Global Advanced Research Journal of Medicine and Medical Sciences (ISSN: 2315-5159) Vol. 2(1) pp. 006-012, January, 2013
Available online http://garj.org/garjmms/index.htm

Full Length Research Paper

The Sero-prevalence of Hepatitis B surface antigen and anti-hepatitis C antibody among women attending antenatal clinic at a tertiary health facility in the Niger Delta of Nigeria

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Accepted 28 January, 2013

Asymptomatic Hepatitis B and C infections are common and when occuring in pregnancy can be transmitted to the newborn. To determine the sero-prevalence rates of asymptomatic Hepatitis B and C infections among pregnant women. 300 pregnant women attending antenatal clinic were consecutively recruited for study. Demographic and past clinical histories were obtained using a questionnaire. Serum samples from each study subject were tested using third-generation enzyme immunoassay kits for Hepatitis B surface antigen (HBsAg) and antibodies against Hepatitis C. Hepatitis B surface antigen prevalence was 3.67% (95% CI: 1.55 - 5.79) whilst anti-Hepatitis C antibody prevalence was 1.33% (95% CI: 0.04 - 2.62). 80% of the subjects with either Hepatitis B or C infections (12 out of 15) had traditional scarification marks on their bodies, 66.7% had undergone at least one previous termination of pregnancy, 26.7% had tattoos, 6.67% had previous blood transfusions, and 26.7% had undergone at least one surgical operation. However, none of the suspected risk factors had a significant relationship with hepatitis infection. Asymptomatic Hepatitis B and C infections are present in pregnant women. Routine screening of pregnant women for HBV and HCV should be instituted in order to detect infection early and prevent or reduce vertical or perinatal transmission.

Keywords: Hepatitis, pregnancy, risk factor, ante-natal screening

INTRODUCTION

Viral hepatitis is the inflammation of the liver caused by infection with the hepatitis viruses. Infections with the Hepatitis B virus (HBV) or the Hepatitis C virus (HCV) are public health problems and are highly endemic in the sub-Saharan Africa (Madhava, Burgess et al. 2002; Kramvis and Kew 2007). Worldwide, there are about 350 million HBV carriers (Goldstein ST., Zhou F. et al. 2005) and 130 to 170 million people infected with HCV (World Health Organization. 2011). HBV and HCV infections are a major cause of morbidity and mortality.

Hepatitis B virus has a circular genome of partially double-stranded DNA. The virus is transmitted through infected blood, sexually and vertically (mother to child) in

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the perinatal period. Perinatal transmission is the most common mode of HBV transmission worldwide (Tran 2009). The Hepatitis B surface antigen (HBsAg) is the serologic hallmark of HBV infection, whilst the soluble extractable protein, the Hepatitis e antigen (HBeAg) is a marker for the highly infectious state. Chronic infection is defined by the presence of HBsAg for more than 6 months. Without immunization, up to 90% of infants born to mothers who are positive for HBsAg and HBeAg, become chronic carriers (McMahon, Alward et al. 1985; Tassopoulos, Papaevangelou et al. 1987; Chang 2000).

Hepatitis C virus is a single-stranded RNA virus. It is transmitted also through infected blood, sexually and vertically (Dienstag JL. 1983; Melbye, Biggar et al. 1990; Wejstal R., Widell A. et al. 1992). HCV has a long lag time between onset of infection and clinical manifestation of liver disease (up to 20 years) (National Institute of Health. 2002). Chronic active hepatitis C infection is associated with increased incidence of preterm delivery and intra-uterine growth retardation (Zanetti, Tanzi et al. 1999). Vertical transmission of HCV from mother to child occurs in 3 - 10% of pregnancies complicated by HCV infection (Berkley EMF., Leslie KK. et al. 2008).

Chronic infection with HBV and HCV are often asymptomatic, and can lead to liver cirrhosis and hepatocellular carcinoma. Thus, most infected people are unaware of their HBV or HCV statuses. Maternal mortality has been shown to increase in pregnant women with liver cirrhosis (Mishra L. and Seeff LB. 1992).

