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RESEARCH ARTICLE

HEPATITIS B VIRUS INFECTION IN PREGNANT WOMEN AT JIBLAH UNIVERSITY HOSPITAL IN JIBLAH CITY, YEMEN

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Abstract

Background: Infection with the hepatitis B virus (HBV) is a worldwide public health concern. About half of the transmission routes of chronic HBV infections in endemic areas are through mother-to-child transmission (MTCT), with HBV infection primarily occurring during infancy and early childhood. One of the most important steps in lowering the prevalence of chronic HBV worldwide is MTCT prevention. The majority of MTCT is caused via natal transmission; therefore immunizing babies against disease is a highly effective method of preventing natal transmission.
Objective: This study was conducted to study the epidemiology of hepatitis B virus among pregnant women attending Jiblah University Hospital in Ibb Governorate, Yemen.
Methods: A hospital-based cross-sectional study was conducted and 154 pre-designed questionnaires and serum samples were collected from October to December 2023 to detect seroprevalence and associated risk factors for markers of HBV (HBsAg) among pregnant women at Jiblah University Hospital in Jiblah City, Yemen. Sera were tested for HBsAg by quantitative ELISA.
Results: The study reported that**,** the seroprevalence of hepatitis B virus was 2.6%. The prevalence of HBsAg was more prevalent in illiterate pregnant women. Educational status has been revealed as a predictor of hepatitis B virus infection.
Conclusion: This study revealed a moderate level of risk of hepatitis B virus infection among pregnant women.
Keywords: Hepatitis B virus, Jiblah, pregnant women, seroprevalence, Yemen.

INTRODUCTION

Viral hepatitis causes death for 1.3 million people annually and it is considered as the second leading infectious cause of death globally[1]. United Nations reports that Viral hepatitis as a global health priority, the United Nations Sustainable Development Goals 2030 (SDG30) which aim to reduce new chronic infections and new infections by 90% including 90% HBV vaccine coverage and a 65% reduction in viral hepatitis-related mortality by 2030[2]. Since of discovering the hepatitis B virus (HBV) in 1965 by Dr. Baruch Blumbe, and, despite the availability of a prophylactic vaccine for more than 23 years, HBV infection remains a disease of significant global health burden[3]. According to the Centers for Disease Control and Prevention, HBV Complications rank as the seventh-highest cause of global mortality and named as "silent killer"[4]. Globally, among individuals with cirrhosis, 42% had HBV infection[5] and 29% of cirrhosis-related deaths[6]. Chronic HBV infection is the leading cause in approximately 50-80% of the cases of hepatocelluar carcinoma (HCC), making it the sixth most common cancer worldwide and the fourth leading cause of cancer-related deaths[7]. Viral Hepatitis in pregnancy is closely linked to a high risk of maternal complications and birth outcomes, resulting in 19.2% very high maternal mortality and 42.6% fetal wastage[4]. HBV can be transmitted via contact with blood or bodily fluids like saliva, vaginal fluid, and semen[3] and has a high rate of vertical transmission causing fetal and neonatal hepatitis[8]. Vertical HBV transmission occurs if the mother has had acute HBV infection and most often occurs during the intrapartum period at the time of delivery[9]. Moreover, about 90% of infants born to mothers testing positive for hepatitis B surface antigens (HBsAg) or e antigens (HBeAg) will develop chronic infection which further develops to liver cirrhosis and hepatocellular carcinoma in young adulthood, posing a significant global public health challenge[10]. Parenteral transmission is still significant in developing countries and currently the most

