Study on Hepatitis B Virus Infection in Pregnant Women and its Risk Factors

Audimulapu Sujatha[1], Shvetha Konda[2]

ABSTRACT

Introduction: Hepatitis B infection is caused by the hepatitis B virus (HBV). It is an enveloped DNA virus that infects the liver and causes hepatocellular necrosis and inflammation. HBV to be known as silent killer. Study aimed To determine the prevalence of Hepatitis B virus infection in pregnant women and its risk factors.

Material and methods: It was a hospital based observational study conducted among pregnant women between January 2016 and September, 2017. Of the 12,240 women screened, 93 were found to be positive, for HBs Ag. Finally, the calculated sample size was 93.

Results: In the present, study HBsAg prevalence rate was 0.76% among antenatal women. Among the 93 women delivered, 1 had an IUD, 1 had a still birth, 13% had preterm labour and 81.6% had term delivery with live foetus. Neonatal complications were RDS, LBW, neonatal jaundice, prematurity and 32% of neonates required NICU admissions. LBW was seen in 15.6% and prematurity was seen in 13.4%. LBW was mainly due to preterm delivery. There was no significant association between HBV infection and neonatal complications. 3 neonatal deaths due to meconium aspiration syndrome and respiratory distress syndrome and finally 85 infants were left for follow up. In the study the transmission rate was calculated as 1.2% which is acceptable.

Conclusion: Universal antenatal screening of all pregnant women is recommended. All tertiary centres should develop adequate laboratory facilities to detect HBeAg, antibody levels against core antigens, which requires strong government policies and political commitment.

Keywords: Hepatitis B Virus, Infection in Pregnant Women, Risk Factors of Hepatitis B Virus

INTRODUCTION

Hepatitis B infection is caused by the hepatitis B virus (HBV). It is an enveloped DNA virus that infects the liver and causes hepatocellular necrosis and inflammation. HBV infection is one of the serious public health problem worldwide and it is 50–100 times more contagious than HIV.[1] Many of the carriers do not realize that they are infected with the virus rendering the HBV to be known as a "silent killer". Hepatitis B is endemic throughout the world, especially in tropical and developing countries. It's prevalence varies from country to country and depends upon a complex mix of behavioural, environmental and host factors. In general, it is lowest in countries or areas with high standards of living.

The HBV infection is a global problem, with 66 percent of all the world's population living in areas where there are high levels of infection. More than 2 billion people worldwide have evidence of past or current HBV infection and 350 million are chronic carriers of the virus, which is harboured in the liver, the virus causes 60-80 percent of all primary hepatocellular carcinoma, which is one of the top three causes of cancer death in East and South East Asia Region, the pacific basin and sub Saharan Africa.[2] Recent reports demonstrated that 68,600 people die of HBV infection and more than 300,000 deaths due to liver cancer are secondary to hepatitis B every year globally.[3] Perinatal and early childhood transmissions are the main routes of HBV infection in high and intermediate endemic areas.[4] The WHO considers hepatitis B to be second only to tobacco among human carcinogens.[7] Based on the different HBsAg carrier rates, countries can be divided in to 3 categories:

High endemicity (> 8 percent)
Intermediate (2-8 percent)
Low endemicity (< 2 percent)

Countries of the region can he divided into 3 epidemiological patterns. The type I occurs in Nepal and Srilanka and is characterized by a low HBsAg carrier rate of 0.9 to 1%. The second pattern (Type 2) can be found in Bhutan, India, Indonesia and Maldives where carrier rate is high in the general population (5 to 7 percent).In India alone there are an estimated 43 to 45 million HBsAg carriers and among them 10-12 million also have HBeAg. Type 3 is observed in Bangladesh, DPR Korea, Myanmar and Thailand, where the carrier rate is very high and ranges from 9 percent to 12 percent.[4]

Study aimed to determine the prevalence of Hepatitis B virus infection in pregnant women and its association with various social, personal and environmental risk factors, to provide a comprehensive review of the current knowledge regarding pregnancy associated with HBV infection and to determine the risk of perinatal HBV transmission in pregnant women attending ANC and recent efforts to reduce the rate of mother to child transmission.

