ORIGINAL ARTICLE ASIAN JOURNAL OF MEDICAL SCIENCES

A study of abnormal liver function in pregnancy and its correlation with fetomaternal outcome in a teaching hospital of Kolkata in Eastern India

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Submission: 05-05-2022 Revision: 02-07-2022 Publication: 01-08-2022

ABSTRACT

Background: Liver is a vital organ to maintain physiology of the body and supports every organ of the body. Its proper functioning during pregnancy is essential for a good maternal and fetal outcome. The study analyzes the causes and fetomaternal outcome in pregnancies and suggests measures to reduce morbidity and mortality. **Aims and Objectives:** This study aims to analyze the maternal and fetal outcome in pregnancy complicated with abnormal liver function test. **Materials and Methods:** This was hospital-based observational prospective study conducted at NRS Medical College and Hospital from March 2020 to August 2021. Total 144 pregnant women with abnormal liver function were included in the study. Template was generated and analysis was done on SPSS software. **Results:** Among 144 pregnant women 44.4% patients were 21–25 years of age. About 79.2% patients had <2 serum bilirubin, 13.9% patients had 2–5 serum bilirubin, 2.8% patients had abruption, 11.8% patients had convulsion, and 9.3% patients had fetal bradycardia. About 13.9% patients had acute kidney injury, 22.2% patients had BT, 9.7% patients had hemolysis, elevated liver enzymes and low platelets, 15.3% patients had postpartum hemorrhage, and 3.8% patients had maternal death. In our study, 34.7% patients had pre-eclampsia and 11.8% patients had eclampsia. **Conclusion:** Abnormal liver function during pregnancy is associated with adverse events for both the mother and the fetus. Regular antenatal check-up, screening, and diagnosing liver disorder can save the lives of many mothers and fetus.

Key words: Fetomaternal outcome; Jaundice; Pregnancy

Access this article online

Website: http://nepjol.info/index.php/AJMS

DOI: 10.3126/ajms.v13i8.44879

E-ISSN: 2091-0576

P-ISSN: 2467-9100

INTRODUCTION

Liver is an important organ to maintain the normal physiology of the body and it supports almost every organ of the body and is vital for survival. Especially during pregnancy, liver should be functionally normal. In Jaundice in pregnancy of any etiology (hemolytic, viral etc.), liver functions are grossly affected.[1] Certain physiological changes unique to pregnancy – hemodynamic, hormonal, and immunological changes may alter the course of both acute and chronic liver diseases. Hence, liver with abnormal functions can increase the complications in pregnancy and sometimes lead to maternal death. The hepatic functions during pregnancy are affected by increased serum estrogen and progesterone levels. Physical findings such as palmer erythema and spider angioma which may suggest liver disease may be found normally during pregnancy.[2] However, up to 3% pregnancies are complicated by liver disorders. Certain liver diseases unique to pregnancy such as acute fatty liver of pregnancy (AFLP) and hemolysis, elevated liver enzymes and low platelets (HELLP) syndrome occur during the third trimester of pregnancy and are associated with increased morbidity and mortality to both the mother and fetus. These disorders have been suggested to represent a spectrum of the same pathologic mechanisms making differentiation among them challenging. Of the patients

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with AFLP, 50% have pre-eclampsia and 20% have severe eclampsia develop HELLP syndrome.

Delivery is the most important step in managing these disorders, because it can be life saving for both mother and child.[3,4] Complications such as disseminated intravascular coagulopathy (DIC), thrombocytopenia, renal failure, postpartum hemorrhage (PPH), and maternal mortality rates are high with the disease. It is responsible for about 60% of perinatal mortality and 14% maternal mortality.[1]

Serum total bilirubin levels are generally lower in pregnant women during all three trimesters, while low conjugated bilirubin concentration is observed during the second and third trimesters. This phenomenon is often attributed to hemodilution and hypoalbuminemia.[5] Hepatic dysfunction may occur in 3–10% of pregnancies and jaundice is observed in 0.1%.[6] The common causes that are associated with pregnancy are as follows: Pre-eclampsia (PEC)/ eclampsia (EC); HELLP syndrome; hyperemesis gravida rum (HG); intrahepatic cholestasis of pregnancy (ICP); and AFLP. It is evident that hepatic dysfunction has a significant impact on maternal as well as fetal outcome in pregnancy.[7]

