Original Research Paper

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Medical Microbiology

RISK FACTORS FOR HEPATITIS B INFECTION AND ASSOCIATED PREGNANCY OUTCOMES IN PREGNANT WOMEN: A STUDY AT A TERTIARY CARE HOSPITAL":

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KEYWORDS :

INTRODUCTION

Hepatitis B virus (HBV) remains a significant global health concern, with an estimated 2 billion individuals having been infected at some point and approximately 296 million living with chronic HBV infection. In response to this burden, the World Health Organization (WHO) introduced a global strategy in 2017 aiming to eliminate viral hepatitis as a public health threat by 2030. The targets include a 90% reduction in new infections and a 65% decrease in hepatitis-related mortality compared to 2015 levels.

Discovery Of HBV Vertical Transmission

Saint-Vel's 1862 report of severe hepatitis in pregnant women in Martinique laid the initial groundwork for studying the effects of HBV infection in pregnancy [42]. However, it was not until 1954 that the possibility of vertical transmission of HBV was considered based on a report of infants who developed hepatitis during the first two months of life and the evidence that some mothers were “silent carriers” of HBV; this was relevant to the problem of maternal transmission of this infection [43].

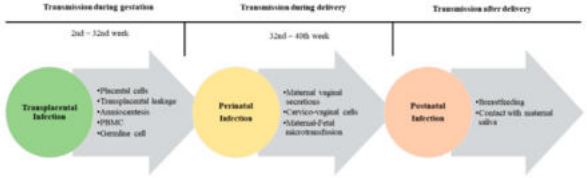

Figure 1. HBV Vertical Transmission Mechanisms.

In a study carried out in newborns, three interrelated factors were found to increase the risk of HBV vertical transmission: a high titer of the HBsAg in the maternal circulation, the presence of this marker in the umbilical cord blood, and HBsAg+ in siblings. It was suggested that if babies remain antigenic until adulthood, vertical transmission could account for an important proportion of asymptomatic cases (carriers) in areas of high HBV prevalence [45]. On the other hand, Okada et al.

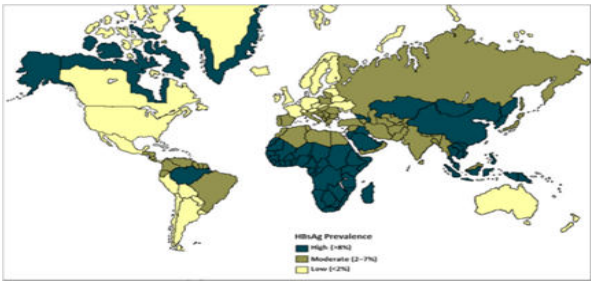

Figure 1.1 Global prevalence of chronic HBV. Adapted from source: Centers for Disease Control (CDC) 2020

MATERIALAND METHOD:

Study Design- Hospital based prospective study was conducted in the microbiology department of a tertiary care hospital.

Sample Collection:

I have collected a total of 50 Pregnant hepatitis Positive Women with an age group range of 18 to 45 years, in the anti-natal clinic. All samples were collected by NABL [ISO-15189] Guideline.

Testing of other HBV biomarkers in HBsAg seropositive women and infants- All women confirmed for the presence of HBsAg were further tested for the presence of (detection limit) HBsAg (1 ng/ml), simultaneously in one cassette using a lateral flow OnSiteHBV-5 test, an antibody sandwich immunoassay (CTK Biotech, Inc, USA)

