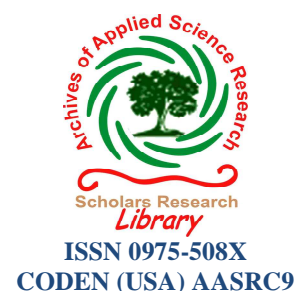




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Prevalence of hepatitis B and C virus co-infection among students of University of Maiduguri, Nigeria

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ABSTRACT

Simultaneous Hepatitis B (HBV) and hepatitis C (HCV) virus infections have always been rare, but the situation could occur after accidental needle-stick injury and blood transfusion in the past. Rapid diagnostic tests were used to screen for HBsAg and anti-HCV antibodies among students of University of Maiduguri in Northern Nigeria. Of the 200 volunteers screened, 8(4.0%) and 9(4.5%) were positive for HCV and HBV respectively while 1(0.5%) were found to be coinfected with the viruses. The gender related prevalence of HCV was 2.6% in females and 4.9% in males while for HBsAg was 2.6% in females and 5.7% in males. Coinfection was 0% and 1.3% for males and females respectively ($p > 0.05$). Age related prevalence for HCV was 2.7% and 5.7% among those aged 18 - 25 years and 26-45 years respectively and similarly 5.4 and 3.4% for HBsAg, respectively. Coinfection was 0% among those aged 18 - 25 years old and 1.1% among those that were 26-45 years old. There was no statistically significant association between age and sex ($p > 0.05$). This study revealed 0.5% of apparently healthy individuals harbouring both of the viruses (HBV and HCV).

Key words: prevalence, HBV, HCV, coinfection.

INTRODUCTION

Both Hepatitis B virus (HBV) and HCV are transmitted parenterally and coinfection is not uncommon, particularly in intravenous drug users and in countries with a high prevalence of HBV infection [17]. Coinfection with evidence of chronic HBV and HCV seems to result in more severe liver disease than either infection alone [12]. with an increased risk of liver cancer[17]. and probably an increased risk of fulminant hepatitis when superinfection with HCV occurs on the background of chronic HBV[9].

Hepatitis B (HBV) and hepatitis C (HCV) viruses are the most common causes of chronic liver disease worldwide[7]. Due to shared routes of transmission, coinfection with HBV and HCV is not uncommon among individuals in HBV endemic areas who also have a high risk of parenteral infections, such as injection drug users [9]. patients on hemodialysis, patients undergoing organ transplantation and HIV-positive individuals. Due to a lack of largescale population-based studies the exact number of HBV/HCV coinfecting patients is unknown. Dual infection with HBV and HCV in the same host ranges from 9% to 30%, depending on the geographic region [17 and 10]. These numbers may underestimate the true number of people with HBV/HCV coinfection as there is a well-known entity of occult HBV infection (i.e., patients with negative hepatitis B surface antigen (HBsAg) but detectable serum HBV DNA) in

patients with chronic hepatitis C [14]. Patients with both HBV and HCV infections may show a large spectrum of virologic profiles. HCV infection can suppress HBV replication and it has been shown that HBV/HCV-coinfected patients have lower HBV DNA levels, decreased activity of HBV DNA polymerase, and decreased expression of HBsAg and hepatitis B core antigen in the liver [15]. Moreover, patients with chronic HBV infection who become superinfected with HCV can undergo seroconversion of HBsAg [9]. Several authors have reported that HBV can reciprocally inhibit HCV replication as well [12]. Specifically, HBV DNA replication has been shown to correlate with decreased HCV RNA levels in coinfecting patients [17]. Furthermore, coinfecting patients have been shown to have lower levels of both HBV DNA and HCV RNA than corresponding monoinfected controls, indicating that simultaneous suppression of both viruses by the other can also occur [15]. Thus, HBV or HCV can play the dominant role, HBV and HCV can inhibit each other simultaneously and they can alternate their dominance. Both viruses have the ability to induce seroconversion of the other. The chronology of infection may have a role in determining the dominant virus. However, the overall effect appears to be HCV suppression of HBV [9].

MATERIALS AND METHODS

Study population

A total of two hundred (200) blood samples from students, of the university of Maiduguri, aged between 18–45 years were screened for HCV and HBV. Blood samples were collected from individuals who volunteered to counseling session. Demographic information about each participant was obtained by oral interview. Such information included sex and age .

Sample collection

Blood samples were collected by venepuncture. 5mls of blood was collected from the patient using a well labeled ethylene diamine tetraacetic acid (EDTA) vacutainer tube. This was allowed to clot and then spun at X10g. The serum was carefully isolated into a labeled cryovials container and stored at -20°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.

ANALYSIS OF DATA

The data generated was entered and analysed using SPSS version 17.0 for windows software. Simple frequencies and tables were generated, while categorised variables were compared using chi square test. A P-value less or equal to 0.05 ($P \leq 0.05$) was considered as statistically significant.