common method of transmission of HBV in developed countries[11]. By contrast, pregnant women with HBV infection are more likely to present with maternal complications including pregnancy induced hypertension, postpartum hemorrhage, preeclampsia, placenta previa, preterm delivery, placental separation, and gestational diabetes mellitus[12]. The CDC recommends prenatal screening for HBsAg in all pregnant women after selective screening of high risk pregnant women for HBsAg. Prenatal screening of pregnant women for HBsAg is now nearly universal in the United States. However, routine screening of pregnant women for HBsAg is yet to be implemented in some other countries' prenatal care programmes, and even in Western countries, some pregnant women have never been tested for HbsAg[13]. HBV infection prevalence rate of 0.1% in the Northwest to 1–4% in the South of Europe, 0.5% in Russia[14], 5.2% in Pakistan[15], 11.7% in China[10], 3.04% in Ethiopia[16], 2.2% in Egypt[17] and 1.5% in Oman[18] were reported in pregnant women. In spite of the current availability of an HBV vaccine. The prevalence of HBV infection is categorized into three geographical areas: high (>8%: East Asia, Africa), medium (2–8%: Mediterranean, Eastern Europe), and low (<2%: North America, Western Europe)[19]. The HBV classification in Yemen is from intermediate to high and ranges between 1.28-10%[20,21]. In Yemen, there is no standard policy for prenatal screening for HBsAg in all pregnant women, but universal immunization for infants was introduced in early 2000 and was expected to cover all the country in the following years[22]. Even though there are few published data on the prevalence of HBV and its associated risk factors among pregnant women, to our knowledge, no study has been conducted in the study area. Hence this study aims to determine the magnitude of HBV infection and its associated risk factors among pregnant women who attended the delivery room at Jiblah University Hospital in Ibb Governorate, Yemen. The findings of this study will be used to design appropriate prevention and control measures and intervention strategies against the transmission of HBV infection especially vertical transmission.

MATERIALS AND METHODS

The study was conducted in the city of Jiblah, located south of Ibb Governorate, about 199 kilometers from the Yemeni capital, Sana'a. In 1965, the American Baptist Association established Jiblah Baptist Hospital. The Ministry of Public Health and Population of Yemen took over management of the hospital in 2003 and changed its name to Jiblah Hospital. In 2018, Jiblah Hospital was named Jiblah University Hospital, which is a referral hospital for all hospitals in Ibb Governorate and neighboring governorates, especially for surgical cases and obstetrics and gynecology cases. This cross-sectional study was carried out on 154 pregnant women attending the labour ward of Jiblah University Hospital, who were randomly selected after obtaining their consent to participate in the study. Pre-tested structured questionnaires were used to collect data on sociodemographic characteristics and risk factors associated with hepatitis B virus infection. From all study subjects approximately 3 ml of venous blood was collected following standard operating procedures by a trained laboratory technician in the hospital laboratory. HBsAg was tested using an antibody enzyme-linked immunosorbent assay (ELISA) test kit (Fortress Diagnostic Ltd. UK Many).

Statistical analysis

Data analysis was performed using SPSS, 26. Chi-square test was used to compare qualitative values and the association was declared significant at a P value of less than 0.05.

RESULTS

As shown in Figure 1, the seroprevalence of hepatitis B among pregnant women in the study population (N = 154). Out of the total respondents, 2.6% (4) tested positive for HBsAg. Socio-demographic characteristics and serological test results are recorded in Tables 1. The age of target population ranged from 16 years to 43 years with the average age of the volunteers was 26.7±6.31. The highest percentage of HBV infection was 6.50% (2) among pregnant women aged 28 – 33 years old, but this was statistically insignificant (*p* value 0.512). Most of participants 58% (89) lived in urban areas and had the highest percentage of HBV infection was 3.40% (3), however there was no significance association (*p* value 0.480). The current study reported that 44% (67) of participants had basic education and that the highest percentage of HBV infection was among non-educated subjects 2 (7.4%). The difference found was statistically significant (*p* value 0.000).

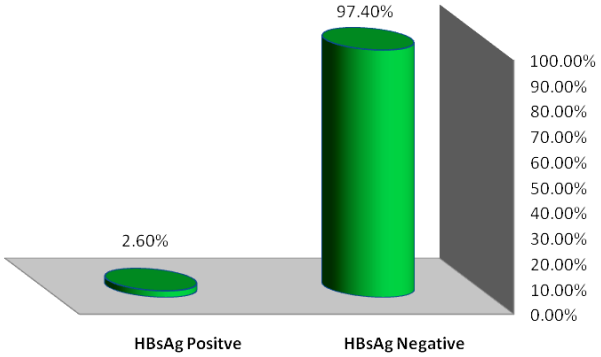

Figure 1: Seroprevalence of HBV infection among the study subjects.