A few Indian studies have brought forth data regarding the prevalence of pregnancy-specific liver diseases, and these are similar to international results. The global nature of this problem necessitates continued research so as to identify individuals at risk and to provide better monitoring, care, and delivery facilities. We found only one study which focused on the utility of a few blood investigations as a tool for prognostication in females with pregnancy-specific liver disease.[8]

The present study, thus, seeks to address this important issue by analyzing a larger number of variables of interest/ investigations and deriving logical conclusions regarding prognostic indicators for both fetal and maternal outcome in hepatic dysfunction during pregnancy.

Aims and objective

The objective of the study is as follows:

1. To find out the abnormal LFT during pregnancy and its detection in different trimesters.
2. To assess the pathological parameters in the liver functions related to pregnancy or coexistent with pregnancy.
3. To analyze the maternal outcome in terms of different complications including different life threatening situation arising in the antenatal period, in intranatal and in postnatal period,
4. To analyses fetal outcome in terms of prenatal morbidity and mortality.

MATERIALS AND METHODS

Type of study

This study was hospital-based observational prospective study.

Study design

This study was prospective cohort study.

Study setting

This study was Department of Gynecology and Obstetrics, NRS Medical College and Hospital.

Place of study

This study was Department of Gynecology 86 Obstetrics, NRS Medical COLLEGE 86 Hospital.

Period of study

The study duration was from March 2020 to August 2021.

Study population

All the patients attending at Department of Gynecology and Obstetrics in NRS Medical College and Hospital, fulfilling the inclusion criteria and willing to participate in the study.

Sample size

The sample size is calculated using proper statistical formula

n=4pq/12

p=Prevalence of abnormal LFT in pregnancy 10%

q=100-p

1 (absolute precision) = 5/0

After putting all this value in the above formula, my sample size was 144. Hence, 144 consecutive pregnant women with abnormal liver function test fulfilling the inclusion criteria were considered for the study. After collecting data, it was analyses with suitable statistical techniques and presented using different graphs, charts, and statistical tests (if any).

Inclusion criteria

The following criteria were included in the study:

1. All the patients attending antenatal clinic in NRSMCH was undergo blood for LFT and patients with abnormal LFT was studied prospectively irrespective of POG.
2. Willing to participate in the study
3. Delivered in NRSMCH irrespective of mode of delivery
4. Delivered in NRSMCH irrespective of period of gestation
5. Antenatal mother with pre-existing liver disorders or with hemolytic disorders.

Exclusion criteria

The following criteria were excluded from the study:

The antenatal mother attending antenatal clinic in NRSMCH

a) With drug induced abnormal liver function test.

b) Mother with normal LFT.
c) Mother with abnormal LFT but also having other medical complication like GDM or hypothyroid.

Sampling technique

All the patients attending antenatal clinic in NRSMCH were undergo blood for LFT and patients with abnormal LFT and normal LFT were studied prospectively to look for its correlation with the fetomaternal outcome.

Study variables

A pre-designed pre-tested data collection form was include the following variables: Name, Age, Gravida, Parity, Period of gestation, Complaints of the mother, Residency, Education, Occupation, Socioeconomic Status, Risk Factors, Detailed History, General Examination, Obstetric Examination, Blood and Radiological investigation, Any intranatal, and Postnatal Complication.

Data collection and interpretation

Name, age, registration number, and address of the patients were noted. After selecting patients and after taking informed consent, the data were collected in the following way:

a) With pre-designed and pre-tested schedule
b) Clinical examination
c) Liver function test

Statistical analysis

For statistical analysis, data were entered into a Microsoft Excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests.

Z-test (standard normal deviate) was used to test the significant difference of proportions. Explicit expressions that can be used to carry out various t-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a t-distribution under the null hypothesis is given. Furthermore, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test.

