present (+) and 10 (15.38%) patients had Pedal edema Present (++).

Table 3: Frequency distribution of diagnosis done in the study population

Type of diagnosis	Number (n)	Frequency	p-value
AFLP	2	3.1	<0.00001
HELLP	17	26.2	
HELLP with AKI	1	1.53	
HELLP with eclampsia	1	1.53	
HELLP with SPE	5	7.7	
HELLP with viral infection	2	3.1	
HG	2	3.1	
HG with wernicks	1	1.53	
Hemolytic anemia	1	1.53	
Intrahepatic cholestatis	1	1.53	
Partial HELLP	1	1.53	
Viral infection	26	40	
No definitive diagnosis attained	5	7.7	

Table 4: Frequency distribution of neonatal outcome measures in the study population

Parameter	Number (n)	Percentage	p-value
Term of the baby			<0.00001
Preterm	15	25.5	
Term	44	74.5	
Birth state of the baby			
Born alive	54	87.2	
Still born	5	8.0	
Aborted	3	4.8	
Sex of the baby			
Girl	29	49.2	
Boy	30	50.8	
NICU admission			
Yes	15	25.4	
No	44	84.6	

Table 5: Distribution of Fetal Outcome

Fetal Outcome	Total	Percentage	p-value
Born Alive	54	91.5	<0.00001
Death (IUD+Perinatal)	5	8.5	

Table 6: Distribution of frequencies of associated medical disorders in the study population

Type of the associated medical disorders	Number (n)	Frequency	p-value
No associated disorders	39	60	<0.00001
Acute kidney injury	1	1.5	
Gestational diabetes mellitus	2	3.1	
Gestational diabetes mellitus with gestational hypertension	2	3.1	
Gestational hypertension	12	18.5	
Gestational hypertension with severe anemia	3	4.6	
Hypothyroidism	4	6.2	
Nephrotic syndrome	1	1.5	
Splenomegaly	4	1.5	

Table 7: Distribution of various clinical symptoms in the study population

Parameter	Number (n)	Percentage	p-value
Icterus			<0.00001
Present (+)	21	32.3	
Present (+++)	1	1.53	
Pallor			
Absent	34	52.3	
Present (+)	30	46.1	
Present (++)	1	1.53	
Pedal edema			
Absent	35	53.8	
Present (+)	20	30.7	
Present (++)	10	15.38	
Urine output			
Normal	47	72.3	
Decreased (↓)	11	16.92	
Decreased (↓↓)	1	1.53	
Decreased (↓↓↓)	1	1.53	
Nil	5	7.69	

Table 8: Distribution of various biochemical parameters in the study population

Parameter	Number (n)	Percentage	p-value
Hemoglobin (g dL^{-1}) Mean: 9.08 and SD 0.91			<0.00001
<8	4	6.15	
8-8.99	30	46.1	
9-9.99	28	43.07	
10-11	1	1.53	
>11	2	3.07	
Platelet count			
In normal range	20	30.7	
Decreased (↓)> 1Lack	3	4.61	
Decreased (↓↓) 50-1Lacks	1	1.53	
Decreased (↓↓↓)<50,000	41	63.07	
Random blood sugar			
In Normal range	62	95.38	
Decreased (↓)	2	3.07	
Increased (↑)	1	1.53	
Renal function test			
In normal range	61	93.84	
Elevated (↑)	3	4.61	
Elevated (↑↑)	1	1.53	

Urine Output: In our study, 47 (72.3%) patients were Normal Urine output and 11 (16.92%) patients were Decreased (↓) Urine output.

Hemoglobin (g dL^{-1}) In our study, 4 (6.15%) patients were <8 (g dL^{-1}) Hemoglobin, 30 (46.1%) patients were 8-8.99 (g dL^{-1}) Hemoglobin, 28 (43.07%) patients were 9-9.99 (g dL^{-1}) Hemoglobin, 1 (1.53%) patient was 10-9.99 (g dL^{-1}) Hemoglobin and 2 (3.07%) patients were >11 (g dL^{-1}) Hemoglobin.

Platelet Count: In our study, 20 (30.7%) patients were normal Platelet count, 3 (4.61%) patients were Decreased (↓)> 1Lack Platelet count, 1 (1.53%) patient was Decreased (↓↓) 50-1Lacks Platelet count, and 41 (63.07%) patients were Decreased (↓↓↓) <50,000 Platelet count and this was not statistically significant (p<0.00001).