Table 1: Association between participants' characteristics and HBsAg.

Variable	NO. (%)	HBsAg		*p** value
		Positive No. (%)	Negative No. (%)	
Age (years)				0.512
16-21	43 (28)	0 (0.00)	43 (100)	
22-27	48 (31)	1 (2.10)	47 (97.90)	
28-33	31 (20)	2 (6.50)	29 (93.50)	
34-39	27 (18)	1 (3.70)	26 (96.30)	
≥40	5 (3)	0 (0.00)	5 (100)	
Residence				
Urban	89 (58)	3 (3.40)	86 (96.60)	0.480
Rural	65 (42)	1 (1.50)	64 (98.50)	
Educational status				
Illiterate	27 (18)	2 (7.40)	25 (92.60)	0.00
Basic	67 (44)	0 (0.00)	67 (100)	
Secondary	52 (34)	1 (1.90)	51 (98.10)	
Graduated	8 (6)	1 (12.5)	7 (87.5)	
Occupation				0.989
House wife	144 (93.5)	4 (2.8)	140 (97.2%)	
Farmer	7 (4.55)	0 (0.00)	7 (100)	
Teacher	2 (1.3)	0 (0.00)	2 (100)	
Student	1 (0.65)	0 (0.00)	1 (100)	
Mode of Delivery				
Normal	83 (54)	2 (2.40)	81 (97.60)	0.874
Cesarean	71 (46)	2 (2.80)	69 (97.20)	
Parity				
Primigravida	51 (33.1)	2 (3.90)	49 (96.10)	0.600
Multigravida	103 (66.9)	2 (1.94)	101 (98.06)	
Knowledge of HBV				0.547
Yes	11 (7.1)	0 (0.00)	11 (100)	
No	143 (92.9)	4 (2.8)	139 (100)	
Blood transfusion				0.329
Yes	29 (19)	0 (0.00)	29 (100)	
No	125 (81)	4 (3.20)	121 (96.80)	

*p<0.05 is considered as significant.

OF all infected females in this study, 2.8% (4) were housewives and represented 93.5% (144) from the volunteers in this study. The relationship found was not statistically significant (p value 0.989). Regarding previous births, more than half of the participants in this study 54% (83) were born naturally, while the rest had a caesarean section 46% (71). No statistical association was detected (p value 0.874). Most of the participants, 92.9% (143), had no idea about viral hepatitis, and the percentage of infection with HBV infection among them was 2.8% (4), while the percentage of infection with hepatitis virus was 0.00% (0) among people who had an idea about Hepatitis B. However, the difference was found to be statistically insignificant (p value 0.547). There is no statistical significance (p value 0.329) between blood transfusions and HBV infection, as this study reported that the percentage of HBV infection among pregnant women who did not receive blood transfusions is 3.2% (4) while 0.00% (0) among people who have previously received blood.