RESULTS AND DISCUSSION

Screening asymptomatic people is an important instrument in disease detection, prompt diagnosis and intervention especially in silent killers like HBV and HCV infections.

Socio-demographic characteristics of this study are shown in table 1. No student was below 18 years of age and the oldest was 45 years old with mean and standard deviation of 27.1 ± 6.5 . Two hundred student volunteered to participate in this study. There were 77 females (38.5%) and 123 males (61.5%). The results shown in table 2 revealed that HCV serology was negative in 192(95.5%) and positive in 8(4.0%) while HBC was negative in 191(96.0%), while for coinfection for HCV/HBV, 199(99.5%) were negative and only one(0.5%) case was positive for both HBV and HCV. They were categorized into those that were between 18-25 years and 26-45 years, most are

of the age range 18-25 years (56.0%), While HCV was found to be more prevalence among age range 26-45 (5.7% vs 2.7%), HBV was found to occur more among age range 18-25 years (5.4% vs 3.4%), however these were found not to be statistically significant between the age and viral infection ($p>0.05$).

As seen on tables 4 with respect to gender, males are more infected than females for HCV (4.9% vs 2.6%) and for also HBV (5.7% vs 2.6%) and however the only case 1(0.5%) was from a female. However there was no statistical significant relationship between sex and the HBV/HCV coinfections ($p>0.05$).

Table 1. Demographic representation of the study population

Variables	frequency	percentage	mean \pm SD	Range
Age (years)	-	-	27.1 \pm 6.5	18-45
Sex (Males)	123	61.5	-	-
(Females)	77	38.5	-	-
TOTAL	200	100		

Table 2. Serological tests performed on students for HBV, HCV and HBV/HCV coinfection

	Anti-HCV(n=200)	HBsAg(n=200)	HCV/ HBV(n=200)
Negative	192(95.5%)	191(96.0%)	199(99.5%)
Positive	8(4.0%)	9(4.5%)	1(0.5%)

Table 3. Seroprevalance of HBV, HCV and HBV/HCV co- infection by age

Infection	Age group(yrs)				Total	
	18-25		26-45		n=200	
	(n=112)		(n=88)			
	No.	%	No.	%	No.	%
Anti-HCV positive	3	2.7	5	5.7	8	4.0
HBsAg positive	6	5.4	3	3.4	9	4.5
HBV and HCV coinfection	0	0.0	1	1.1	1	0.5

Table 4. Seroprevalance of HBV, HCV and HBV/HCV co- infection by sex

Infection	Gender				Total	
	Male		Female		n=200	
	(n=123)		(n=77)			
	No.	%	No.	%	No.	%
Anti-HCV positive	6	4.9	2	2.6	8	4.0
HBsAg positive	7	5.7	2	2.6	9	4.5
HBV and HCV coinfection	0	0.0	1	1.3	1	0.5

Hepatitis B and C are endemic in counties worldwide. Classified high endemicity from HBV infection and defined it as HBsAg greater than 7% in an adult population. This also supports the [16] report for Nigeria as highly endemic area with prevalence greater than 8%. In reported studies for hepatitis B carried out in some parts of Nigeria, there were higher prevalence's rates of 12.8% in Minna [6], 15.8% in Maiduguri [3], 11% in Makurdi [2]. Lower reports reported include 2.19% in Benin City [1], 8.3% in Zaria [11], and 5.7% in Ilorin [1]. In some African countries, there were high prevalence rates of 17.3% in Burkino Faso Lower reports were 5.3% in Ethiopia, 6.3% in Tanzania [4]. In comparison to other findings from the rest of the world were 2.11% in Northern Turkey [12], 12% in Taiwan [10]. These variations, noticed may be related to the differences in the modes of transmission of HBsAg and HCV dictated by environmental factors and sociocultural practices. The 1% prevalence of HCV in the tested population was found to be low when compared to other studies carried out in Nigeria. [1] reported a 12% in South-Western Nigeria and the 2.5% in Maiduguri [3]. When compared to findings from other African countries, there were higher rates of 17-26% in Egypt, 2.6% Côte d'Ivoire It was found to be the same as thre research carried in Sudan. There was a lower prevalence rate of 0.01% in the United Kingdom [16]. HBV/HCV coinfection, a prevalence of 8.2% was recorded in Abuja [2], 5.2 and 11.09% in Kaduna and Jos respectively [13]. In a study of a presumed low risk group in Jos, 0.4% was reported [6]. Higher coinfection prevalence rates of 14.9% in Enugu [5] and 12% in Lagos have also been reported [2]. A 4.0% and 4.5% prevalence of infection for HCV and HBV respectively and 0.5% prevalence of coinfection in an apparently healthy population of a school community was reported in this study. This is a cause for alarm especially with its attendant consequences [5]. 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 unknowingly. There is therefore the need for preventive measures and an urgent need for public enlightenment campaigns in Nigeria. This study therefore set out to determine the seroprevalence of HBsAg and anti - HCV antibodies in an apparently healthy population.

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