Original Article

Seroprevalence of Hepatitis B and C, and Human Immunodeficiency Viruses in Saudi Pregnant Women and Rates of Vertical Transmission

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Kuwait Medical Journal 2015; 47 (3): 221 - 224

ABSTRACT

Objectives: Information regarding the prevalence of hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency (HIV) viruses in Saudi pregnant women is either lacking or outdated. The aims of this study were to determine the current prevalence of these viruses among Saudi pregnant women and to estimate the rates of vertical transmission.
Design: Retrospective cross-sectional study
Setting: Antenatal clinic at a university hospital in Kingdom of Saudi Arabia (KSA)
Subjects: Three thousand two hundred and forty-six Saudi pregnant women seen in antenatal clinics between July, 2010 and June, 2011
Main Outcome Measures: Laboratory results of HBsAg, anti-HCV, and HIV antibodies in all subjects and vertical transmission rates to newborns of seropositive mothers
Results: The mean age was 31 years (± 6.5 years). HBsAg was detected in 1.08% out of the 3,242 tested women. Two babies (6.25%) out of the 32 live tested neonates were positive. Only two (0.07%) women out of 3,051 were positive for anti-HCV antibodies with no vertical transmission. 3119 (96.1%) women were tested for HIV antibodies and none were found to be positive.
Conclusion: The prevalence of HBsAg among Saudi pregnant women (1.08%) is lower than previously reported. However, antenatal testing for HBV is still warranted. Universal antenatal screening of HCV or HIV in Saudi Arabia may not be justifiable due to the very low prevalence of these viruses among pregnant women.

KEY WORDS: hepatitis B virus, hepatitis C virus, human immunodeficiency virus, seroprevalence, vertical transmission

INTRODUCTION

Chronic blood-borne viral infections such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) can have a major impact on affected individuals and more so on newborns of pregnant women as a result of vertical transmission. Thus, testing for HBV and HIV in pregnancy is medically indicated to prevent vertical transmission[1-3].

Vertical transmission of HBV, for instance, is known to be the leading cause of infection transmission, and perinatal infection is associated with an extremely high rate of chronicity (up to 90%)[4]. In 1991, WHO recommended that HBV vaccine be part of national immunization programs of all countries in an attempt to reduce the prevalence of HBV. Saudi Arabia was one of 151 countries that followed such recommendation[5]. In addition, the American Congress of Obstetricians and Gynecologists endorsed routine screening for HBV in all pregnant women since 1992[6,7]. This practice was recommended to ensure that women receive optimal medical care as well as appropriate post-exposure prophylaxis is given to the newborn of seropositive mothers.

Prevalence of these aforementioned viruses among the antenatal population may be a reliable indicator of its prevalence in the general population. Nonetheless, the prevalence of HBV is variable based on the population tested. In Saudi Arabia, previous studies estimated that HBV prevalence averaged between 5% and 10% in the 1980's. In 2000, the rate dropped to 1.7% but this was among blood donors samples[8]. A study on

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the prevalence of HBV among Saudi pregnant women was published in 2005. The investigators found 2.46% seropositive rate among 2664 tested women[9].

On the other hand, antenatal screening for HCV and HIV have not been universally accepted for routine testing in all pregnant women. It is generally reserved for women in high-risk groups. Few countries, however, such as the Netherlands, Estonia and Czech Republic introduced routine universal antenatal screening of HIV for all pregnant women with opting-out policy[10 -11].

We expect that the prevalence of HBV among Saudi pregnant women will even be lower than previously reported mainly due to the strict implementation of HBV vaccinations among all children born in Saudi Arabia. As for HCV and HIV seroprevalence in Saudi pregnant women, there is no published data but it's expected that they are very low.

Currently, the department of Obstetrics and Gynecology in a university public hospital in Riyadh city in Saudi Arabia has introduced routine antenatal testing of HCV and HIV for all women following their pregnancy at this hospital along with HBV testing.

