

Sexual transmission of the hepatitis B virus among blood donors in a tertiary hospital in Nigeria

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ABSTRACT

Introduction: Hepatitis B can be spread by several routes, including sexually. This study aimed to determine the prevalence of sexual transmission of the virus among the Nigerian population.

Methods: This was a prospective cross-sectional study involving 234 blood donors in a Nigerian tertiary hospital. Each prospective donor was screened for hepatitis B surface antigen using an enzyme-linked immunosorbent assay test. A structured questionnaire was used to obtain information regarding the possible routes of hepatitis B acquisition and the number of lifetime heterosexual partners. Respondents were divided into three risk groups. The data obtained was analysed, and the frequencies, percentages, means and standard deviations were obtained. The chi-square test was used to compare categorical variables, and a p-value equal or less than 0.05 was considered statistically significant.

Results: A total of 234 respondents aged 18 to 56 years (mean 27.3 years) participated in the study. 223 were male and 11 were female. The overall seroprevalence of hepatitis B was 17.1 percent. The seroprevalence was higher among participants without sexual partners (20.6 percent) and those with multiple sexual partners (20.0 percent), but lower among those with single sexual partners (15.0 percent). A history of needle injuries, jaundice and injections from quacks were statistically significant when these risks were combined with a sexual risk for hepatitis B virus infection (p-value is less than 0.05).

Conclusion: Sexual transmission of hepatitis B was not found to be an important factor. Preventive strategies should include universal hepatitis B vaccination and discouraging the indiscriminate use of sharp objects and unauthorised medical practices.

Keywords: blood, hospital, institution, transmission, virus

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INTRODUCTION

Chronic hepatitis B infection is a global problem; however, Asia and sub-Saharan Africa are most affected by it.⁽¹⁾ Hepatitis B can be transmitted in the following ways: via unscreened or improperly screened blood, sexual contact, mother-to-child transmission, the use of unsterilised needles, sharp objects like blades and scarification materials that are shared among people.⁽²⁾ Hepatitis B surface antigen (HBsAg) has been identified in the bodily fluid of nearly every infected person. The two non-percutaneous routes that are considered to have the greatest impact are intimate sexual transmission and perinatal transmission.⁽²⁾ In sub-Saharan Africa, however, close contact among toddlers is considered to be instrumental in contributing to the high rate of hepatitis B infection among the population.⁽³⁾ Many studies have been conducted on the seroprevalence of HBsAg in different populations in Nigeria, but very few have focused specifically on its sexual transmission. No such studies have emerged from Southwestern Nigeria. Thus, the current study was conducted among voluntary blood donors to examine the prevalence of sexual transmission of the hepatitis B virus (HBV).

METHODS

A prospective cross-sectional study was conducted among 234 donors in a tertiary hospital in Nigeria. The study period spanned from December 2008 to March 2009. Ethical clearance was obtained from the institution's ethics committee. Prospective blood donors who consented to participate in the study were recruited consecutively and interviewed by means of a structured questionnaire, which focused on the number of sexual partners (casual and steady partners, marriage(s) and divorces), if any. Other possible routes of acquisition of the hepatitis B virus, such as a history of blood transfusion, scarification marks, needle-stick injuries,

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intravenous drug abuse and indiscriminate needle injections from quack medical personnel, were also covered in the questionnaire. The questionnaire did not include a family history of hepatitis B. Demographic information, such as age, gender, occupation and marital status, were recorded for each patient.

Screening for hepatitis B was done by the enzyme immunoassay method using a Clinotech test kit (Clinotech Diagnostics, Richmond, BC, Canada). The results were recorded for each patient. The respondents were then divided into three risk groups based on the information obtained from the questionnaire: those without any sexual partners, those with only one sexual partner and those with multiple sexual partners. The data obtained was analysed using the Statistical Package for the Social Sciences version 13 (SPSS Inc, Chicago, IL, USA). Frequencies were generated, and the percentages, means and standard deviations were calculated. The chi-square test was used to compare the categorical variables. A p -value ≤ 0.05 was considered to be statistically significant.

RESULTS

A total of 234 participants completed the study, of which 223 were male and 11 female (male-female ratio is 20:1). 82 (35.0%) participants were married, while 152 (65.0%) were single. The participants were aged 18–56 (mean 27.3 ± 7.7) years (Table I). 34 (14.5%) participants were single and had no sexual partners, 155 (66.2%) participants had one sexual partner and 45 (19.2%) had more than one sexual partner. Overall, 40 participants tested positive for HBsAg, yielding a prevalence rate of 17.1%, while the other 194 (82.9%) tested negative. Table II provides a comparison of the three groups. The seropositive rate of participants without sexual partners was 20.6% (7 out of 34 participants), those with one sexual partner was 15.5% (24 out of 155 participants), and those with more than one sexual partner was 20.0% (9 out of 45 participants). When single participants without sexual partners were compared with those with one or multiple sexual partners, the differences in the hepatitis seropositive status were not found to be statistically significant ($p = 0.45$ and $p = 0.95$, respectively). The groups were also compared in terms of the risk factors for the acquisition HBV (Table III). A significant association was found only for those with a history of injection from a quack medical practitioner, needle-stick injury and jaundice ($p = 0.04$, $p = 0.03$ and $p = 0.04$, respectively).

DISCUSSION

The seroprevalence of HBV among blood donors in

Table I. Age distribution of the participants.

