

Seroprevalence and relative risk of HBsAg among female patients seeking healthcare service in Bo Government Hospital, Sierra Leone: 14-months database study

Keyword: Hepatitis, Chronic, Seroprevalence, Healthcare

Abstract

Background

Chronic hepatitis B virus (HBV) seroprevalence varies globally but is positively correlated with the prevalence of HIV since both have the same route of transmission-contact with infected body fluids. Sierra Leone has a nascent hepatitis B epidemic and there is a paucity of research data and awareness about the infection.

Aims

This study determined the seroprevalence and relative risk of hepatitis B surface antigen (HBsAg) among female healthcare seekers who used the main government referral hospital in Bo, Southern Sierra Leone from May 2012- June 2013.

Method

We retrospectively analysed serological laboratory results of HBsAg for female healthcare seekers who used the Bo Government Hospital laboratory in Sierra Leone from May 2012 to June 2013.

Research setting

This study is a multicenter investigation conducted at the Bo Government Hospital laboratory and the Department of Community Health and Clinical Sciences at Njala University in Bo southern Sierra Leone. Bo is the second largest city of Sierra Leone and is the regional headquarters of southern Sierra Leone. All laboratory diagnostic tests for HBsAg diagnosis were done at the Bo Government Hospital laboratories.

Study subjects

A total of 2,218 female subjects took part in this investigation; girls 5-18yrs (15.28%), adults females >18yrs (48.92%), pregnant women (17.49%), and lactating women (18.31%). Study subjects were between 5-45yrs; mean age 26yrs; HBsAg⁺ mean age was 24yrs; HBsAg⁻ mean age was 29yrs.

Results

From May 2012 to June 2013, one thousand and fifty four (47.52%) of female healthcare seekers at the Bo Government Hospital in Sierra Leone were tested positive for HBsAg; 159(7.17%) pregnant women, 168 (7.57%) lactating mothers, 154 (6.94%) were 5-18yrs and 573 (25.83%) were > 18yrs. Pregnant women were at higher risk (RR=1) for HBV infection compared to lactating mother. The risk (RR=0.67)

for HBV infection was also greater in pregnant and lactating mother compared to non pregnant and lactating mothers.

Discussions

Few independent investigations have estimated national HBsAg seropositivity in Sierra Leone at 2.6%-5.1%. The high HBsAg seropositivity among our subjects can be attributed to the large population surveyed and may also be due to differences in the socio-demographic and economic background of our study cohort compared to those of other investigations.

Conclusions

The high seroprevalence of HbsAg among adult females emphasize the need for a robust public health preventive and control measures including the use of HBsAg vaccination, immunization as well as routine blood screening as a means of reducing the spread of the infection.

Introduction

An estimated 350 million people are chronically infected with HBV World wide.¹ The seroprevalence of hepatitis B surface antigen (HBsAg) varies globally and countries can be defined as having a high, intermediate and low prevalence of HBV infection based on the prevalence of HBsAg carriers.¹ About 15%-40% HBV carriers develop serious sequelae but not hepatic complications from chronic hepatitis B in their lifetime.² Most HBV infection is transmitted parenterally amongst adults through unprotected sexual. The most common mode of transmission in areas of high HBV endemicity where the infection is acquired early in life is through close personal contact amongst children and infected families-“horizontal” spread. Immigrants from high or intermediate prevalence countries and in those with high risk behaviors are at high risk of HBV infection compared to residents of low risk nations.

Many a high risk groups have been identified in the transmission of HBsAg including healthcare emergency personnel, infants born to infected mothers, individuals with multiple sex partners either past or present, illicit drug users (injecting, inhaling, snorting, popping pills) and homosexuals. HBV carriers are at increased risk of developing cirrhosis, hepatic decompensation, and hepatocellular carcinoma³.

Methods

This study is a multicenter investigation conducted at the Bo Government Hospital laboratory and the Department of Community Health and Clinical Sciences at Njala University in Bo southern Sierra Leone. Bo is the second largest city of Sierra Leone and is the regional headquarters of southern Sierra Leone. All laboratory diagnostic tests for HBsAg were conducted at the Bo Government Hospital laboratories from May 2012 to June 2013. Protocol design, literature reviews, and data analysis were done at the Department of Community Health and Clinical Sciences of Njala University in Bo from July 2013 to August 2013.