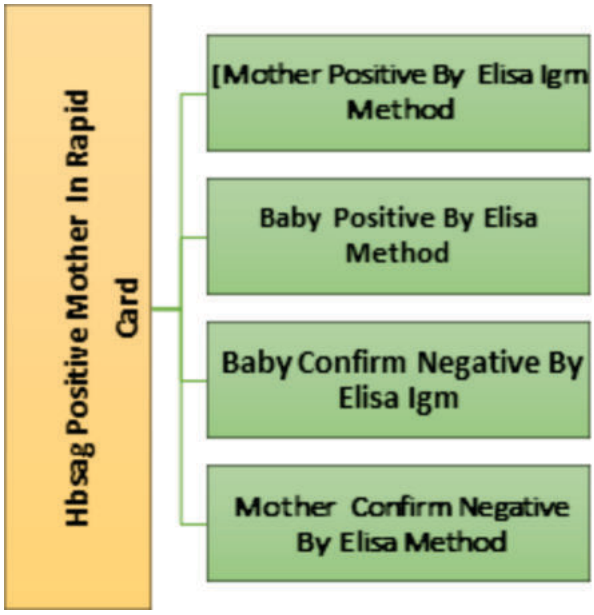

Figure 1.2 All mother Positives Rapid Card Further testing

Study Outcomes-

"The main outcome assessed in this study was the transmission of hepatitis B virus (HBV) from mother to child. This was identified by a positive hepatitis B surface antigen (HBsAg) test in infants born to mothers who also tested positive for HBsAg. Testing for HBsAg in exposed infants was conducted between birth and 24 months of age. Factors at the study level that could contribute to variations in transmission rates included the hepatitis B e-antigen (HBeAg) status of the mother."

RESULT-

The overall pooled risk of MTCT of HBV in India was 2.5%. In women without HIV infection, the risk of MTCT of HBV was 20.7% (95% CI 2.8%–70.4%), and 32.2% (95% CI 28.1%–36.7%) in women with HIV infection. After excluding the outlier study, the risk of MTCT of HBV in studies that included only HIV-negative women was 9.4% (95% CI, 5.1%–16.6%).

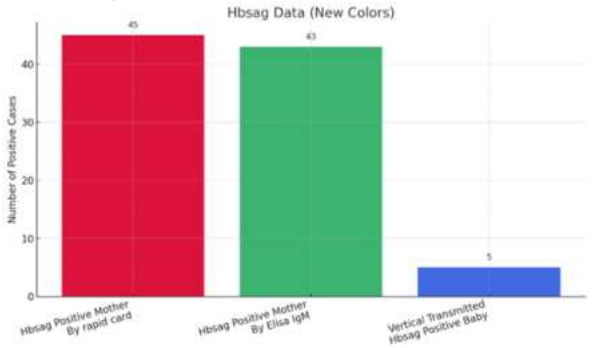

Figure 1.3 Vertical Transmitted Mother T To Chid Graph

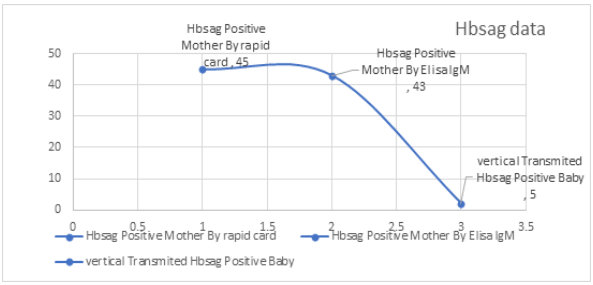

Figure 1.4 Vertical Transmitted Mother-to-Child Graph

A total no. of 842 Pregnant women in the age group of 20-40 years who attended, in the one-year study period were included. Among the 842 cases,45 pregnant women were found to be seropositive for HBsAg by Rapid card test. Those positive cases were further confirmed by ELISA testing & after confirmation 43 out of 45 cases, were found seropositive for HBsAg and 3 were found seronegative. According to our study, the estimated Sero-prevalence of HBsAg among pregnant women is 0.52%. The study showed the highest prevalence in the majority of participants were aged 20–25 years (58.4%), followed by those aged 26–30 years (31.00%), 31–35 years (10.6%), and 36–40 years (00). The mean age was 25.38 years.