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MATERIAL AND METHODS

This was a hospital based observational study conducted among pregnant women who attended ANC for routine antenatal checkup between January 2016 and September, 2017.The study population was all consecutive pregnant women who attended ANC for check-up during the study period. Serum was withdrawn from each study subject and used to test for HBs Ag by an enzyme linked immunosorbent Assay (ELISA) test kit. Of the 12,240 women screened, 93 were found to be positive, for HBs Ag. Finally, the calculated sample size was 93.

Inclusion criteria

All antenatal women who were counselled and tested positive for HBV and are willing to continue pregnancy.

Exclusion criteria

Antenatal women who were tested negative for HBV, those who were tested positive but willing for Medical Termination of Pregnancy, those who tested positive but had associated medical comorbidities.

The purpose of the study was explained to the subjects, and they were asked to participate voluntarily in the study. Information on socio demographic and other pertinent data was collected. All HBsAg positive mothers were referred to physician and followed by testing their liver function in hospital laboratory. All the women who were tested positive for hepatitis B were advised to get HBeAg, HBV DNA viral load investigations. But due to lack of affordability, patients could not get all the investigations done. However, only supportive care was given because treatment guidelines and specific drugs for HBV infections were not available. Each patient was thoroughly examined during antepartum, intrapartum and immediate postpartum period. All the new-borns of the affected individuals were given active and passive immunization and were followed to check for transmission.

RESULTS

Incidence of Seroprevalance of Hepatitis B in antenatal population in present study.

Total number of women screened = 12,240

Number of patients tested positive for HBsAg = 93

Percentage of Seroprevalance = 0.76%

Maxmium number of patients (54) belongs to 22 – 26 years constituting 58%. Mean age is 23.61 years. There are 40% of primi gravida and 60% are multi gravida. 49% of the subjects were booked cases and 51% of the subjects were unbooked cases. 57% of the subjects were from rural area and 43% from urban area (table-1).

Thus Number of patients in 1st Trimester are 8 (8.6%), 2ndTrimester 38 (41%) and 3rd Trimester are 47(50.4%).

In the present study 2 patients presented with acute hepatitis and were treated with Lamivudine and supportive measures and both of them had resolution of acute phase. One patient was brought in a state of hepatic encephalopathy and had fulminant hepatic failure. Inspite of best supportive treatment patient could not be saved. Majority (97%) were inactive carriers (table-2).

There were 2 abortions, 12 preterm deliveries, 76 full term live births, 1 intra uterine death and 1 still birth. The remaining one case was a maternal death at 34wks of gestation due to fulminant hepatic failure (figure-1).

Number of subject who had severe oligohydramnios = 11.2%

Number of subject who had polyhydramnios= 6%

In our study 74.45% of patients had clear liquor and 25.55%

Age in years	Number of positive subjects	% of prevalence based on age group
17 – 21	24	25.9
22 – 26	54	58
27 – 31	15	16.1
Total	93	100
Parity		
Primi	37	40%
Multi	56	60%
Total	93	100
Booked/Unbooked		
Booked	46	49%
Unbooked	47	51%
Total	93	100%
Rural/Urban		
Rural	53	57%
Urban	40	43%
Total	93	100%
8 – 14 weeks	8	8.6%
15 – 20 weeks	13	14%
21 – 28 weeks	25	27%
29 – 32 weeks	18	19.4%
Beyond 33 weeks	29	31%
Total	93	100%

Table-1: Distribution of cases as per Age group.

