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Full Length Research Paper

Prevalence of hepatitis B and C virus infection among people of a local community in Keffi, Nigeria

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Hepatitis B (HBV) and hepatitis C (HCV) virus infections have remained recurring decimals in blood transfusion, vertical transmission, liver cirrhosis and hepatocellular carcinoma (HCC). Most of the published studies of their prevalence in Northern Nigeria are among HIV/AIDS patients. The need for such vital information among an apparently healthy population was the basis for this study. Rapid diagnostic tests were used to screen for HBsAg and anti-HCV antibodies among people of a local community in Northern Nigeria. Of the 113 volunteers screened, 15(13.2%) were positive for each of the viruses while 10(8.85%) were found to be coinfected with the viruses. The gender related prevalence of HBsAg was 9.5% in females and 24.1% in males. Anti-HCV was reactive in 16% of the females and 3.4% of the males. Coinfection was 10.3 and 8.33% for males and females, respectively ($p > 0.05$). Age related prevalence for HBsAg was 13.8 and 11.5% among those aged 1 - 40 years and above 40 years, respectively and similarly 12.6 and 15.4% for anti-HCV antibodies, respectively. Coinfection was 8.0% among those aged 1 - 40 years old and 11.5% among those that were older. There was no statistically significant association between age, and presence/absence of facial/body marks with viral infection ($p > 0.05$). This study revealed 13.3% of apparently healthy individuals harbouring each of the viruses (HBV and HCV) and also a relatively high prevalence of coinfection (8.85%). This finding is a cause for alarm.

Key words: HBV, HCV, prevalence, infection, coinfection.

INTRODUCTION

Hepatitis B virus (HBV), a DNA virus of the family hepadnaviridae is the causative agent of hepatitis B infection (Pungpapong et al., 2007). It is 50 - 100 times more infectious than HIV and 10 times more infectious than hepatitis C virus (HCV) with many carriers not realizing they are infected with the virus, thus referred to as a “silent killer “(Samuel et al., 2004). The minimum infectious dose is so low that such practices like sharing a tooth brush or a razor blade can transmit infection (Chang, 2008). HBV also shares similar routes of transmission with HIV (Willey et al., 2008). The virus has been detected in peripheral mononuclear cells, tissues of pancrease, spleen, kidney and skin, and fluids like saliva, semen, sweat, breast milk, tears, urine and vaginal secretion (Chen et al., 2009). Approximately 350 million people are infected with HBV worldwide (Liu and Hou, 2006).

Hepatitis C virus is an RNA virus of the flaviviridae family and appears to have humans and chimpanzees as the only species susceptible to its infection (Polyak, 2006). About 170 million people are infected with HCV worldwide (Liu and Hou, 2006; Suhajian et al., 2007). It has also been detected in semen (Cavalliero et al., 2008) and saliva (Chen et al., 2009). The risk of vertical transmission is 6 and 25% in mothers who are only HCV positive and in those who are HCV/HIV positive respectively (Watannabe et al., 2003).

HBV and HCV account for a substantial portion of liver diseases worldwide and infected individuals can remain asymptomatic for decades. However, more than 80% of them become chronic carriers which result in an increased risk of liver cirrhosis, liver cancer and liver failure 20 - 30 years later (Volf et al., 2008). And because

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they share similar modes of transmission, coinfection is not uncommon especially in areas of high prevalence and among people at high risk for parenteral infection (Liu and Hou, 2006). Coinfection of HBV and HCV seems to result in more severe disease than either infection alone. However, HCC might be prevented by early detection and therapy (Xuan et al., 2007).

In view of the advantage of early detection and therapy, this study was designed to determine the prevalence of HBV, HCV and their coinfection in an apparently healthy population. This is with a view to providing baseline data for further research, public health policy formulation, and awareness campaign for the need to know one's hepatitis status especially in a HIV and HBV endemic area.

MATERIALS AND METHODS

Study area

This study was carried out in a local community in Keffi which is a town in Nasarawa State in the Northern part of Nigeria. It is approximately 68 km from Abuja the Federal Capital and about 128 km from Lafia the Nasarawa State Capital. The town is located between latitude 8° 5' N of the equator and longitude 7° 5' E of the Greenwich meridian on an altitude of 850 m above sea level (Akwa et al., 2007).

Study population

Participants were members of the 'High Court' community in Keffi. It is a settlement made up of people from different ethnic and religious backgrounds. Inhabitants of this community are mostly farmers. An interesting feature among them was the facial/body marks on some of them. Blood samples were collected from individuals who volunteered to participate in the study after a counselling session. Demographic information about each participant was obtained by oral interview. Such information included sex, age and presence of facial/body marks.