The prevalence of HBV infection in Nigeria is estimated to be 2.4 - 18.4% of the population (Olokoba AB., Salawu FK. et al. 2009; Ugwuja EI. and Ugwu NC. 2010; Ndako JA., Nwankiti OO. et al. 2011). However, there is little available information about Hepatitis B and C infections in Bayelsa State of Nigeria. The prevalence and the genetic diversity of HBV and HCV are yet to be determined for Bayelsa State.

This study was therefore designed to determine the seroprevalence of Hepatitis B and C infections among apparently healthy pregnant women and the associated risk factors.

MATERIALS AND METHODS

Study design

This was a descriptive cross-sectional study carried out over a 6 month period spanning from October 2011 to March 2012. 300 pregnant women attending antenatal clinic at the Niger Delta University Teaching Hospital (NDUTH), Okolobiri, in Bayelsa State, Nigeria, were consecutively recruited for the study.

Study Area

The study was carried out at the NDUTH situated in Okolobiri community, a semi-urban community in the Yenagoa Local Goverment Area of Bayelsa State, in the Niger Delta region of Nigeria. The NDUTH is a tertiary hospital that serves the entire Bayelsa State and neighbouring communities in Delta and Rivers States of Nigeria. The hospital serves different socio-economic strata of the society - mostly the lower and middle socio-economic groups.

Exclusion/Inclusion criteria

Apparently healthy women attending antenatal clinic were recruited for the study. Women with a past history of hepatitis, those with jaundice, fever, liver enlargement were excluded from the study.

Demographic and clinical data were further obtained using a questionnaire. The questionnaire asked about previous history of blood transfusions, previous surgery, previous termination of pregnancy, previous sexually transmitted infections, tattooing, scarification marks, and polygamy/exposure to multiple sex partners, exposure to jaundiced patients. The questionnaires were administered by the researchers to a total of 300 participants. Respondents were given a free hand in response to questions and were only guided in their responses when they voluntarily called for assistance. They were also assured that the information provided would be kept confidential.

The sampling method we used was systematic random sampling with every third client being interviewed. We got the appointment list for each day of the week and calculated the sample fraction. The number of study participants was determined using probability proportionate-to-population size allocation methods.The information obtained were coded and transferred onto a proforma already design for the study.

Ethical Clearance

Ethical approval for the study was obtained from the Ethics Review Board of the NDUTH. Informed consent was obtained from all subjects recruited into the study.

Sample collection and processing

5ml of venous blood was collected by venepuncture into a plain bottle with no anti-coagulant, and allowed to clot.

Table 1. Socio-demographics of the study subjects

Parameter		n=300	%
Age	15 to 20	6	2
	21 to 30	174	58
	31 to 40	111	37
	41 to 45	9	3
Parity	0	66	22
	1 to 3	168	56
	>4	66	22
Marital status	single	24	8
	co-habiting	43	14.3
	married	233	77.7
	divorced	0	0
Education	nil	50	16.7
	primary	94	31.3
	secondary	120	40
	tertiary	36	12
Occupation	unemployed	73	24.3
	housewife	128	42.7
	petty trader	40	13.3
	farmer	59	19.7
	civil servant	0	0
	student	0	0

Table 2. Prevalence of Hepatitis B and C infections

No of subjects	HBsAg +ve	Anti-HCV +ve
300	11 (3.67%)	4 (1.33%)

The sample was centrifuged at 2000g for 5 minutes and the serum was transferred to a plain container and stored at 4°C.

Prevalence of HBV chronic infection is characterized the detectable level of Hepatitis B surface antigen(HBsAg). The presence of Hepatitis B surface antigen (HBsAg) was determined using third-generation enzyme immunoassay (EIA), rapid test ELISA kits (Acon Laboratories, USA).

Presence of antibodies against HCV (anti-HCV) was also determined using rapid test ELISA kits (Acon Laboratories, USA).

