



OVERVIEW OF HEPATITIS B SURFACE ANTIGEN INCIDENCE AMONG PREGNANT WOMEN IN KING HUSSEIN MEDICAL CENTRE AND PRINCE HASHEM HOSPITAL

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ABSTRACT

Objective: To determine the prevalence of hepatitis B surface antigen among pregnant women presenting to antenatal care clinic in Prince Hashem Hospital in Zarqa city and King Hussein Medical Centre (KHMC) in Amman, Jordan. **Method:** This was a cross-sectional study conducted on 256 randomly selected pregnant women attending the antenatal care clinic in two different hospitals (quaternary and tertiary centres) during the period from July 2017 to January 2018 in Prince Hashem Hospital (Tertiary) and KHMC (Quaternary). The targeted group for this study was pregnant women who were born before 1993, because they had not received the Hepatitis B Recombinant Vaccine as it was only added to the National Jordanian Vaccination Program on 1993. Therefore, 56 women were excluded and the total number of included women was 200. Blood samples were collected from these patients and sent to the laboratory for Hepatitis B surface antigen (HBsAg) detection by Enzyme Linked Immunosorbent Assay (ELISA). **Results:** The age range of the studied women was 26–50 years with mean age of 38 years. Out of 200 tested women, 7 were positive for HBsAg, accounting for 3.5%. **Conclusion:** Hepatitis B surface antigen positivity in pregnant women reflects an increased risk of vertical transmission of the virus to unborn babies. Therefore, all pregnant women attending antenatal care should be tested for HBV infection; infected women should be followed-up and their babies must receive HBV vaccines at birth.

KEYWORDS: Hepatitis B surface antigen, Hepatitis B virus, pregnant women.

INTRODUCTION

Hepatitis B virus (HBV) is a double-stranded DNA virus from the Hepadnaviridae family. HBV has many antigenic components, such as Hepatitis B surface Antigen (HBsAg), hepatitis B e antigen (HBeAg), and hepatitis B core antigen (HBcAg). Immunity against HBV infection is via a response to HBcAg and HBsAg. IgM anti-HBc means that there is recent infection and usually disappears within six months, whereas IgG anti-HBc persists for life, indicating past infection. Antibodies to HBsAg (anti-HBs) appear after the clearance of HBsAg or after vaccination. HBsAg persisting for more than six months is defined as chronic HBV infection.^[1] Chronic hepatitis B is a life threatening liver disease that increases risk of death due to liver cirrhosis and hepatocellular carcinoma (HCC).^[2]

The transmission of HBV is via percutaneous or mucosal exposure to infected blood or body fluids (saliva and

semen), through sexual, non-sexual and occupational contact with patients, or via perinatal transmission from mother to child (vertical transmission), which is the most common method of transmission.^[3,4] Pregnant women who are positive for HBsAg have a 10–40% risk of transmitting the virus to their babies.^[5] The virus travels through the blood stream, replicating only in liver tissue, with an incubation period of 60–150 days. The appearance of clinical manifestations is age-dependent; the patients at extremes of age are usually asymptomatic because of decreased immunity. Signs and symptoms of acute hepatitis B include fever, nausea, vomiting, abdominal pain, jaundice, stool and urine discoloration, and hepatomegaly.^[3] The outcome of hepatitis B varies from acute self-limiting hepatitis to chronic hepatitis and fatal fulminant hepatitis.^[4]

The risk of the progression of an acute hepatitis B infection to a chronic one is mainly related to the age of the patient when they became infected; the younger the age, the higher the risk of chronic hepatitis. The development of chronic hepatitis is evident in more than 90% of infected infants and in 25–50% of young children, while it only develops in 6–10% of adults. In addition, the immune-suppressed patients also were at a higher risk of progression into chronic infection.^[3,6] In pregnancy, HBV may flare up and increase the rate of abortion, preterm labour and foetal distress. Transmission of the virus from the mother to the foetus rarely occurs through the placenta; most cases of transmission occur during labour, with uterine contractions and membrane rupture, or vertically from exposure to birth canal infected secretions.^[4]