Clinical presentation	Number of patients	Percentage
Acute hepatitis	2	2%
Fulminant hepatic failure	1	1%
Inactive carriers	90	97%

Table-2: Distribution of patients according to clinical presentation

AFI	Number of Subjects	Percentage
<5cm	10	11.2%
5cm – 8cm	6	6.6%
8cm – 24cm	69	76.66%
>25cm	5	6%
Colour of liquor		
Clear	67	74.45%
Meconium	23	25.55%
Mode of delivery		
NVD	54	60%
Outlet forceps	6	6.5%
Elective LSCS	24	27%
Emergency LSCS	6	6.5%

Table-3: Amniotic Fluid Index, Colour of liquor and Mode of delivery

Maternal Complications	Number of patients with complications
Anemia	52
Pre-eclampsia	12
Eclampsia	3
Abruption	5
Jaundice	3
PPH	15
Puerperal sepsis	Nil
Neonatal complications	
Prematurity	12
Respiratory distress syndrome	14
Low Birth Weight	14
Birth Asphyxia	2
Meconium Aspiration Syndrome	2
Neonatal Jaundice	25
Sepsis	0

Table-4: Obstetric and neonatal complications

Number of patients treated with Lamivudine	Number of patients resolved	Obstetric outcome in each case	Neonatal outcome	MTCT
2	2 (100%)	Full term normal vaginal delivery	Good	No
		Preterm delivery at 34 weeks of gestation	Prematurity, LBW, RDS	No

Table-5: Outcome of Lamivudine treated cases of acute hepatitis

Weight	Number of foetal outcome	Percentage
<1.5 kg	2	2.3%
1.5 – 1.9 kg	6	6.7%
2 – 2.4 kg	6	6.7%
2.5 – 2.9 kg	38	42.1%
3 – 3.4 kg	32	35.5%
3.5 – 3.9 kg	6	6.7%
Adverse foetal outcome		
IUD	1	1.1%
Still birth	1	1.1%
Early neonatal death	3	3.3%
Live infants followed	85	94.5%
Total	90	100

Table-6: Foetal outcome in study

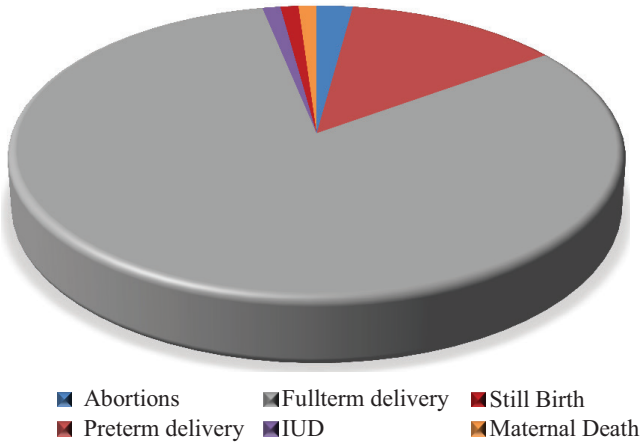

Figure-1: Obstetric Outcome

No. of Infants tested positive	1	1.2%
No. of Infants tested negative	84	98.8%

Table-7: Maternal to child Transmission

had meconium stained liquor (table-3).

In our study 66.5%of women delivered vaginally of which 6.5% were aided by outlet forceps and 33.5% were delivered by caesarean section of which 27%were elective caesarean sections and 6.5% were emergency caesarean sections, done for various obstetric indications (table-4).

There were 12 preterm births and 76 full term live births. Majority of the LBW cases were due to prematurity and all of them had NICU admissions. Only 2 of the term neonates were of LBW. RDS was present in 9 full term neonates and 5 of the preterm neonates. There were 2 cases of birth asphyxia. Of the 23 cases with meconium stained liquor, 2 had meconium aspiration syndrome. Neonatal jaundice was seen in 25 neonates but majority were mild and physiological and did not require NICU admission in most of the cases. None of the neonates developed sepsis in the present study (table-5).

The two patients who presented with acute hepatitis were treated with Lamivudine 100mg from the onset of hepatitis. Resolution occurred in both. One patient had full term normal vaginal delivery with good neonatal outcome and no adverse neonatal effects. One patient had preterm delivery at 34 weeks gestation. Baby had LBW and RDS and was admitted in NICU for 5 days. Both the babies were tested negative for HBsAg after passive immunization and complete course of active immunization.