Once a t value is determined, P-value can be found using a table of values from Student's t-distribution. If the calculated P-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favor of the alternative hypothesis.

$P \leq 0.05$ was considered for statistically significant.

Ethical clearance

The study will be conducted only after obtaining written approval from the Institutional Ethics Committee. Written informed consent will be taken from every study patient or their logical representative.

RESULTS

This hospital-based observational prospective study was conducted at the Department of Gynecology and Obstetrics, NRS Medical College and Hospital from March 2020 to August 2021. During the period, 144 pregnant women with abnormal liver function test fulfilling the inclusion criteria were included in the study. Template was generated in Microsoft Excel sheet and analysis was done on SPSS software.

In our study, 17 (11.8%) patients were ≤20 years of age, 64 (44.4%) patients were 21–25 years of age, 40 (27.8%) patients were 26–30 years of age, and 23 (16.0%) patients were 31–35 years of age. Calculatedz value was 2.9443 and p value was 0.00328. The result is significant at P<0.05. Almost 58 (40.3%) patients had Parity Multiparous and 86 (59.7%) patients had Parity Nulliparous. Calculated z value was 3.2998 and p value was 0.00096. The result is significant at P<0.05. 9 (6.3%) patients were in POG (diagnosis of abnormal LFT) gr second trimester and 135 (93.8%) patients were in POG (diagnosis of abnormal LFT) gr third trimester. Calculated z value was 14.8492 and p value was <0.00001. The result is significant at P<0.05. In our study, 115 (79.9%) patients were Booked in antenatal care and 29 (20.1%) patients were unbooked in antenatal care. Calculated z value was10.135 and p value was <0.00001. The result is significant at P<0.05. In our study, 55 (38.2%) patients were belonging to lower class, 57 (39.6%) patients were belongs lower middle class, 21 (14.6%) patients were belong middle class, and 11 (7.6%) patients were belong upper class. Calculated z value was 0.2417 and p value was 0.81034. The result is not significant at P<0.05 (Table 1).

In our study, 44 (30.6%) patients had Pruritus. Calculated z value was 6.5997 and p value was <0.00001. The result is significant at P<0.05. 53 (36.8%) patients had Vomiting. Calculated z value was 4.4783 and p value was <0.00001. The result is significant at P<0.05. Forty (27.8%) patients had headache. Calculated z value was 7.5425 and p value was <0.00001. The result is significant at P<0.05. Thirty-five (24.3%) patients had Pedal Edema. Calculated z value was 8.721 and p value was <0.00001. The result is significant at P<0.05. In our study, 77 (53.5%) patients had normal SBP (Normal value <140 mm Hg) and 67 (46.5%) patients had Elevated SBP (Normal value <140 mm Hg). Calculated z value was 1.1785 and p value was 0.238. The result is not significant at P<0.05. Seventy-four (51.4%)

patients had normal DBP (Normal value <90 mm Hg) and 70 (48.6%) patients had Elevated DBP (Normal value <90 mm Hg). Calculated z value was 0.4714 and p value was 0.63836. The result is not significant at P<0.05. One hundred and fourteen (79.2%) patients had <2 serum bilirubin, 20 (13.9%) patients had 2–5 serum bilirubin, and 10 (6.9%) patients had >5 serum bilirubin. Calculated z value was 11.1048 and p value was <0.00001. The result is significant at P<0.05. Nine (6.3%) patients had <100 SGOT (<40 IU/L) and 135 (93.8%) patients had 100–1000 SGOT (<40 IU/L). Calculated z value was 14.8492 and p value was <0.00001. The result is significant at P<0.05. On the other hand, 9 (6.3%) patients had <100 SGPT (<40 IU/L) and 135 (93.8%) patients had 100–1000 SGPT (<40 IU/L). Calculated z value was14.8492 and p value was <0.00001. The result is significant at P<0.05 (Table 2).

In our study, 4 (2.8%) patients had abruption, 17 (11.8%) patients had convulsion, 2 (1.4%) patients had cord prolapse, 13 (9.3%) patients had fetal bradycardia, 1 (0.7%) patient had persistent less FM, 10 (6.9%) patients had thick meconium stained liquor, and 8 (5.6%) patients had intrauterine fetal death (IUFD) in intrapartum complication (Figure 1).