Table 9: Distribution of various liver function test parameters in the study population

Parameter	Number (n)	Percentage	p-value
Total bilirubin (mg dL^{-1})			<0.00001
Elevated (↑)	38	58.4	
Elevated (↑↑)	4	6.15	
Elevated (↑↑↑)	23	35.33	
Indirect bilirubin (mg dL^{-1})			
Elevated (↑)	40	61.5	
Elevated (↑↑)	3	4.61	
Elevated (↑↑↑)	22	33.83	
Direct bilirubin (mg dL^{-1})			
Elevated (↑)	27	41.6	
Elevated (↑↑)	38	58.43	
SGOT			
Elevated (↑)	11	16.92	
Elevated (↑↑)	54	83.08	
SGPT			
Elevated (↑)	8	12.3	
Elevated (↑↑)	2	3.07	
Elevated (↑↑↑)	55	84.6	
LDH			
In normal range	35	53.85	
elevated	30	46.15	
Bile salts and bile pigments			
Present	45	69.23	
Absent	20	30.77	
Bleeding time and clotting time			
Elevated (↑)	40	61.54	
Elevated (↑↑)	25	38.46	
Prothrombin time and INR			
In normal range	25	38.46	
Elevated (↑↑)	40	61.54	

Table 10: Distribution of viral markers in the study population

Type of viral markers	Number (n)	Frequency	p-value
Negative	37	56.9	<0.00001
HAV positive	1	1.53	
HBs AG positive	26	38.46	
HCV positive	1	1.53	

Table 11: Distribution of Maternal Complications

Maternal Complications	Number (n)	Frequency (%)	p-value
Hepatic Encephalopathy	4	23.53	<0.00001
ARF	2	11.76	
Atonic PPH	8	47.06	
Abruption	1	5.88	
DIC	2	11.76	

Random Blood Sugar: In our study, 62 (95.38%) patients were normal blood sugar, 2 (3.07%) patients were Decreased blood sugar and 1 (1.53%) patient was Decreased blood sugar.

Renal Function Test: In our study, 61 (95.38%) patients were normal renal function test, 3 (4.61%) patients were Elevated Renal function test and 1 (1.53%) patient was Elevated Renal function test.

Total Bilirubin (mg dL^{-1}): In our study, 38 (58.4%) patients were Elevated (↑) Total bilirubin, 4 (6.15%) patients were Elevated (↑↑) Total bilirubin and 23(35.33%) patients were Elevated (↑↑↑) Total bilirubin.

Indirect Bilirubin: In our study, 40 (61.5%) patients were Elevated (↑) Indirect bilirubin, 3 (4.61%) patients were Elevated (↑↑) Indirect bilirubin and 22 (33.83%) patients were Elevated (↑↑↑) Indirect bilirubin.

Direct Bilirubin: In our study, 27 (41.6%) patients were Elevated (↑) Direct bilirubin and 38 (58.43%) patients were Elevated (↑↑) Direct bilirubin.

SGOT: In our study, 11 (16.92%) patients were Elevated (↑) SGOT and 54 (83.08%) patients were Elevated (↑↑) SGOT.

SGPT: In our study, 8 (12.3%) patients were Elevated (↑) SGPT, 2 (3.07%) patients were Elevated (↑↑) SGPT and 55 (84.6%) patients were Elevated (↑↑↑) SGPT.

LDH: In our study, 35 (53.85%) patients were normal LDH and 30 (46.15%) patients were Elevated LDH.

Bile Salts and Bile Pigments: In our study, 45 (69.23%) patients were Bile salts and bile pigments Present.

Bleeding Time and Clotting Time: In our study, 40 (61.54%) patients were Elevated (↑) Bleeding time and clotting time and 25 (38.46%) patients were Elevated (↑↑) Bleeding time and clotting time.

Prothrombin Time and INR: In our study, 25 (38.46%) patients were Normal Prothrombin time and INR and 40 (61.54%) patients were Elevated (↑↑) Prothrombin time and INR and this was not statistically significant (p<0.00001).

In our study, 1 (1.53%) patient was HAV positive, 26 (38.46%) patients were HBs AG positive and 1 (1.53%) patient was HCV positive and this was not statistically significant (p<0.00001).

In our study, the majority of patients (96.9%) were booked, while a small proportion (3.1%) were not booked, indicating a high rate of booking status among the participants and this was not statistically significant (p<0.00001).

Referral: In our study, a majority of patients (92.3%) were referred, while a smaller proportion (7.7%) sought medical attention on their own, indicating a high reliance on referrals in patient care.

The mode of delivery varied among the patients, with a significant proportion undergoing emergency LSCS (47.4%) and vaginal delivery with episiotomy (40.5%), and this was not statistically significant (p<0.00001).

The diagnosis status of the patients revealed various conditions, with a noteworthy prevalence of emergency HELLP (26.2%) and viral infection (40.0%), demonstrating the complexity of medical conditions observed in the study and this was not statistically significant (p<0.00001).