Birth weight of less than 2.5kg is low birth weight and was

Studies	6.3%
Sunita Mittal et al.,[5]	6.3%
Gill et al.,[6]	5%
Ahmad et al.,[7]	12.8%
Biswas et al.,[8]	2.3%
Panda et al.,[9]	2.6%
Sehgal et al.[10],	2.6%
Mean age in years	
Sabria Rashid et al[12]	28.5 years.
Suruchi Shukla et al[13]	23.85 years
Present study	23.61 years
Percentage of subjects in 3rd trimester	
Jaisiwal et al.[14]	72%
Patra et al.[15]	72%
Suruchi Shukla et al.[16]	75%
Present Study	50.4%
Preterm labour percentage	
Suruchi Shukla et al.[16]	17%
Medhat et al[17]	14.9%
Mirghani et al.[18]	20.8%
Kumar et al.[19]	66.6%
Present study	13%

Table-8: Variables in comparison with other studies

seen in 15.6% of babies (table-6).

Out of the 90 women who delivered, 1 had an intra uterine death, 1 had a still birth and 88 had live births. Of the 88 live births, 3 neonates died in the early neonatal period. In our study. 32% of the neonates required NICU admission for various reasons and 68% did not require any NICU admission.

Out of 85 neonates who were given both active and passive immunization 1 (1.2%) was affected with hepatitis B (table-7).

DISCUSSION

In the present, study HBsAg prevalence rate was 0.76% among antenatal women which is lower than rates reported by other studies (table-8).

In a recent study conducted by Neeta Khokhar et al.[20], in 2015 in Gujarat, Prevalence was found to be 3.03%.Another recent study done in Eastern Ethiopia by Abdi Umare et al.[21,] in 2016 showed a prevalence rate of 6.9%.Another study done by Sabria Rashid et al.[22] in 2010 at Muhimbili National Hospital showed a prevalence rate of 3.9%.The lower prevalence rate in this study might be due to increased health awareness among population these days and increased vaccination coverage by various programmes.

In this study prevalence of HBsAg was maximum among women in the age group between 22 – 26 years i.e., 58% followed by 25.9% between age group 17 – 21 years. This is comparable to the study done by Neeta Khokhar et al.,[20] 2015.

This finding is consistent with a report in Nigeria.

This is in contrast to study conducted by Yasmeen et al.,[23] in 2012 which showed maximum prevalence (58.5%) of HBsAg positives in the women of age groups 26 – 30 years. The possible explanation for this finding could be that women in these age groups are more sexually active.

In our study done 40% of the subjects were primi gravida. In the present study majority of the patients (50.4%) belongs to third trimester, followed by 41% in the second trimester and only 8.6% in first trimester. In a study conducted by Yasmen et al.[23] in 2012 in Srinagar 71.4% patients were in third trimester and 28.6% patients were in second trimester and none of the patients in first trimester.

In study done by Suruchi Shukla et al.[16] in 2011, the mean gestational age was 29.38 weeks. In present study 97% of the subjects were asymptomatic inactive carriers without any clinical manifestations or laboratory derangements in liver function tests. They were diagnosed to have HBV infection by universal screening.

Two patients presented with symptoms of itching, passage of high coloured urine, loss of appetite, malaise, yellowish discoloration of skin/eyes, vomiting, myalgia and arthralgia. Liver function tests revealed serum bilirubin levels>3mg/dl and had elevation in serum ALP and ALT levels more than two times above the normal levels. These patients were managed conservatively with symptomatic treatment. Both of them were treated with Lamivudine and had resolution of acute hepatitis. Of them one patient had a full term normal vaginal delivery with birth weight 2.6kg and one patient had a preterm delivery at 34weeks of gestational age with LBW of 2kg.

In this study there was one patient who had hepatic encephalopathy due to fulminant hepatic failure. Inspite of all the efforts put, the patient could not be survived and there was one maternal mortality in the present study. Viral hepatitis is the most common cause of jaundice in pregnant women. An earlier study conducted by Patra et al.[15] in 2003-2005 on 220 pregnant women presenting with jaundice caused by acute viral hepatitis had found 33% prevalence of HBV.