In our study, 20 (13.9%) patients had acute kidney injury (AKI), 4 (2.8%) patients had DIC (Disseminated intravascular coagulation), 32 (22.2%) patients had BT, 4 (2.8%) patients had HE, 14 (9.7%) patients had HELLP, 22 (15.3%) patients had PPH, and 5 (3.8%) patients had maternal death (Figure 2).

In our study, 50 (34.7%) patients had pre-eclampsia, 17 (11.8%) patients had Eclampsia, 30 (20.8%) patients had IHCP, 5 (3.5%) patients had HG, 3 (2.1%) patients had AFLP, 8 (5.6%) patients had Hepatitis A, 5 (3.5%) patients had Hepatitis B, 14 (9.7%) patients had Hepatitis E, 5 (3.5%) patients had Beta Thal Major, 2 (1.4%) patients had Sickle Cell Anemia, 3 (2.1%) patients had Obstructive Jaundice, and 2 (1.4%) patients had Leptospirosis in Etiology of liver disorder GR (Table 3).

In our study, 3 (2.1%) patients had very low birth weight, 88 (61.1%) patients had low birth weight, and 53 (36.8%) patients had normal birth weight. Calculated z value was 4.1257 and p value was <0.00001. The result is significant at P<0.05. In our study, 58 (40.3%) patients had Preterm POG and 86 (59.7%) patients had Term POG. Calculated z value was 3.2998 and p value 0.00096. The result is significant at P<0.05. In our study, 61 (42.4%) patients had NICU Admission. Calculated z value was 2.5927 and p value was 0.0096. The result is significant at P<0.05 (Table 4).

In our study, 40 (27.8%) patients were APGAR at 1 min (<7). Calculated z value was 7.5425 and p value was <0.00001. The result is significant at P<0.05. In our study, 41 (28.5%)

Table 1: Demographic distribution of the participants

Age (years)	Frequency	Percentage
≤20	17	11.8
21–25	64	44.4
26–30	40	27.8
31–35	23	16.0
Total	144	100
Parity		
Multiparous	58	40.3
Nulliparous	86	59.7
Total	144	100
POG (Period of Gestation) (Diagnosis of Abnormal LFT) gr		
Second trimester	9	6.3
Third trimester	135	93.8
Total	144	100.0
Status of antenatal care		
Booked	115	79.9
Unbooked	29	20.1
Total	144	100.0
Socioeconomic status		
Lower class	55	38.2
Lower middle class	57	39.6
Middle class	21	14.6
Upper class	11	7.6
Total	144	100.0

Table 2: Distribution according to baseline variables

Pruritus	Number of cases (N)	Percentage
No	100	69.4
Yes	44	30.6
Total	144	100.0
Vomiting		
No	91	63.2
Yes	53	36.8
Total	144	100.0
Headache		
No	104	72.2
Yes	40	27.8
Total	144	100.0
Pedal Edema		
No	109	75.7
Yes	35	24.3
Total	144	100.0
SBP (systolic blood pressure) (normal value <140 mm Hg) g		
Normal	77	53.5
Elevated	67	46.5
Total	144	100.0
DBP (diastolic blood pressure) (normal value <90 mm Hg)		
Normal	74	51.4
Elevated	70	48.6
Total	144	100.0
Serum bilirubin (0.2–1.2) gr		
<2	114	79.2
2–5	20	13.9
>5	10	6.9
Total	144	100.0
SGOT (serum glutamic-oxaloacetic transaminase) (<40 IU/L)		
<100	9	6.3
100–1000	135	93.8
Total	144	100.0
SGPT (serum glutamic-pyruvic transaminase) (<40 IU/L)		
<100	9	6.3
100–1000	135	93.8
Total	144	100.0

patients were APGAR at 5 min (<7). Calculated z value was 7.3068 and p value was <0.00001. The result is significant at P<0.05. In our study, 39 (27.01%) patients had prematurity, 26 (18.1%) patients had early neonatal death, and 6 (4.7%) patients had still born in fetal complication (Table 5).