We determined the seroprevalence rate for hepatitis B surface antigen (HBsAg) by retrospectively analyzing laboratory test results for all female healthcare seekers who used the Bo Government Hospital laboratory in Sierra Leone from May 2012-June 2013. The presence of hepatitis B surface antigen (HBsAg) in the serum of HBV patient indicates either an inactive carrier state, acute or chronic HBV infection. All subjects for this study were confirmed cases of chronic hepatitis B who were later placed for antiviral treatment. All subjects were requested to undergo re-diagnosis six weeks after their initial positive diagnosis for confirmation test. Chronic HBV patients unlike acute cases have HBsAg present in

their serum after six weeks of initial diagnosis. All subjects had no prior knowledge about their HBsAg status and were only referred to the Bo Government Hospital laboratory for HBV testing based on suspicion of being infected with either HIV or viral hepatitis or coinfection with both. Bo Government Hospital is using ICD 10 for its HBV classification. This study did not determine hepatitis B e antigen (HBeAg) seropositivity due to logistic factors. HBeAg seropositivity is an indication of active viral replication and infectivity.

The Determine HBsAg immunochromatographic assay was used for HBsAg diagnosis of all study subjects. The Determine HBsAg immunoassay is commonly used in resource-constraint countries like Sierra Leone for HBsAg diagnosis because of its affordability and relative sensitivity. In most developing countries the Determine HBsAg immunoassay used both for diagnosing suspected HBV infection as well as for monitoring HBsAg status. Procedures for HBsAg diagnosis using the Determine HBsAg immunoassay serological kit involves collecting 50ul of blood sample with a fingerstick and an EDTA capillary tube, transfer of blood sample to a sample pad and adding a drop of chase buffer to the blood sample on the sample pad. The blood sample is allowed to wait for 15minutes before results are read. To ensure the Determine HBsAg immunoassays' validity, a procedural control is incorporated into the device and is labeled "control".

In interpreting the Determine HBsAg immunoassays HBV test results, a visible red color (bar) in the patient's window would be interpreted as positive, one red bar in the control window of the strip (labeled C) and no red bar in the patient window would be interpreted as negative, and invalid result implies when there is no red bar in the control window of the strip, and even if a red bar appears in the patient window of the strip, the result is invalid and should be repeated. A Determine HBsAg test result could also be interpreted positive even if the patient bar appears lighter or darker than the control bar. However, if the control bar does not turn red following the HBsAg test with the Determine HBsAg immunoassay, the test result is invalid and the blood sample should be retested. All subjects for this investigation were obtained from the Bo Government Hospital laboratory records. We later used Chi Square to determine the relative risk of HBsAg infection among the various age groups.

Results

A total of 2,218 female healthcare seekers visited Bo Government Hospital laboratory from May 2012 to June 2013; girls 5-18yrs (15.28%), adult females >18yrs (48.92%), pregnant women (17.49%), and lactating women (18.31%). There were 1,054 (47.52%) HBsAg seropositive; 159(7.17%) pregnant women, 168 (7.57%) lactating mothers, 154 (6.94%) were 5-18yrs and 573 (25.83%) were > 18yrs (Table 1). Study subjects were between 5-45yrs; mean age 26yrs; HBsAg⁺ mean age was 24yrs; HBsAg⁻ mean age was 29yrs.

Pregnant women and lactating mothers are 0.8 times at risk of becoming infected with HBV compared to non pregnant women (girls and adults >18yrs). Both pregnant and lactating mothers have equal risk (RR=1) of becoming infected with HBV, while girls (5-18yrs) are 0.85 times at risk of being infected with HBV compared to adult >18yrs. Pregnant women have greater (0.91) risk of being infected with HBV than girls (5-18yrs) and adults (>18yrs). The risk for HBV infection among pregnant women is 0.77 times that of adults >18yrs.

Table 1 Frequency of HBsAg among descriptive variables

Variables	HBsAg ⁺ n (%)	HbsAg ⁻ n (%)	Total n (%)
Pregnant	159(15.09%)	229(19.67%)	388 (17.49%)
Lactating	168(15.94%)	238(20.45%)	406 (18.31%)
5-18yrs	154(14.61%)	185(15.89%)	339 (15.28%)
> 18yrs	573(54.36%)	512(43.99%)	1,085 (48.92%)
TOTAL	1,054 (47.52%)	1,164(52.48%)	2,218 (100%)

Discussions

We set to determine HBsAg seropositivity and relative risk for female health seekers visiting the Bo Government Hospital in southern Sierra Leone for the period under review. We retrospectively analysed the laboratory test results for 2,218 female healthcare seekers who visited the Bo Government Hospital laboratory for HBV diagnosis within the period of May 2012 to June 2013; girls 5-18yrs (15.28%), adults females >18yrs (48.92%), pregnant women (17.49%), and lactating women (18.31%). There were 1,054 (47.52%) HBsAg seropositive; 159(7.17%) pregnant women, 168 (7.57%) lactating mothers, 154 (6.94%) were 5-18yrs and 573 (25.83%) were > 18yrs. A HIV and HBsAg seroprevalence survey conducted among combined sexes at a health facility in Freetown the capital of Sierra Leone indicated 21.72% (43/198) HBsAg seropositivity; 25.5% males and 17.7% females⁴. Few independent investigations have estimated national HBsAg seropositivity in Sierra Leone between 2.6%-5.1%⁵. The high HBsAg seropositivity in our study can be attributed to the large population surveyed and may also be due to differences in the socio-demographic and economic background of our study cohort compared to those of other investigations. Bo city where we conducted our study is a socioeconomically deprived region compared to Freetown where the previous study was done.

