

Original Article

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Sero-prevalence of hepatitis B and C among mentally ill patients attending a tertiary hospital in Nigeria

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Abstract

Background: Mentally ill persons are vulnerable to sexually transmitted infections including hepatitis B and C because of their high level risky behaviors. This study is aimed at establishing the sero-prevalence of hepatitis B and C among the mentally ill individuals (MII) attending Psychiatric clinic of the University of Ilorin Teaching Hospital (UITH), Nigeria since it has not been documented.

Methods: A total of 350 MII were recruited. HBsAg testing was by immunoassay test strip (Grand Medical Diagnostic[®] USA) while hepatitis C was tested by commercially prepared kits from ACON,[®] USA. Healthy adults who presented as donors in the Blood Bank of the hospital were used as controls.

Results: A total of 700 participants including 350 MII and 350 blood donors (BDs) were recruited for the study. The mean ages of MII and control participants were 36.5 ± 12.3 and 31.4 ± 8.3 , respectively. The sero-prevalence of hepatitis B and C among patients with mental illness was 10.0 and 12.6%, respectively, as compared to 10.9% and 1.1% of the blood donors. There was a significant difference in the prevalence of HCV among mentally ill when compared with the blood donors ($P = 0.001$, $\chi^2 = 33.97$; OR (CI) = 12.44 (5.33-29.03).

Conclusion: Mentally ill patients attending UITH were significantly infected with hepatitis C virus. There is need for interventional measures to reduce the prevalence of hepatitis C among the mentally ill population such as health education and early screening of mentally ill in our setting.

Key words: Blood donors, hepatitis B and C, mental illness, Nigeria, sero-prevalence

Résumé

Contexte: Personnes malades mentaux sont vulnérables aux maladies sexuellement transmissibles, y compris l'hépatite B et C à cause de leurs comportements risqués de haut niveau. Cette étude vise à établir les sero-prévalence de l'hépatite B et C chez les individus malades mentaux (MII) fréquentant une clinique psychiatrique de l'hôpital universitaire de l'Université d'Ilorin (XOTE), Nigeria puisqu'elle n'a été signalée.

Méthodes: A MII 350 au total ont été recrutés. Tests AgHBs était par bandelette de test d'immuno-essai (Grand Medical Diagnostic[®] USA) tandis que l'hépatite C a été testée par des kits préparés commercialement auprès d'ACON,[®] USA. Les adultes en bonne santé qui a présenté comme donneurs dans la Banque de sang de l'hôpital ont été utilisés comme témoins.

Résultats: Un total de 700 participants, y compris les MII 350 et 350 donneurs de sang (BDs) ont été recrutés pour l'étude. Les âges moyens des MII et le contrôle des participants étaient $36,5 \pm 12,3$ et $31,4 \pm 8,3$, respectivement. La sero-prévalence de l'hépatite B et C chez les patients souffrant de maladie mentale a été 10,0 et 12,6 %, respectivement, comparativement à 10,9 % et 1,1 % des donneurs de sang. Il y avait une différence significative

de la prévalence du VHC chez les aliénés quand comparé avec les donneurs de sang ($P = 0,001$, $\chi^2 = 33,97$; OU (CI) = 12.44 (5.33-29.03).

Conclusion : Des patients malades mentaux fréquentant XOTE étaient significativement infectés par le virus de l'hépatite C. Il y a nécessité d'interventionnelles mesures visant à réduire la prévalence de l'hépatite C chez la population de malade mentaux tels que l'éducation à la santé et des services de dépistage précoce des troubles mentaux dans notre cadre.