DISCUSSION

This hospital-based observational prospective study was conducted in the Department of Gynecology and Obstetrics, NRS Medical College and Hospital from March 2020 to August 2021. All the patients attending antenatal clinic in NRSMCH were undergo blood for LFT and patients with abnormal LFT were studied prospectively irrespective of POG, Willing to participate in the study, delivered in NRSMCH irrespective of mode of delivery, delivered in NRSMCH irrespective of period of gestation, and antenatal mother with pre-existing liver disorders or with hemolytic disorders were included in this study.

In our study, 17 (11.8%) patients were ≤20 years of age, 64 (44.4%) patients were 21–25 years of age, 40 (27.8%) patients were 26–30 years of age, and 23 (16.0%) patients were 31–35 years of age. Calculated z value was 2.9443. Almost 58 (40.3%) patients had parity multiparous and 86 (59.7%) patients had parity nulliparous. Nine (6.3%) patients were in POG (Diagnosis of Abnormal LFT) g second trimester and 135 (93.8%) patients were in POG (Diagnosis of Abnormal LFT) g Third trimester. In our study, 115 (79.9%) patients were booked in antenatal care and 29 (20.1%) patients were unbooked in antenatal care. In our study, 55 (38.2%) patients were belonging to lower class, 57 (39.6%) patients were belong lower middle class, 21 (14.6%) patients were belong middle class, and 11 (7.6%) patients were belong upper class.

Singh et al.,[9] found that 76.5% cases were between 20 and 30 years of age, 72.9% cases were primigravida, and 90.59% cases presented in third trimester of pregnancy.

In our study, 44 (30.6%) patients had Pruritus. Calculated z value was 6.5997 and p value was <0.00001. The result is significant at P<0.05. Fifty-three (36.8%) patients had vomiting. Calculated z value was 4.4783. Thirty-five (24.3%) patients had Pedal Edema. In our study, 77 (53.5%) patients had normal SBP (normal value <140 mm Hg) and 67 (46.5%) patients had elevated SBP (normal value <140 mm Hg). Seventy-four (51.4%) patients had normal DBP (normal value <90 mm Hg) and 70 (48.6%) patients had elevated DBP (normal value <90 mm Hg). One hundred and fourteen (79.2%) patients had <2 serum bilirubin, 20 (13.9%) patients had 2–5 serum bilirubin, and 10 (6.9%) patients had >5 Serum bilirubin. Nine (6.3%) patients had <100 SGOT (<40 IU/L) and 135 (93.8%) patients had 100-1000 SGOT (<40 IU/L). On the other hand, 9 (6.3%) patients had <100 SGPT (<40 IU/L) and 135 (93.8%) patients had 100–1000 SGPT (<40 IU/L).