Similarly, In a study conducted by Reddy et al, the most prevalent condition observed was HELLP syndrome, affecting 33.3% of the patients. This was followed by acute fatty liver of pregnancy, which affected 22.2% of the patients, and intrahepatic cholestasis of pregnancy, which affected 11.1% of the patients[1]. In a study conducted by Reddy *et al*. the most prevalent condition observed was HELLP syndrome, affecting 33.3% of the patients. This was followed by acute fatty liver of pregnancy, which affected 22.2% of the patients, and intrahepatic cholestasis of pregnancy, which affected 11.1% of the patients[2]. Satia *et al*.[4] showed that viral hepatitis was the most common cause (62%), followed by cholestasis of pregnancy (24%)[1]. The etiology of HELLP syndrome remains uncertain, however, it is hypothesized to entail irregularities in the placental vasculature and malfunctions in maternal vascular endothelial cells, leading to inadequate perfusion. Anemia is a significant public health issue, particularly during pregnancy, in developing nations[4]. The World Health Organization (WHO) has classified anemia in pregnancy as a condition where the concentration of hemoglobin is less than 11 g dL^{-1}. The laboratory research in this study found that 76% of the patients had haemoglobin.

Term of the Baby: In our study, the majority of patients had term babies (74.5%), while a significant proportion had preterm babies (25.5%).

Birth State of the Baby: The study revealed that the majority of babies (87.2%) were born alive, while a small proportion were stillborn (8.0%) or aborted (4.8%).

Sex of the Baby: The study observed a relatively balanced distribution of gender among the babies, with 49.2% being Girl and 50.8% being Boy. This gender equilibrium highlights the need for gender-sensitive approaches in maternal and neonatal healthcare interventions.

NICU Admission: The study demonstrates a predominant trend of positive neonatal outcomes, with 91.5% of babies being born alive. Moreover, a noteworthy proportion of 60.0% of patients did not exhibit associated disorders. However, the occurrence of various maternal disorders, such as gestational hypertension, and the requirement for NICU admission for 25.4% of newborns, illustrate the complexity of maternal and neonatal health and this was not statistically significant (p<0.00001) .

Icterus: Within our investigation, 21 patients (32.3%) exhibited Icterus, while 44 patients (67.68%) displayed Present (+++) Icterus.

In our study, majority number patients 30 (46.1%) had Pallor Present (+).

Pedal Edema: The study revealed that 30.7% of patients exhibited the presence of pedal edema (+), while 15.38% had pedal edema (++).

Urine Output: The study observed that 72.3% of patients exhibited normal urine output, while 16.92% had decreased urine output (↓).

Hemoglobin (g dL^{-1}): We showed that with 46.1% of patients falling within the 8-8.99 (g dL^{-1}) range, followed by 43.07% in the 9-9.99 (g dL^{-1}) range. A smaller percentage of patients exhibited hemoglobin levels below 8 (g dL^{-1}) (6.15%), above 11 (g dL^{-1}) (3.07%), and in the 10-10.99 (g dL^{-1}) range (1.53%) and this was not statistically significant (p<0.00001).

Bilirubin Levels and Liver Function: The study revealed that a substantial proportion of patients exhibited elevated total bilirubin (58.4%), indirect bilirubin (61.5%) and direct bilirubin (41.6%)[5].

Serum Enzyme Levels: Elevated levels of SGOT were observed in 16.92% of patients, while 12.3% exhibited elevated SGPT levels. These results signify potential liver and muscle injury or stress, underscoring the importance of evaluating and addressing serum enzyme levels in the context of the patients' overall health and this was not statistically significant (p<0.00001).

LDH and Coagulation Parameters: LDH levels were elevated in 46.15% of patients, indicating cellular damage or hemolysis. Additionally, a considerable percentage of participants exhibited elevated bleeding time and clotting time (61.54%), along with elevated Prothrombin time and INR (61.54%), emphasizing potential coagulation abnormalities within the study population and this was not statistically significant (p<0.00001)[6].

Bile Salts, Bile Pigments, and Infections: The presence of bile salts and bile pigments was notable in 69.23% of patients, indicating potential hepatobiliary system dysfunction. a small percentage of patients tested positive for HAV, HBsAG, and HCV, signifying viral hepatitis prevalence within the cohort and this was not statistically significant (p<0.00001) Similarly According to Williamson *et al*.[7] the poor fetal outcome in intrahepatic cholestasis of pregnancy was due to the toxic bile acid level in the fetus causing fetal arrhythmia.

CONCLUSION

We draw the conclusion that jaundice during pregnancy is associated with high rates of perinatal and maternal mortality. Based on our investigation, viral hepatitis, more precisely hepatitis B, is the main cause of jaundice. Acute renal damage and hepatic encephalopathy are the two main effects on mothers. According to our research, HELLP is the most common cause of death. According to our research, mothers who have a bilirubin level of more than 10 at admission have a very poor prognosis and a high rate of maternal death. A multitude of factors could contribute to our country's high rate of maternal deaths, such as poor nutrition hygiene, a delay in hospital referrals, a delay in seeking medical attention, and the high incidence of anemia. Many patients are already dead when they are admitted to the tertiary healthcare system, and they often do not respond well to treatment.

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