We conclude from the above-mentioned facts that the prevention of perinatal transmission of HBV is a critical issue in reducing the numbers of chronic carriers of the virus; therefore, every pregnant woman should be routinely screened in the antenatal clinic for HBsAg and women with positive results should be followed-up until birth. Their neonates must receive HBV vaccines and hepatitis B immunoglobulin (HBIG) to decrease the transmission rate by 75–90%.^[7,8]

Methods and patients

This was a cross-sectional study from July 2017 to January 2018 to determine the prevalence of HBsAg seropositivity in two military hospitals: KHMC in Amman and Prince Hashem Hospital in Zarqa. A total number of 256 pregnant women were selected randomly among those who were visiting antenatal care clinics in the two hospitals. We excluded women who were born after 1993 because they received the hepatitis B recombinant vaccine, so the total number of women included in this study was 200. Blood samples were collected from these women in yellow-topped gel tubes and sent to the laboratory for HBsAg screening. The samples were centrifuged at 2000 rotations per minute (rpm) for 10 minutes to separate the serum, and then serological assay of HBsAg was performed using the ELISA method. After that, the results were collected and

analysed to calculate the percentage of HBsAg seropositivity.

Approval to conduct this study was received from the ethical committee of the Royal Medical Services.

RESULTS

In total, 200 pregnant women were screened for HBsAg. The age range was 26–50 years with mean age of 38 years (p-value of 0.20). The average parity for these women was 3.34. Seven of the 200 pregnant women showed seropositivity for HBsAg (3.5%), and the age range of these women was 26–38 years; all patients were asymptomatic, and apparently healthy, with no history of surgical interventions or blood transfusion. The mother of one patient was found to be a HBV carrier after investigating the source of the virus in this pregnant lady. There was no significant difference regarding parity and seropositive patients (p-value of 0.14). Level of education and socioeconomic status between the two studied groups (seropositive and seronegative pregnant women) was not significantly different.

N.B: One patient showed HCV AB positivity, representing 0.5% of the women included in this study.

Table 1: Prevalence of HBV in different regions.

Country	Prevalence of HBV (%)
South Sudan	11.0
Uganda	11.8
Ethiopia	4.5
Laos	5.44
Nigeria	6.6
India	1.0
Guam, USA	2.0
Iran	1.5
Pakistan	1.16
Saudi Arabia	2.46
Egypt	1.75
Yemen	10.8
Hong Kong	10.1
Taiwan	15.5

Table 2: Statistical analysis of risk factors.

Risk factors	Mean	P - value
Parity	3.34	0.14
Age	38	0.20
History of jaundice in women	-	0.00
History of jaundice in husband	-	0.00
History of surgery	-	0.00
History of blood transfusion	-	0.00
Occupation	-	0.00

DISCUSSION

Hepatitis B is a major health problem worldwide. Vertical transmission is responsible for nearly half of chronic HBV infections.^[9] HBV vaccination is considered an effective way of preventing infection and

therefore reducing clinical and epidemiological burden of the disease.^[10] The routine screening of women during pregnancy is not universally implemented, despite the importance of detecting infection to prevent vertical transmission of the virus.^[11] After screening, seropositive

women should be evaluated and followed-up to assess disease status, whether active or inactive, and to evaluate the treatment options during pregnancy and after giving birth. HBV DNA quantification is recommended to determine viral load and assess the risk of intrauterine transmission of the virus.^[12]

The international prevalence of HBsAg in pregnancy is approximately 5%, but this varies from 0.6% in low endemic areas to 20% in high endemic areas.^[4]