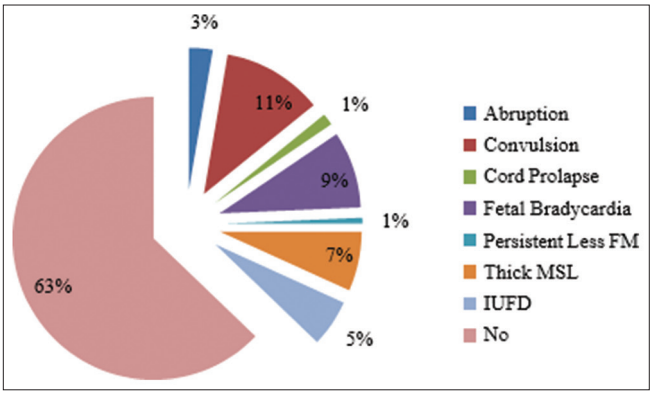

Figure 1: Distribution of intrapartum complication

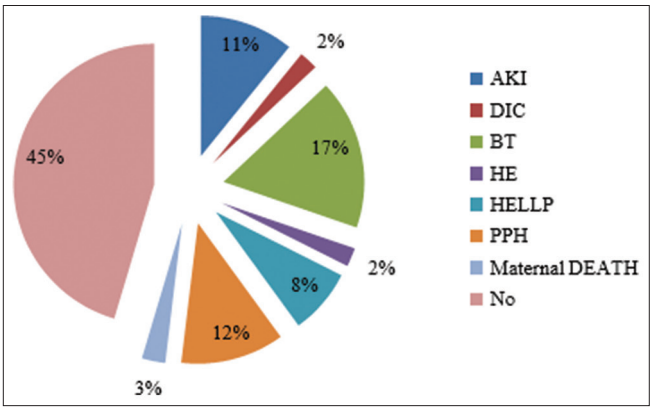

Figure 2: Distribution of postpartum complication

Table 3: Distribution of etiology of liver disorder GR

Etiology of liver disorder GR	Frequency	Percent
Pre-eclampsia	50	34.7
Eclampsia	17	11.8
Intrahepatic cholestasis of pregnancy	30	20.8
Hyperemesis gravidarum	5	3.5
Acute fatty liver of pregnancy	3	2.1
Hepatitis A	8	5.6
Hepatitis B	5	3.5
Hepatitis E	14	9.7
Beta Thal Major	5	3.5
Sickle cell anemia	2	1.4
Obstructive jaundice	3	2.1
Leptospirosis	2	1.4

Sumangali et al.,[10] found that the incidence of abnormal liver function tests was 6.7%. Among these, 96% were due to pregnancy specific liver dysfunction mainly due to hypertensive disorders. The mean value of bilirubin was more in infective hepatitis. There were four cases of intra uterine deaths and no maternal death. Pregnancy specific disorders are the major cause of abnormal liver function tests in pregnancy, especially in the third trimester.

Table 4: Distribution of birth weight (kg) GR, POG (At The time of delivery) and NICU Admission

Birth weight (kg) GR	Frequency	Percent
Very low birth weight	3	2.1
Low birth weight	88	61.1
Normal birth weight	53	36.8
Total	144	100.0
POG at the time of delivery		
Preterm	58	40.3
Term	86	59.7
Total	144	100.0
NICU Admission		
No	83	57.6
Yes	61	42.4
Total	144	100.0

NICU: Neonatal intensive care unit, POG: Period of gestation

Table 5: Distribution of APGAR at 1 min (<7), APGAR at 5 min (<7) and fetal complication

APGAR at 1 min (<7)	Frequency	Percent
No	104	72.2
Yes	40	27.8
Total	144	100.0
APGAR at 5 min (<7)		
No	103	71.5
Yes	41	28.5
Total	144	100.0
Fetal complication		
Prematurity	39	27.01%
Early Neonatal Death	26	18.1%
Still born	6	4.7%
No	84	58.3%

APGAR: American Pediatric Gross Assessment Record

In our study, 4 (2.8%) patients had abruption, 17 (11.8%) patients had convulsion, 2 (1.4%) patients had Cord Prolapse, 13 (9.3%) patients had fetal bradycardia, 1 (0.7%) patient had Persistent less FM, 10 (6.9%) patients had thick MSL, and 8 (5.6%) patients had IUFD in intrapartum complication. In our study, 20 (13.9%) patients had AKI, 4 (2.8%) patients had DIC, 32 (22.2%) patients had BT, 4 (2.8%) patients had HE, 14 (9.7%) patients had HELLP, 22 (15.3%) patients had PPH, and 5 (3.8%) patients had maternal death.

Mishra et al.,[11] found that the incidence of abnormal LFT was 0.9%. 13/80 (16.75%) women had liver disorder not specific to pregnancy, whereas 67/80 (83.25 %) women had pregnancy-specific liver dysfunction. Of these, 65(81.25 %) women with liver dysfunction had pre-eclampsia including 11 (13.75 %) with HELLP and six women with eclampsia. 48/65 (60%) women had pre-eclampsia in the absence of HELLP syndrome or eclampsia. Tank et al.,[12] showed that 80.71% of the patients had HELLP syndrome. The remaining were cases of acute fulminant hepatitis and AFLP. The most consistent finding was thrombocytopenia (88.46%). Disseminated intravascular coagulopathy (DIC) was the most common complication (65%). BT/CT were 100% sensitive for the diagnosis of DIC. Maternal and perinatal mortality were 42.3% and 61.5%, respectively. Intensive care facilities and an early diagnosis are essential for the management of mothers with severe liver disease.