Study done by Suruchi Shukla[16] revealed that viral hepatitis is the commonest (57%) of jaundice in pregnant women and among viral hepatitis HBV is the most common cause of hepatitis constituting 64.9% of infective hepatitis. In the same study 6 out of 100 pregnant women with clinical evidence of hepatitis developed hepatic encephalopathy and all were infected with hepatitis E virus and all of them died. The maternal mortality rate in pregnant mothers infected with hepatitis E virus as reported by other studies ranges between 15-45% and may be as high as 70%. Thus HEV was associated with a high mortality rate among pregnant women. In present study the liver enzymes were largely within normal ranges and did not vary significantly between HBsAg positive and HBsAg negative pregnant mothers. This means that most of our mothers were inactive carriers. Preterm delivery is a common maternal complication of hepatits in pregnancy and is observed in the following studies with rates:

Caesarean section rate in our study is 33.5% which is comparable to that done by Suruchi Shukla[16], where it was 29.7%. Maternal complications rate encountered in present study is nearly similar to that seen in general population

indicating that hepatitis B infection has no significant association with maternal complications. Most common complication was anemia accounting to 56% which falls in the range of prevalence seen in general population of pregnant women. Other complications like preeclampsia, abruption, eclampsia, post partum haemorrhage were also observed in the same range as that seen in HBsAg negative patients. Low birth weight is thought to be a complication of hepatitis B infection.

Various studies on fetal outcome

Studies	Percentages
LBW percentage	
Suruchi Shukla et al.[16]	30.8%
Kumar et al.[19]	7.6%
Present study	13%
IUD percentage	
Mirghani et al.[18]	6.3%
Medhat et al[17]	8.3%
Kumar et al.[19]	3.8%
Present study	1.1%
Rate of neonatal deaths	
Medhat et al[17]	6.3%
Present study	3.3%

In this study there were 32% of neonatal intensive care unit admissions for reasons like respiratory distress syndrome, birth asphyxia, prematurity, low birth weight, neonatal jaundice, meconium aspiration. Most common complication seen during neonatal period was neonatal jaundice, but in most of the cases it was physiological and was self-limiting and did not require NICU admission.

Second most common complication in our study was LBW, which was mainly due to prematurity. Incidence of LBW in term infants was very low Passive immunization with HBIG was given to all the live born 88 babies and full course of active immunization with hepatitis b recombinant vaccine was given to 85 babies. In case of preterm babies of HBsAg positive mothers, the birth dose is indicated even if the baby weighs less than 2kg, but should be followed by a further 3 doses starting at 6 weeks of age. This is due to the reduced immunogenicity of hepatitis b vaccine in preterms weighing less than 2kg in the first month of life. Active and passive immunization together reduces maternal to child transmission by 80-85%. In the present study it was reduced by 98.8%.

CONCLUSION

Universal antenatal screening of all pregnant women by hepatitis B surface antigen (HBs Ag) testing is recommended. Newborns born to hepatitis B carriers should receive combined immunoprophylaxis consisting of hepatitis B immune globulin (HBIG) and hepatitis B vaccine within 12 hours of birth. Hepatitis B infection is a preventable disease, and all at-risk individuals, particularly health care workers, should receive the hepatitis B vaccine series as part of the recommended childhood immunization schedule. The mode of delivery technique of delivery, the management of third stage of labour the care of new born are all very important in reducing the parent child transmission of HBV. Route of delivery has not been shown to influence the risk of vertical HBV transmission, and caesarean delivery should be reserved for obstetric indications in women with HBV infection.

Breastfeeding is not contraindicated in women with HBV infection with appropriate hygienic precautions, if the infant receives HBIG passive prophylaxis and vaccine active prophylaxis. Susceptible pregnant women who are at risk for hepatitis B infections should be specifically targeted for vaccination. All patients tested positive for hepatitis B surface antigen should also be screened for HBeAg to know the viral load and disease severity, which will help for better management and reduce maternal mortality and perinatal transmission. All tertiary centres should develop adequate laboratory facilities to detect HBeAg, antibody levels against core antigens, which requires strong government policies and political commitment.

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