Mots clés : Sang des donneurs, l'hépatite B et C, la maladie mentale, Nigéria, sero-prevalence

Introduction

Viral hepatitis particularly, hepatitis B and C are common with the two accounting for up to 75% of all cases of liver disease worldwide making it a disease of global concern.^[1] Chronic hepatitis B infection is estimated to occur in about 350 million people worldwide and is commoner between the ages of 25-44 years.^[2] The modes of transmission of hepatitis B and C include sexual contact, exposure to infected blood, body secretions, and breastfeeding.^[3] Intravenous drug injection currently accounts for more than half of modes of transmission in USA.^[4] Reports have indicated higher rate of hepatitis B transmission compared with HIV as a result of the ability of the virus to remain viable and infectious for more than a week in the environment.^[5] Nigeria is classified among the hyper-endemic zone for viral hepatitis B with a prevalence of HBsAg ranging between 9 and 39%.^[6-8]

Hepatitis C which was discovered in 1989 as a global disease has a worldwide prevalence of 3.3% with about 170-200 million infected individuals.^[2,9] Higher prevalence however has been reported from some African nations such as 14.5% in Egypt.^[10] It is commoner within the age 30-49 years.^[11,12] Persons with serious mental illness have a greater vulnerability to sexual transmitted infections than the general population.^[13] Studies have shown that patients with severe or persistent mental illness engage in behaviors that predispose them to sexually transmitted infections including HIV, hepatitis B and C and syphilis.^[13,14] Risky behaviors like promiscuity, sex trade, and intravenous drug use with shared needles, and unprotected sex predisposes them to blood borne diseases.^[15,16] Other factors such as poor reality perception, affective instability, impulsiveness, vulnerability to victimization, inconsistent condom use as well as inaccurate information about sexually transmitted infections play significant role.^[17,18]

Study from Taiwan shows a prevalence of 18.1% of hepatitis B in patient with mental illness,^[19] and in a similar study in US, the prevalence of hepatitis B and C infection among psychiatric

patients were 23.4 and 19.6%, respectively, and these were approximately 5 and 11 times the overall estimated population rates for these infections in USA.^[4] Most reports on hepatitis B and C infections among people with mental illness are from countries other than Nigeria, hence the need for this study. The aim of this study is therefore to determine the sero-prevalence of hepatitis B and C among patients with mental illness at University of Ilorin Teaching Hospital.

Methods

Description of study area

This study was conducted at Psychiatric clinics of the Department of Behavioral Sciences and Blood Bank in the University of Ilorin Teaching Hospital, Ilorin, Nigeria. Ilorin is the capital of Kwara State and is located at the latitude 8° 30'N and longitude 4° 35'E. The population of Ilorin based on 2006 census and annual population growth rate of 2.5% is 786,426. The inhabitants are largely civil servants in various federal, state and local government offices and parastatals. Farming, trading, and operation of small scale industries are other common occupation. University of Ilorin Teaching Hospital is a referral center and serves people within the state and neighboring states like Oyo, Osun, Kogi, Ekiti, and Niger.

Study design

The research was prospective cross-sectional study of hepatitis B and C prevalence among patients with mental disorders and compare with blood donors. The study was conducted over a period of 12 months. Consecutive mentally ill patients, both new and old, after certification by attending psychiatric physician were recruited into the study until the calculated sample size was attained at the psychiatric clinic of the hospital. Family replacement and voluntary non-renumerated blood donors recruited at the Blood Bank of the hospital were used as control. The socio-demographic details (e.g., age, sex, occupation) and risky behaviors and other necessary informations of the participants were obtained using a structured questionnaires designed for the study. The questionnaire is self-administered and those unable to read and write were assisted by the

researchers in completing the questionnaires. About 5 ml of venous blood was obtained by venipuncture using aseptic technique from all participants. The samples were dispensed into well labeled vacutainer plain bottles and transported to the hematology laboratory unit of the hospital for storage and testing.

Ethical approval was obtained from the University of Ilorin Teaching Hospital Ethical Review Committee. Written informed consent was also obtained from the participants.