The aims of this study were to determine the prevalence of hepatitis B virus, hepatitis C virus, and HIV in Saudi pregnant women attending antenatal clinics in a university hospital in Saudi Arabia and to determine the transmission rates of those viruses to the newborns of seropositive women. Such information will update and provide data that can lead to some recommendation about antenatal screening for those three viruses based on the results, which can help decision makers in the health ministry to consider testing for HIV and HCV as part of routine testing for all pregnant women in Saudi Arabia.

MATERIAL AND METHODS

A cross-sectional study of all pregnant women attending antenatal clinics of a university hospital in Riyadh city between July 1, 2010 and June 30, 2011 was conducted. No consent from the included subjects was needed because the data was retrieved from hospital health information system and patient's identity was not declared. The Institutional Review Board (IRB) approved the study prior to commencing data collection based on no consent form. Laboratory data for HBV, HCV, and HIV tests of eligible women were retrieved. Women with invalid file numbers or those who did not have the test done were excluded from analysis. Screening tests for the aforementioned viruses, Hepatitis B surface antigen (HBsAg), Hepatitis e Antigen (HBeAg), anti-HCV antibodies, and HIV-1 antibodies was requested during the first antenatal visit. Enzyme Immunoassay (EIA) test was used to determine the presence of HBsAg and HBeAg; anti-HCV antibodies and HIV-1 antibodies were assessed by the same method (EIA and confirmatory test was done by polymerase chain reaction or PCR). Results of these tests were obtained from the Laboratory Access System and were recorded in a standardized data collection form.

Data with regard to the newborns of seropositive mothers were collected from their medical charts. Data regarding postnatal testing of newborns and any prophylactic treatment were collected as well.

Statistical Analysis

Our sample was chosen by convenience. Continuous data is presented as mean and standard deviation if centrally distributed. Skewed data were presented as median and interquartile range. Seroprevelance data were presented as numbers and percentages. Data was analyzed by using PASW Statistics™ program, version 18. Prevalence for each infection was calculated with confidence intervals based on the Poisson distribution for HBsAg, anti-HCV, and HIV antibodies.

RESULTS

The mean age of included women was 31 years (± 6.5), and ranged from 16 to 53 years. Almost all women (99.9%) out of this cohort were tested for Hepatitis B virus antigens and 35 women were found to be positive (1.08%; 95% C.I: 0.72% – 1.44%). Among these seropositive women, 32 women delivered in the same hospital and all their live newborns were tested for HBsAg. Only two newborns were delivered vaginally, out of the 32 tested neonates (6.25%) were found to be positive and their mothers were found to be the only women with positive HBeAg. All live newborns of infected mothers were given immunoglobulin therapy and vaccination at birth.

Regarding HCV testing, two women (0.07%, 95% CI: 0.02% - 0.12%) out of the 3,051 tested subjects were positive for anti-HCV antibodies; both babies were born at this hospital and the test for HCV antibodies was negative up to 12 months of age. None of the tested mothers for HIV (3,119) was positive in this cohort.

DISCUSSION

Hepatitis B and C infections are leading causes of chronic liver disease worldwide. Saudi Arabia was considered one of the endemic areas for those viruses in the 1980's prior to the introduction of several strategies to reduce the transmission of such viruses. Since then, information on the epidemiology of HBV and HCV was accumulated over the last two decades and it showed a marked decline (more than 50%) during the studied period[8]. This decline in prevalence was more significant in HBV (1.7% from 4.7%) compared to HCV (0.28% from 0.58%)[8]. For HIV type 1, the joint United Nations Program on HIV / AIDS reported a projected prevalence of 0.3% in Saudi Arabia[12].

This study is the first study that assessed the prevalence of HCV and HIV along with HBV in obstetrics population in Saudi Arabia. We had the opportunity to check the results of universal antenatal screening for all above-mentioned viruses. The percentage of tested women for each virus was variable but quite high in general; HBV was tested in 99.9% of the total sample, while HIV was tested in 96.1% and HCV in 94%.