Age (yrs)	No. of participants (%)
18–20	27 (11.5)
21–30	145 (62.0)
31–40	46 (19.7)
41–50	13 (5.6)
51–60	3 (1.3)
Total	234 (100.0)

this study was 17.1%. This was higher than that found in the general Nigerian population, at 10%–15% of 140 million people.^(4,9) Although pockets of high prevalence rates were reported in some areas of the country,^(5,10) it is, however, found to be very high in this study. The reasons may be related to findings such as indiscriminate injections from quack medical practitioners and needle-stick injuries. The prevalence of hepatitis B among those with multiple sexual partners was 20% in our study. Although this value is high, the number of participants in this category was also small; a larger, more representative sample may provide a clearer picture. As this was a cross-sectional study involving three categories of sexual risk groups, there was an unequal number of participants in the groups, which were neither gender- nor age-matched. The prevalence of hepatitis B among the high-risk group when compared with the lower risk group was not found to be statistically significant ($p = 0.95$). It is interesting to note that the prevalence among participants without any sexual partners was even higher than in those with multiple partners, which may support previous reports that sexual transmission plays only a minor role in Nigeria for HBV infection.⁽³⁾

The comparison of the risk groups with other risk factors associated with the acquisition of HBV yielded significant results for a history of jaundice, injection from quacks and needle-stick injuries (Table III). Thus, the occurrence of two or more risk factors for hepatitis B infection is likely to have the cumulative effect of leading to a positive hepatitis B result. The number of participants with one or multiple sexual partners who tested seropositive to HBsAg was greater among those who had scarification marks or needle-stick injuries. However, among participants with a history of jaundice, the same number tested positive in the two high-risk groups, even though they had multiple partners. This may mean that where there is a history of jaundice, additional risk factors may not have cumulative effects.

Sexual transmission of hepatitis B has been reasonably established by various studies in the literature.^(11–15) However, some studies have shown that it does not play an important role,^(16–18) but among

Table II. Comparison of the three groups of participants.

Group	No. of participants		Chi-square test
	HBsAg +ve	HBsAg -ve	
Singles with no sexual partners (n = 34)	7	27	$\chi^2 = 5.3$; df = 1
Participants with one sexual partner (n = 155)	24	131	p = 0.45
Singles with no sexual partners (n = 34)	7	27	$\chi^2 = 0.00$; df = 1
Participants with > one sexual partner (n = 45)	9	36	p = 0.95

HBsAg: hepatitis B surface antigen

Table III. Risk factors for the acquisition of hepatitis B virus infection among the three groups.

Risk factor	Singles with no sexual partners (n = 34)		Participants with one sexual partner (n = 155)		Participants with > one sexual partner (n = 45)		Chi-square test
	HBsAg +ve	HBsAg -ve	HBsAg +ve	HBsAg -ve	HBsAg +ve	HBsAg -ve	
	Previous blood transfusion	2	32	7	148	1	
Previous scarification marks	16	18	51	104	23	22	$\chi^2 = 2.06$; df = 1; p = 0.2
Infection from quacks	7	27	17	138	12	33	Pearson $\chi^2 = 13.3$; df = 6; p = 0.04
Previous needle-stick injury	1	33	31	124	18	27	$\chi^2 = 9.01$; df = 1; p = 0.03
History of jaundice	1	33	2	153	2	43	$\chi^2 = 4.04$; df = 1; p = 0.04
Intravenous drug abuse	0	34	8	147	1	44	$\chi^2 = 0.03$; df = 1; p = 0.86

HBsAG: hepatitis B surface antigen

Caucasians, the weight of the evidence favours sexual transmission.^(19,20) A study from Nigeria also supported the possibility of sexual transmission of HBV among those with multiple sexual partners,⁽²¹⁾ while another study from Tanzania found a low rate of sexual infection, in keeping with the findings of this study,⁽²²⁾ thus suggesting that a low rate of sexual infection may be a pattern among Africans.

Surface antigens were used as markers of hepatitis B infection in this study; it is possible that many of our participants may have previously had evidence of a hepatitis B infection, which our screening method did not identify. This has been reported by Sattar and Islam in their study, in which evidence of prior HBV infection (anti-HBc) in 78% of HBsAg negative sera was found among prostitutes in Dhaka, Bangladesh.⁽¹³⁾ Among Caucasians, sexual transmission of the virus has been reported in studies of both homosexuals and heterosexuals.^(12,14) Homosexual transmission occurs as a result of trauma to the rectal mucosa, which aids transmission of the virus. In heterosexual transmission, on the other hand, the lifetime number of sexual partners, the duration of steady partners and a history of

sexually transmitted diseases are factors related to the rate of positive sera.^(14,21,23-25) In the current study, which was conducted among heterosexuals, a link between the rate of hepatitis B positivity and the number of lifetime sexual partners could not be established. There appears to be a high rate of transmission of the virus among patients with sexually transmitted diseases and among drug abusers compared to other groups of people.⁽²⁶⁾ This study did not enquire into the participants' history of sexually transmitted diseases, and among patients with a history of intravenous drug abuse, their hepatitis B results were not significant compared to others.

Based on reports from Nigeria, local cultural practices such as scarification marks, needle-stick injuries and injections from unqualified medical persons are possible modes of transmitting HBV.⁽⁴⁾ The current study was only able to demonstrate an association with previous needle-stick injury. A longitudinal study may provide a more accurate picture, as some studies have linked these practices to an incidence of chronic liver diseases.⁽⁵⁾

There are several limitations to the study. Firstly, the hepatitis B sera status of the respondents before puberty

was not known, especially for those who acquired the virus *in utero* or horizontally from their peers. Also, those with multiple sexual partners who practice safe and protected methods were not taken into consideration. Finally, some respondents in this study could also have acquired their hepatitis B infection vertically *in utero*.

In conclusion, hepatitis B transmission among people with high-risk sexual behaviours was not significantly demonstrated in this study, although the addition of other risk factors significantly increased the risk of hepatitis B infection. While sexual transmission may be one route through which the virus is spread in Nigeria, emphasis should also be placed on these other means of transmission in order to ensure proper infection control.

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