The main objective of our study is to assess the prevalence of HBV seropositivity in pregnant women in our country, which was found to be 3.5%; this is lower than that found in Jordan in 2002, which was 4.3%, but is in accordance with epidemiological studies that have shown an intermediate prevalence of 2–7% in the Middle East, and close to the worldwide prevalence of HBV in pregnancy, which is 3%.^[13,14,15] Studies in other countries showed different seroprevalence rates. In South Sudan, the seropositivity of HBsAg was higher (11%), as reported by Kerbak *et al.*^[16] The same was the case in Uganda, where a study found a high prevalence rate, reaching 11.8%.^[5] In a study conducted in Ethiopia in 2013, the level was 4.5%, which is slightly higher than the percentage reported here.^[17] Choisy *et al.* conducted a large study on 13,238 pregnant women in Vientiane, Laos, over seven years from 2008 to 2014, and found a prevalence rate of 5.44%, which is slightly higher than ours.^[8] Also, in southern Nigeria, the percentage is higher, reaching about 6.6%.^[18] The prevalence rate was much lower in India, as reported by Sathiyakala *et al.*, and in Guam, USA, in 2014 with results of 1% and 2%, respectively.^[19,20] In Iran, the seropositivity of HBsAg in pregnancy was low (1.56%), as reported by Afzali *et al.*^[2] Pakistan has a low prevalence, as Ahmad *et al.* reported a ratio of 1.16%.^[11] If we compare our results with countries in the same region, it is clear that Saudi Arabia and Egypt have lower percentages, of 2.46% and 1.75%, respectively.^[21,22] In Yemen, Al Murad *et al.* revealed a high prevalence in pregnancy, reaching 10.8%.^[23] In a large study conducted in Hong Kong of 93,306 pregnant women, the overall prevalence of HBsAg was 10.1%.^[10] The highest percentage of HBsAg seropositivity found during pregnancy was in Taiwan in a study conducted with 10,327 Taiwanese pregnant women in 2008, which showed a seroprevalence of 15.5%.^[24] Table 1 summarises the prevalence of HBV in pregnancy in different regions.

Regarding age, we could not find a correlation between the age of the positive women in the current study and an increased prevalence, with a p-value of 0.20 (Table 2); this might be because the studied group was not big enough (only seven women were positive for HBsAg). Other studies showed that the highest prevalence during pregnancy was in the age group from 20–25 years.^[2,5,16,17] When we tried to find the presence of risk factors for acquiring HBV infection, we found that the positive group did not show a specific socioeconomic

status that differed from the negative group; most of the patients come from intermediate to low socioeconomic status. El-Sharbawy *et al.* and Akbar *et al.* reported that the seropositive pregnant women in their studies were coming from poor socioeconomic communities with lower educational status.^[22,25] Other risk factors include surgery and blood transfusion; however, our seropositive patients did not undergo any surgical procedures and denied any history of blood transfusion. This finding was in accordance with the study of Kerbak *et al.*^[16] A history of close contact with a HBV-infected patient was discovered incidentally in one out of seven cases, accounting for about 14%; when this patient was told that she was found to be HBsAg positive, she arranged a family screen for her brothers and sisters, who were all positive, so she investigated her mother who was found to be positive and was believed to have transmitted the virus to her children through vertical transmission. This percentage was lower than that found in other studies.^[22] Regarding the occupation of the patients, five of the seven are housewives, one is a teacher, and one is a government employee, so none are working in the healthcare field, which carries a higher risk due to contact with infected patients. None of the seven positive patients had a history of jaundice or any other clinical signs of hepatitis, which is in agreement with the study of Sharifi-Mood *et al.*, while Vázquez-Martínez *et al.* reported that 8% of cases had symptoms of hepatitis.^[26,27]

Limitations of study

The main limitation was that the studied group was from only two cities, so was not representative of the whole country. Another limitation is that the risk factor assessment is mainly dependent on the history taken from the patients themselves rather than from documents.

CONCLUSION

Hepatitis B surface antigen positivity in pregnant women reflects an increased risk of vertical transmission of the virus to the unborn babies. Therefore, all pregnant women attending antenatal care should be tested for HBV infection and infected women should be followed-up, as their babies must receive HBV vaccines at birth. Also, women of childbearing age should be vaccinated if proven to be HBs Ab negative.

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