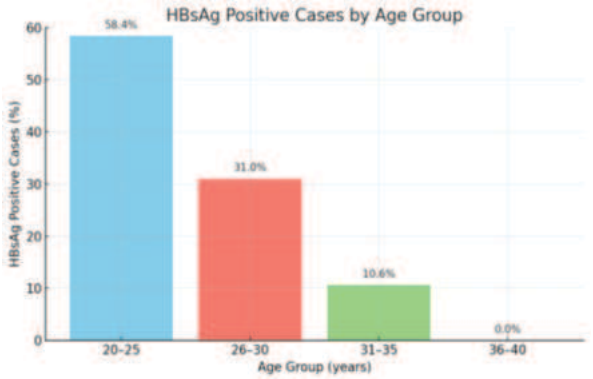

Figure 1.5 Age Prevalence Graphical Representation

DISCUSSION-

The current study showed a prevalence rate of 0.52% for HBsAg among pregnant women. The seroprevalence of HBsAg differs from one country to another, from region to region, and between different groups. This difference may be because of the population type studied, different geographical regions, genetic factors, and socioeconomic status. Among pregnant women seroprevalence of HBsAg globally is 1.5 to 2.5% whereas it varies from 2 to 7.7% in India. So, The seroprevalence of HBsAg carrier state during pregnancy in our study (0.52%) was low. There are few studies performed on the seroprevalence of hepatitis B virus infection among pregnant women. According to a central India study done by Sodani et al at a tertiary care hospital, in Indore, the seroprevalence of HBsAg among pregnant women reported was 1.16%.[12] Sunita Mishra et al.'s study found that the prevalence rate is 1.09%,[6]. In another study done by Chatterjee et al., the Prevalence was 0.82%.[23] The prevalence rate of HBsAg was found to be 0.5% in the study of Rajshree et al whereas the prevalence was 1.56% in the study of Afzali et al. [3] According to the study done by Pandy et al, it was 1.1% reported. and by Dwivedi et al, a prevalence rate of HBsAg 0.9% was reported among antenatal women. [5]

In previous studies, seroprevalence of hepatitis B surface antigen (HBsAg) among pregnant women has varied slightly across regions in India. Parveen et al. reported a seroprevalence rate of 0.61%, while Sibia et al. noted a slightly higher rate of 1.11% in a study conducted in a northern Indian institution [25]. Similarly, Varghese et al. (2004) found an HBsAg prevalence of 0.8%, and a study by Sandesh et al. (2006) in Kerala, South India, reported a lower prevalence of 0.25% [13,14]. The findings of the present study are largely consistent with these reports.

This study observed that HBsAg seropositivity was highest among pregnant women aged 20–25 years (58.4%), followed by those aged 26–30 years (31.04%), 31–35 years (10.6%), and none in the 36–40 years age group. No cases were reported in women aged 18–20 years or 41–45 years. The variation in age distribution across studies may reflect differences in geographical regions and socioeconomic factors. For instance, Sodani et al., in a study conducted at a tertiary care hospital in Indore, Madhya Pradesh, found the highest prevalence among women aged 26–30 years (46.1%), followed by 20–25 years (23%), 31–35 years (19.33%), and 36–40 years (11.5%) [12]. Conversely, Bayo et al. observed a higher rate of infection in women aged 20 years or younger [16]. A study by Dwivedi et al. reported a decreasing trend in HBsAg positivity with increasing age, with the highest prevalence among women aged 21–25 years (56.76%) followed by 26–30 years (40.5%) and 31–35 years (2.7%) [5]. Sibia et al. also identified the 25–30 years age group (48.78%) as the most affected, followed by 18–25 years (29.26%) and 30–35 years (22%) [25].

Regarding parity, the present study found HBsAg seropositivity to be 36.2% among primigravida and 63.8% among multigravida women. Of the nine HBsAg-positive mothers whose infants were tested, three were primigravida and six were multigravida. All nine mothers were asymptomatic and unaware of their infection status. Interestingly, infants born to 17 mothers who were already aware of their HBsAg status tested negative in the neonatal period, highlighting the importance of early detection and intervention.

An increasing trend of seroprevalence with higher parity was observed, aligning with findings from Dwivedi et al., where prevalence rates were 0.15% in primigravida, 0.78% in second gravida, 2.10% in third gravida, and 1.76% in women with more than three pregnancies [5]. Similar trends were reported by Allowably et al. and Bartolini et al. [22]. However, a study by Pandy et al. at a tertiary hospital in North India found no significant difference in HBsAg positivity between primigravida and multigravida women, though 60% of the HBsAg-positive cases were multigravida, suggesting the possibility of vertical transmission in previous pregnancies [4].

In this study, two-thirds of the HBsAg-positive infants (66.67%) were delivered via lower segment cesarean section (LSCS), while the remaining third (33.33%) were delivered normally. These results suggest that LSCS may not significantly reduce the risk of vertical transmission. This contrasts with findings by Sharma et al., who reported a higher transmission rate in vaginal deliveries (69%) compared to cesarean sections (31%), potentially due to reduced maternal-fetal microtransfusions during elective LSCS.

CONCLUSIONS:

This study investigates the prevalence of hepatitis B surface antigen (HBsAg) among pregnant women and examines the rate of vertical transmission through early neonatal testing. The primary objective is to enhance the detection and management of hepatitis B during pregnancy, minimize the long-term impact on healthcare systems, and promote effective prevention of perinatal transmission through timely administration of monoprophylaxis in newborns

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