DISCUSSION

In 2022, the number of annual deaths from viral hepatitis increased to 1.3 million, 83% of whom were due to HBV infection[1]. Prevalence of HBV may be different in different regions and various groups of the same country. In Yemen, previous studies revealed prevalence rates of HBV among general population ranges from 0.7% to 2%[23] and ranges from 2% to 18%[24,25] among blood donors and among pregnant women ranges from 1.28% to 10%[20,21]. This study estimated that the prevalence of HBV exposure among pregnant women was 2.6% and revealed intermediate endemicity of HBV infection according to WHO classification criteria. This result is consistent with the prevalence of HBV among pregnant women in the Arabian Peninsula and the Arab Gulf countries, which ranges from 1% to 7.1%[26,27], as well as in Europe, where the prevalence of HBsAg in pregnant women ranges from 0.1% in the Northwest to 1–4% in the South[14]. The finding of this study 2.6% was higher than the results from studies conducted in Saudi Arabia 0.27%[26] , Iraq 1.1%[26], Qater 1%[22], Oman 1.49%[18] and in Russia 0.5[14]. On other hand, the results of the present study was lower than studies carried out in Jordan 5%[28], Egypt 5%[27], Sudan 5.6%[16], Pakistan 5.2%[15], Ethiopia 3.04[16], Uganda 11.8%[29], Greece 2.89%[13] and China 11.74%[10]. The result of this study reported that prevalence of HBV infection was lower than that studies conducted in the Yemeni capital in the years 2003, 2011 and 2013, which revealed that the seroprevalence among pregnant women were 3.8%[30], 10.8%[21]. Differences in HBsAg seroprevalence in Yemen and elsewhere may be due to differences in habitual social behavior, level of awareness of different routes of transmission of the virus, geographic,

socioeconomic and immunization status, data collection methods, and tests used to detect HBV infection, study design, sample size and study period. The current study showed no association between HBV and age of participants (*p* value 0.512), which is consistent with a study's findings conducted in Yemen[21], Jordan[28], Uganda[29], and in Nigeria[31]. However, it differs from studies carried out in Yemen[30], Saudi Arabia[27], China[10], Ethiopia[16], USA[32] and in Greece[13]. This study reported that there was strong association between HBV infection and educational level of pregnant women (*p* value 0.000). Illiterate women were more exposure to HBV infection than educated women which clarified importance of education to fight HBV infection. This might be due to study participants have a lack of awareness of transmission methods of the hepatitis virus. This result is similar to the study conducted in Ethiopia[33] and in Cameroon[34]. However, the result of this study is inconsistent with other studies conducted in Yemen[21], Jordan[28], Nigeria[31], Uganda[29], and in USA[32]. Analysis of this study revealed that no significant correlation was found between residence, occupation and mode of delivery with HBsAg positivity. This is in line with studies conducted in Yemen[21], Iraq[28], Ethiopia[33], China[35] and in Uganda[29]. While study done in Cameroon stated that there was association between HBV infection and place of residence[34]. In this study, parity was identified as non risk factor for HBV infection (*p* value 0.600). This is in agreement with the findings from other studies conducted in Yemen[30], Ethiopia[33], China[35], and in Uganda[29]. On other hand, the findings of this study disagree with other studies carried out in Iraq[28], and Nigeria[31]. The current study indicated that about 92.9% (143) of the study population had no knowledge of HBV and that 2.8% of them were infected with HBV, although there was no statistical association (*p* value 0.547), which is inconsistent with a study result from study carried out in Ethiopia[35]. However, this study reported that a high percentage of HBV infection was among illiterate participants and there was a strong association identified between them. Despite the prevalence of HBV infection, 3.2% (4) and 00% (00) of participants with or without a history of blood transfusion were infected with the HBV. However, no statistical relationship between history of blood transfusion and HBV infection. These findings are consistent with previous studies conducted in Yemen[21], Iraq[28], and Uganda[29], and may be explained by viral screening practices required before donating or receiving blood.

Limitation of the study

This study had some limitations; including the sample size and study period may be small. This study used only one HBV marker to indicate HBV infection among studied pregnant women.

CONCLUSIONS

The results of this study suggest that magnitude of HBV infection has intermediate level among pregnant women. Lower education level was risk factor for HBV infection. Therefore, providing health education on HBV transmission and screening of all pregnant women are recommended to prevent HBV infection.

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AUTHOR'S CONTRIBUTION

Al-Mohani SKM: study design, data collection, data extraction, editing the manuscript. **Al-Mohani OSK:** field investigation for collecting data, statistical analysis. All authors read and approved the final manuscript.

DATA AVAILABILITY

Data will be made available on request.

CONFLICT OF INTEREST

The authors declare no competing interests.

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