Statistical analysis

Statistical analysis was performed with the Graphpad Prism version 4® (Graphpad software, San Diego, CA). Differences between groups were determined by the one-way analysis of variance (ANOVA) or paired t- test with the level of significance set at $p < 0.05$.

RESULTS

The ages of the pregnant women ranged from 19 years to 45 years, mean 29.31 years. 77.7% of them were married and 40% had secondary school education, 42.7% were housewives and 56% had parity of between 1 and 3 (Table 1).

11 subjects had serum samples positive for HBsAg (3.67%; 95% CI: 1.55 - 5.79), whilst 4 subjects had samples positive for anti-HCV (1.33%; 95% CI: 0.04 - 2.62). No subject was positive for both HBsAg and anti-HCV (Table 2).

Education and Marital status

There was no statistically significant relationship between education, marital staus and Hepatitis B and C infection (Table 3).

Table 3. Relationship between education and marital status and hepatitis infection

		Total (n=300)	HBsAg +ve (n=11)	Anti-HCV +ve (n=4)	p value
Education	- primary	94 (31.3%)	1	0	
	- secondary	120 (40%)	1	1	
	- tertiary	36 (12%)	6	2	
	- None	50 (16.7%)	1	1	0.84
Marital status	- married	233 (77.7%)	8	3	
	- single	24 (8%)	2	1	
	- co-habiting	43 (14.3%)	3	4	0.41
	-divorced	0	0	0	

Table 4. Probable risk factors associated with hepatitis infection

	No. Of subjects	HBsAg			anti-HCV		
Variables	**(n=300)**	**HBsAg +ve**	**HBsAg -ve**	**p value**	**anti-HCV +ve**	**anti-HCV -ve**	**p value**
Scarification marks							
present	115	8	107	0.062	4	111	
absent	185	3	182		0	185	0.06
History of blood transfusion							
present	21	1	20	0.78	0	21	
absent	279	10	269		0	279	
Tattooing							
present	58	2	56	0.91	2	56	
absent	242	9	233		2	240	0.19
History of previous surgery							
present	63	4	59	0.25	0	63	
absent	237	7	230		4	233	0.19
History of pregnancy termination							
present	162	9	153	0.11	1	161	
absent	138	2	136		3	135	0.34
History of sexually transmitted infection							
present	51	2	49	0.9	2	49	
absent	249	9	240		2	247	0.14

Scarification marks

38.3% of the subjects had scarification marks on their bodies. 72.7% of the subjects with positive HBsAg (8 out of 11) and 100% of the subjects positive for anti-HCV (4 out of 4), had scarification marks. Despite this, there was no statistical relationship between Hepatitis infection (B and C) and a history of scarification marks on the body (Table 4).

Previous blood transfusion

7% of the subjects had received at least a blood transusion in the past. Only 9.09% of those positive for HBsAg had previously been transfused with blood. None of the women positive for anti-HCV had been transfused. There was no statistical relationship between previous blood transfusion and infection with HBV among the study subjects.

Tattooing

19.3% of the subjects had tattoos on their bodies. 18.2% of those positive for HBsAg and 50% of those positive for anti-HCV had tattoos. There were no statistically significant differences between the subjects with tattoos infected with either HBV or HCV and those uninfected.

Previous surgery

21% of the women had undergone a surgical procedure in the past. 36.4% of those positive for HBsAg had been operated on before. None of those positive for anti-HCV had undergone previous surgery. There was no association between previous surgery and infection with either HBV or HCV.

Previous termination of pregnancy

54% of the pregnant women had terminated at least one pregnancy in the past. Although 81.8% of HBsAg positive subjects (9 out of 11) and 25% of anti-HCV positive subjects had undergone at least one previous termination of pregnancy, there was no statistical relationship between previous termination of pregnancy and acquisition of HBV or HCV infection.