Sample collection

Blood samples were collected by venepuncture. The arm of the individual was tied with a tourniquet and the position of the veins disinfected using cotton wool soaked in methylated spirit. Using a disposable sterile needle and 5 ml syringe for each participant, blood samples were collected from them. Each blood sample was transferred into a labelled plastic microtitre tube containing ethylene diamine tetraacetic acid (EDTA) which is an anticoagulant. Each resultant supernatant (Plasma) was carefully decanted into a new labelled tube and stored at -29°C until ready for use.

Hepatitis B Surface Antigen (HBsAg) Detection

The Smart Check™ HBsAg device, a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface antigen in serum/plasma was used for screening the participants. It utilises a combination of monoclonal and polyclonal antibodies to selectively detect elevated levels of HBsAg in serum/plasma. The test was carried out and interpreted according to the manufacturer's instructions.

Hepatitis C Virus Detection

Anti-HCV antibodies were detected in plasma using Shantest™ HCV rapid test manufactured by Shantha Biotechnics Limited, which is a third generation qualitative ELISA that uses recombinant proteins and synthesized peptides derived from core and structural regions of HCV to detect the presence of anti-HCV in plasma. The test was carried out and interpreted as recommended by the manufacturer.

Statistical analysis

The prevalence of each viral infection (HBV and HCV) was determined from the proportion of seropositive individuals in the total population under consideration and expressed as a percentage. The chi-square test was employed to determine the relationships between gender, age and presence of facial marks with HBV and HCV infection. P values of < 0.05 were considered to be statistically significant.

RESULTS

One hundred and thirteen people volunteered to participate in this study. There were 84 females (74%) and 29 males (24%). They were categorized into those that were ≤ 40 years and those that were ≥ 41 years old. Most of them were aged ≤ 40 years (77%). About 9% of the total population had facial/body marks. HBsAg and anti-HCV were each reactive in 13.3% of the study population while coinfection was reported in 8.8% of them.

While HBV was found to be more prevalent among persons aged ≤ 40 years old (13.8% vs 11.5%), HCV was found to occur more among those aged ≥ 41 years old (15.4% vs 12.6%) (Table 1). However, there was no statistically significant relationship between age and the viral infections ($p > 0.05$). With respect to gender, females were infected more with HCV than HBV (16.6% vs 9.5%) but males were more proned to HBV infection than HCV (24.1% vs 3.4%) although coinfection was not very different in them (Table 2). Gender was not a risk factor for infection and so was facial/body marks ($p > 0.05$). Eighty two percent of the participants did not have facial/body marks and proportionately had a higher prevalence of infection by each of these viruses. Prevalence for HBV and HCV was 5 and 10% respectively among those that had facial/body marks (Table 3).

DISCUSSION

Screening asymptomatic people is an important instrument in disease detection, prompt diagnosis and intervention especially in silent killers like HBV and HCV infections. This study therefore set out to determine the seroprevalence of HBsAg and anti - HCV antibodies in an apparently healthy population. Of the 113 people screened, a prevalence of 13.3% was recorded for HBsAg. This is relatively high in view of the fact that it

Table 1. Seroprevalence of HBV, HCV and HBV/HCV coinfection by age in an apparently healthy Northern Nigerian Community.

Infection	Age groups (years)				Total	
	1 - 40		≥40		(n = 113)	
	(n = 87)		(n = 26)			
	No.	(%)	No.	(%)	No.	(%)
HBsAg positive	12	13.8	3	11.5	15	13.3
Anti-HCV positive	11	12.6	4	15.4	15	13.3
HBV/HCV Coinfection	7	8.0	3	11.5	10	8.8

Table 2. Seroprevalence of HBV, HCV and HBV/HCV coinfection by gender in an apparently healthy Northern Nigerian Community.

Infection	Gender				Total	
	Female		Male		(n=113)	
	(n = 84)		(n = 29)			
	No.	(%)	No.	(%)	No.	(%)
HBsAg positive	8	9.5	7	24.1	15	13.3
Anti-HCV positive	14	16.6	1	3.4	15	13.3
HBV/HCV coinfection	7	8.3	3	10.3	10	8.8

Table 3. Seroprevalence of HBV, HCV and HBV/HCV Coinfection by presence/absence of facial body marks in an apparently healthy Northern Nigerian Community.

Infection	Facial/body marks				Total	
	Present		Absent		(n = 113)	
	(n = 20)		(n = 93)			
	No.	(%)	No.	(%)	No.	(%)
HBsAg positive	1	5	14	15	15	13.3
Anti-HCV positive	2	10	13	14	15	13.3
HBV/HCV Coinfection	1	5.0	9	9.7	10	8.8

was found in an apparently healthy population. In comparison to studies from other parts of the country, the prevalence of infection reported in this study was higher than the 4.9 and 10.3% reported in Port Harcourt and Jos respectively (Ejele and Ojule, 2004; Sirisena et al., 2002). In contrast it was less than the 21.3% recorded in Ibadan (Otegbayo et al., 2003), 23.9 and 15.1% in two studies in Jos (Uneke et al., 2005; Egah et al., 2007), and 17.1% among sex workers in Nasarawa state (Nneka, 2007). There was also a report of 18.2 and 7.3% among pregnant women in Zaria (Luka et al., 2008) and Kano (Dawaki and Kawo, 2006) respectively. These differences might not be unconnected with the fact that some of the studies were not from the same risk group.