In our study, 50 (34.7%) patients had pre-eclampsia, 17 (11.8%) patients had eclampsia, 30 (20.8%) patients had IHCP, 5 (3.5%) patients had HG, 3 (2.1%) patients had AFLP, 8 (5.6%) patients had Hepatitis A, 5 (3.5%) patients had Hepatitis B, 14 (9.7%) patients had Hepatitis E, 5 (3.5%) patients had Beta Thal Major, 2 (1.4%) patients had Sickle Cell Anemia, 3 (2.1%) patients had Obstructive Jaundice, and 2 (1.4%) patients had Leptospirosis in Etiology of liver disorder GR.

In our study, 3 (2.1%) patients had very low birth weight, 88 (61.1%) patients had low birth weight, and 53 (36.8%) patients had normal birth weight. In our study, 58 (40.3%) patients had preterm POG and 86 (59.7%) patients had term POG. Calculated z value was 3.2998 and p value was 0.00096. In our study, 61 (42.4%) patients had NICU Admission. Calculated z value was 2.5927 and p value was 0.0096. In our study, 40 (27.8%) patients were APGAR at 1 min (<7). In our study, 41 (28.5%) patients were APGAR at 5 min (<7). In our study, 39 (27.01%) patients had prematurity, 26 (18.1%) patients had early neonatal death, and 6 (4.7%) patients had still born in fetal complication.

Kirbak et al.,[13] found that hepatitis B case was defined as any women participating in the study and was found to be positive for HbsAg and confirmed by ELISA. Jain et al.,[14] found that most common complication is DIC followed by hemorrhagic shock and subsequently AKI and septicemia. About 77.7% babies were born alive and 30.9% NICU admission due to severe birth asphyxia and prematurity. Of these, 16.6% died in neonatal period. Maternal mortality in 14.5% patients due to viral hepatitis, HELLP, and septicemia. Jaundice in pregnancy is a rare medical disorder and deadly combination affecting maternal and fetal outcome. Suresh et al.,[15] found that pre-eclampsia (57%), eclampsia (19%), HELLP syndrome (8%), viral infection (6%), HG (5%), ICP (4%), chronic liver disease (1%), and sepsis were encountered. There were 41 fetal deaths, 42% preterm deliveries, and NICU admission rate was 27%. Five maternal deaths occurred.

Limitations of the study

The limitation of our present study is that the sample size was small. Only 144 cases are not sufficient for this kind of study. The study has been done in a single center. On-going COVID-19 pandemic and lockdown have further hampered the study. Therefore, further studies should be

conducted with bigger sample sizes and hospitals in rural and urban area.

CONCLUSION

Abnormal liver function during pregnancy is associated with adverse events for both the mother and the fetus and hypertensive disorders remain the major cause. In our study, hypertensive disorder in pregnancy and viral hepatitis is the two most common cause behind abnormal liver function during pregnancy. Hepatic encephalopathy and AKI are the two most common maternal complications. The other factor responsible for a high maternal mortality and overall poor fetomaternal outcomes in our country may be delay in seeking medical advice, poor nutrition hygiene, prevalence of anemia, and delay in referral to the higher centers. Hence, many of patients when brought to the tertiary care hospital are already in moribund conditions and often do not responds to treatment. Regular antenatal check-up, screening, and diagnosing liver disorder at an earliest, proper treatment and timely referral to higher centers can save the lives of many mothers and fetus.

ACKNOWLEDGMENT

Authors would like to acknowledge the patients who participated in this research study.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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KKP, MAH- Involved in the diagnosis and management of the cases. **SC, SB-** Did the literature search. **KKP, SC, MAH-** Wrote the manuscript.

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Source of Funding: None, **Conflicts of Interest:** None.