Sexually transmitted infections (STI)

17% of the pregnant subjects had a past history of sexually transmitted infection. 18.2% of HBsAg positive subjects and 50% of anti-HCV positive subjects had previous histories of sexually transmitted infections, but there were no significant differences between those infected with HBV or HCV and those uninfected who had a previous history of STI.

DISCUSSION

Asymptomatic infection with the hepatitis viruses can have important consequences on the unborn child, and can result in long lasting health complications and so deserves to be detected early.

We observed a prevalence of 3.67% for HBsAg, which is less than the 8.3% to 12.5% reported by other workers in Nigeria (Ezegbudo CN., Agbonlahor DE. et al. 2004; Eke, Eke et al. 2011; Ugbebor O., Aigbirior M. et al. 2011) and 5.6% in Sudan (Elsheikh, Daak et al. 2007) among pregnant women.

Also, the sero-prevalence of 1.33% for anti-HCV is less than the 3.6% to 5% in previous studies in Nigeria (Duru MU., Aluyi HSA. et al. 2009; Ugbebor O., Aigbirior M. et al. 2011) and 2.1% in Gabon (Ndong-Atome, Makuwa et al. 2008), but similar to the 1.03% observed in India (Kumar A., Sharma KA. et al. 2007).

Regional differences in risk factors and cultural practices may be responsible for these variations in prevalence rates. None of the study subjects belonged to a high risk profession - healthcare workers, barbers or sex workers.

In our study, there was no association between scarification marks and hepatitis infection, which is in agreement with other studies in Nigeria (Pennap GR., Yakubu A. et al. 2010; Ugbebor O., Aigbirior M. et al. 2011), but different from results obtained in another study (Eke, Eke et al. 2011). Scarification marks are commonly inflicted on the body for a variety of reasons in West Africa, using knives, blades and other sharp instruments. These instruments are frequently used on multiple people at the same time (Babatunde OP. and Oyeronke AE. 2010). Tattoos are applied in a similar fashion to scarification marks, but were not statistically associated with hepatitis infection in our study.

Sexual practices could not be properly explored as most of the study subjects skipped questions pertaining to sexual practices and the number of partners. Cultural and religious reasons could be responsible for this unwillingness to divulge individual sexual practices.

Nigeria is highly endemic for HBsAg, and this is reflected in the high prevalence rates from different studies (Uneke CJ., Ogbu O. et al. 2005; Egah DZ., Banwat EB. et al. 2007; Pennap GR., Yakubu A. et al. 2010; Ndako JA., Nwankiti OO. et al. 2011; Sule WF., Okonko IO. et al. 2011). However, the proportion of these infections transmitted vertically/perinatally is not known. There is therefore a need to proactively prevent perinatal transmission, and the first step is to identify those at risk of transmitting these infections to their newborns.

Prevention of perinatal transmission is important because infection in infancy leads to chronic disease (Tran 2009). In the USA, 97% of pregnant women are screened before delivery and this has significantly decreased perinatal transmission (Schrag, Arnold et al. 2003). This coupled with treatment during pregnancy has been shown to reduce perinatal transmission (van Zonneveld, van Nunen et al. 2003). Routine screening of all pregnant women during the prenatal period is an effective and efficient means of identifying infants at risk for becoming long-term HBV carriers (Arevalo JA. 1989).

With countries having low prevalence rates calling for increased testing of pregnant women (Euler et al. 2003), countries like Nigeria with high prevalence rates would need to introduce strategies to increase testing if perinatal transmission is to be reduced.

Despite the availability of vaccination against HBV infection, prevalence rates are still high in Nigeria. We therefore recommend routine screening of all pregnant women for HBV and HCV infection in Nigeria, in order to reduce morbidity and consequent mortality from the Hepatitis B and C infection.

CONCLUSION

There is a relative low prevalence of HBV and HCV among pregnant women attending clinic at the NDUTH, Okolobiri, compared with other parts of Nigeria. However, there is a need for routine screening and prevention of perinatal transmission. There is also a need for more investigation of prevalence and the risk factors of HBV and HCV.

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