Individuals aged ≤ 40 years had a prevalence of 13.8% as against 11.5% in the older group. This is justified by reports from earlier researchers that among sexually transmitted and blood borne infections, high risk individuals have a higher probability of getting infected with HBV due to its low infectious dose (Chang, 2007; Uneke et al., 2005) and this age group encompasses individuals at the age of greatest sexual activities thus supporting the role of sexual transmission of the virus (Dawaki and Kawo 2006). However, there was no statistically significant association between the viral infection and age. Similarly there was no significant association between gender and viral infection ($p > 0.05$) although the prevalence was higher (24.1%) among the males. The reason for this male preponderance is not obvious especially as the practice of men having sex with men and men having sex with men and women is rare in the community. It could also be as a result of the paucity of samples from the males. Likewise facial/body marks was not found to be a risk factor in HBV infection in this

community (p > 0.05).

The anti - HCV antibody prevalence of 13.3% in this study was similar to reports from Enugu where 14.9% was reported (Ebie and Pela, 2006) but higher than the 5.2 and 11.09% reported in Jos and Kaduna respectively (Strickland, 2002) and 4.3% in a study among a presumed low risk group in Jos (Egah et al., 2007). The prevalence of HCV infection in this community was also found to be high when compared to reports from some countries in Africa (5.3%), Eastern Mediterranean (4.6%), Western Pacific (3.9%), South East Asia (2.15%), America (1.17%) and Europe (1.03%) (WHO, 2007) but lower than reports from Egypt (20%) (Frank et al., 2002). Our finding may imply that there is a general increase in HCV transmission although the prevalence was not found to be significantly associated with any of the risk factors examined (p > 0.05). However, participants that were ≤ 40 years old had a prevalence of 19.5% against 12.5% among the older participants. This also correlates with age of greatest sexual activity thus lending credence to the role of sexual transmission (Koate et al., 2002) although said to be rare (Sy et al., 2006).

An interesting observation in this study (Table 2) was that more males (24.1%) were infected with HBV than females (9.5%) while more females (16.6%) were infected with HCV than males (3.4%). There was no obvious explanation for the difference in gender as a risk factor for these viral infections although Bwogi et al. (2009) reported a lower prevalence of HBV in men than in female and suggested the interplay of circumcision as protective. This was not the case in this study even though it was in an area that male circumcision is mandatory. However, the male volunteers were very few. This observation is a basis for further studies.

Factors like the differences in sample size, the sensitivity and reliability of viral assay reagents, the category of people, geographical location of the study population and their socio-cultural practices might have contributed to the differences reported for both HBC and HCV viral infection prevalence. For example incarcerated youths have a higher prevalence of behaviours that put them at risk for these viral infections than the general public (Sahajian et al., 2007).

Unlike reports by Sahajian et al. (2007), this study was unable to demonstrate the contribution of traditional practices like body/facial marks as a statistically significant risk factor in the transmission of these viruses. This might not be unconnected with the fact that the instruments used for such procedures are usually washed and passed through naked flame before and after each procedure. This might have been serving as a good means of sterilization of the instruments.

On the whole, this study noted the endemicity of both viruses in this population culminating in a recorded HBV/HCV coinfection of 8.5%. About 66% of all those infected with either of these viruses were coinfected. This gives credence to the fact that they share similar modes of transmission (Liu and Hou, 2006). In similar studies of HBV/HCV coinfection, a prevalence of 8.2% was recorded in Abuja (Agwale et al., 2004), 5.2 and 11.09% in Kaduna and Jos respectively (Strickland, 2002). In a study of a presumed low risk group in Jos, 0.4% was reported (Egah et al., 2007). Higher coinfection prevalence rates of 14.9% in Enugu (Ebie and Pela, 2006) and 12% in Lagos have also been reported (Agwale et al., 2004).

A 13.3% prevalence of infection for each of the viruses and 8.5% prevalence of coinfection in an apparently healthy population of a local community was reported in this study. This is a cause for alarm especially with its attendant consequences (Xuan et al., 2007). These results also show the endemicity and the rising profile of HBV and HCV in apparently healthy individuals with the consequent risk of transmission of these viruses albeit unknowingly. This underscores the need for preventive measures. There is therefore an urgent need for public enlightenment campaigns, a collaboration with Sexually Transmitted Disease programs and the introduction of routine screening of prospective blood donors for both viruses in Nigeria.

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