Our study revealed that pregnant women have greater risk (RR=1) than lactating mothers of being infected with HBV which could be related to the fact that women in Bo unlike most other regions have sex and entered into marry at an early age. Most women in southern Sierra Leone where Bo is located are sexually active at an early age. These women had their first sexual intercourse before 18years and had married when they were 20-24yrs. The median age for first married and first sexual intercourse for women in Bo for the age group 20-24 yrs were 16.9yrs and 16yrs respectively⁶. Southern Sierra Leone is also recorded to have highest number of teenage pregnancy with first child compared to other regions. The teenage pregnancy with first child for southern Sierra Leone is 7.8% compared to 5.7% (eastern) and 4.2% (western); the median age at first birth for women in southern Sierra Leone is 18yrs⁶. This high risk for HBV infection among pregnant women in this study is also explainable by the fact that majority of the women within the study site have multiple sex partners and rarely practice safe sex.

According to the 2008 Sierra Leone Demographic Health Survey (SLDHS 2008), southern Sierra Leone has the least number of men and women who practice safe sex through the use of condoms compared to other regions in the country⁶. Southern Sierra Leone registered the least number of males who limit their sexual intercourse to one HIV negative partner, use condoms and limit sexual intercourse to one HIV negative partner, and practice sexual abstinence⁶. The factors above also account for pregnant women and lactating mothers having high (RR= 0.8) risk for HBV infection than girls and adult > 18yrs.

Girls (5-18yrs) are 0.85 times at risk of being infected with HBsAg compared to adults >18yrs. Southern Sierra Leone including Bo where this study was conducted recorded the highest number of males transactional sex compared to other regions in the country⁶. Transactional sex as defined in the SLDHS 2008 report involves the exchange of sex for money, favors, or gifts. The act is associated with high risk of contracting HIV and other sexually transmitted infections such as HBV, syphilis and gonorrhea because of its ability to compromise power and its tendency towards establishing multiple sex partnerships. The SLDHS 2008 interviewed men who had sexual intercourse in the past 12 months leading to the survey and to ascertain whether they paid for such sex. Girls (5-18yrs) because of their lack of experience, prevailing socioeconomic condition and low level of education, can be easily manipulated into having transactional sex with men in a bid to meet their financial and educational needs.

Conclusion

In view of the high seroprevalence (47.52%) of HbsAg among female healthcare seekers and the particular high risk of pregnant women and lactating mothers becoming infected with HBV compared to non pregnant women (girls and adults >18yrs) there is a need for a robust public health preventive and control strategies including the HBV vaccination, immunization and awareness raising programs to be step-up in all major towns and city in Sierra Leone. Pregnant women are at elevated risk (RR=1) of contracting HBV compared to lactating mothers, while girls (5-18yrs) are 0.85 times at risk of being infected with HBV compared to adults >18yrs. Pregnant women have greater (0.91) risk of being infected with HBV than girls (5-18yrs) and adults (>18yrs). The risk for HBV infection among pregnant women is 0.77 times that of adults >18yrs. The elevated HBsAg seroprevalence among the female population in Bo alongside the high risk of pregnant women becoming infected with HBV compared to non pregnant women is becoming a public health issue in Sierra Leone. However, as a way of reducing the high HBsAg seroprevalence among women in Bo there is an urgent need for the implementation of HBV vaccination and immunization during infancy, increased public health education and awareness raising campaigns. Also, sexually active females may also be advised to practice safe sex including the use of female condom in order to minimize the risk of HBsAg transmission. As another safety precaution method, private and public laboratories may be advised to routinely screened blood products and donors for HBsAg before transfusion to needy patient.

Consent

All authors declared that a written informed consent letter was obtained from authorities of the Bo Government Hospital in Sierra Leone prior to the use of medical link data of HBV seropositive patient for this study.

Ethical Approval

All authors hereby declared that all procedures relating to this study was approved by the appropriate ethics committee of the Department of Community and Clinical Sciences, Njala University, and the Bo Government Hospital in Sierra Leone.

Competing Interest

All authors have declared that no competing interests exist.

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