Among 3242 Saudi pregnant women, HBsAg was found in 1.08% women. This may indicate a further decrease in the prevalence of HBV in pregnant women compared to previously reported 2.44% seroprevalence rate among 2664 pregnant Saudi women[13]. Such decrease could be due to sampling techniques or more likely due to true change in the prevalence of HBV among women of reproductive age in Saudi Arabia. The prevalence of HBV was similar to that in neighboring countries within relatively similar populations like for instance a study done in Oman, Qatar, and the United Arab Emirates (UAE). The investigators found that out of a total of 1710 enrolled women between the ages of 15 - 45 years (only 1694 had serological results available), HBsAg was positive in 7.1% in Oman, 1% in Qatar, and 1.5% in the UAE. Thus, the prevalence in Qatar and the UAE are quite similar to Saudi Arabia while Oman shows seven-fold higher prevalence rate[14].

The transmission rate of HBV to newborns of infected mothers was estimated to be 6.25% in this study. Worldwide, perinatal transmission of HBV is an important route of infection. Studies have shown vertical transmission rates of HBsAg between 10% and 85%[15]. But El-Magrahe *et al* reported the lowest vertical transmissions of 0.9% only[16]. A study done in India which investigated the seroprevalence of HBV in pregnant women showed that vertical transmission was only in women who had vaginal delivery and none among those who delivered by elective cesarean section[17]. This finding was similar to that in our study where all positive babies were delivered by the vaginal route. This may add to the evidence that elective cesarean section may protect babies from vertical transmission[18].

Regarding hepatitis C, the seropositive rate for anti-HCV antibodies was 0.07% out of the 3,051 women who had the test done. Again, in this study the prevalence is much lower (0.07%) than a previously reported prevalence of HCV in pregnant women in Saudi Arabia (0.7%) by Shobokshi *et al*[19]. However, the seroprevalence of HCV among children in Saudi Arabia in two different studies published over 10 years ago was ranging from 0.04% to 0.1%[20, 21]. Abdel-Moneim *et al* reported the most recent estimation of HCV infection among Saudi population for the period between 2008 and 2011. They found HCV seroprevalence of 7.3% among 15,323 Saudi individuals[22]. Their population included many older subjects above the reproductive age group, which can explain the possible high prevalence of HCV in their study.

As for the neonatal vertical transmission in our sample, none was positive within the twelve-month time frame.

HIV was not detected in our sample, corroborating low prevalence noted in Saudi population. This may be, however, due to sampling error but the scattered reports on HIV-1 prevalence in Saudi Arabia support that HIV prevalence is low in low-risk groups. For example, studies on blood donors in Saudi Arabia showed HIV prevalence as low as 0.006%[23]. In another low risk group, 926 pregnant women in Makkah City were negative for HIV-1 antibodies on antenatal screening[24]. These studies may indicate the extremely low prevalence of HIV-1 in low risk populations in Saudi Arabia. A recent study on the prevalence of HBV, HCV, and HIV in 500 infertile couples attending a tertiary care facility in Saudi Arabia reported similar findings like in our study[25]. The overall prevalence of HBV in the population studied was 1.8%. For females only, HBV prevalence was 1.5%, and for males it was 2.1%. Overall HCV prevalence in this group was 0.5%. All females were negative for HCV, while males had a prevalence of 1.1%. All males and females were negative for HIV.

CONCLUSION

The prevalence of HBsAg among Saudi pregnant women (1.08%) in a tertiary care hospital is lower than the previously reported figure. However, antenatal testing for HBV is still paramount important due to the available preventive measure to minimize vertical transmission. On the other hand, universal antenatal screening of HCV or HIV in Saudi Arabia may not be justified at this point of time due to the very low prevalence of both infections.

Limitations of the study

This study has relatively small sample size in relation to disease prevalence and not all subjects in the cohort were included in the final analysis. Also, the lack of data on any risk factors or other demographics has limited its conclusion.

ACKNOWLEDGEMENTS

We would like to acknowledge the support we received from the Deanship of Scientific Research at King Saud University for funding this project through Research Group Project # RGB-VPP-241.

Conflict of interest: None to disclose

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