Specimen handling

The blood was centrifuged at 2500 rpm for 10 min and serum was separated using disposable pipette. The sera were kept at -20°C until analyzed for hepatitis B and C. HBsAg testing was one by a one stage hepatitis B surface antigen test strip, a qualitative lateral flow immunoassay product of Grand Medical Diagnostic, USA according to manufacturer's instruction. Antibody to hepatitis C virus was tested using commercially available kits from ACONS, USA, according to manufacturer's instruction.

All data were imputed into computer and analyzed with Statistical Package for Social Sciences, SPSS (Windows version 13.0; SPSS Inc, Chicago, IL, US) software.^[20] Results are presented in frequencies, means, standard deviations (SD), and compared using Chi-square, Fisher's exact test, or odd ratio at 95% confidence interval as found necessary, with *P* value set at 0.05.

Results

A total of 700 participants including 350 patients with mental disorders and 350 blood donors were recruited for the study. The mean age of MII was 36.5 ± 12.3 and that of the control 31.4 ± 8.3 . There were 179 (51%) males and 171 (48.8%) females MII participants. Out of the 144 MII who were married, 105 (72.9%) were living with their spouses compared with 204 (99.0%) of 206 married BDs and most (140 or 40% MII, and 185 or 52.9% BDs) had up to a tertiary level of education. About (71 or 21.4% MII and 96 or 27.4% BD) were civil servant, while more of the MII were found in the unemployed and petty traders occupational group [Table 1].

In comparing lifestyle and risky behavior practices (i.e., alcohol and cigarette consumption, sexual practices, extramarital engagement, sex trade and self-injection practices), more respondents in the BDs had consumed alcohol than the MII (37 or 10.6% *vs.* 11 or 3.1%, respectively), smoked than the MII (19 or 5.4% *vs.* 8 or 2.3%, respectively), and had engaged in extramarital sex than the MII (105 or

30.0% *vs.* 59 or 16.9%, respectively). However, more of the MII has had blood transfusion in the past than the BDs (40 or 11.4% and 13 or 3.7%, respectively), and had also engaged in sex trade than the BDs (12 or 3.4% and 1 or 0.3%, respectively) [Table 2].

The prevalence of hepatitis B and C among patients with mental illness (MII) in this study was 10.0 and 12.6%, respectively, as compared to a sero-prevalence of 10.9 and 1.1% in the blood donors [Tables 3 and 4]. There was no significant difference in the prevalence rate of hepatitis B virus among person with MII compared with control group ($P = 0.805$, $\chi^2 = 0.061$) as against that of hepatitis C where persons with MII were significantly infected compared with control ($P = 0.001$). No factor was found associated with HBV infection in the MII [Table 5 and 6].

Discussion

The sero-prevalent of hepatitis B in this study among patients with mental illness was 10.0%

Table 1: Socio-demographic distribution of MII and BDs

Variables	MI I (N=350) n (%)	BDs (N=350) n (%)
Gender		
Male	179 (51.1)	339 (96.9)
Female	171 (48.9)	11 (3.1)
Age		
16-35	193 (55.2)	252 (72.0)
36-55	131 (37.4)	97 (27.7)
56-75	25 (7.1)	1 (0.3)
>75	1 (0.3)	0 (0)
Mean age	36.5±12.3	31.4±8.3
Marital status		
Divorced	18 (5.1)	-
Married	144 (41.1)	206 (58.9)
Single	170 (48.6)	143 (40.9)
Widowed	18 (5.1)	1 (0.3)
Family type		
Monogamy	123 (71.9)	185 (89.8)
Polygamy	48 (28.1)	21 (10.2)
Occupation		
Professionals	-	4 (1.1)
Civil servant	75 (21.4)	96 (27.4)
Businessman/woman	10 (2.9)	30 (8.6)
Skilled artisan	56 (16)	88 (25.1)
Pensioner	8 (2.3)	-
Petty traders	56 (16)	16 (4.6)
Unemployed/housewife	145 (41.4)	116 (33.1)
Religion		
Christian	176 (50.3)	174 (49.7)
Muslim	140 (40)	210 (60)
Level of education		
Illiterate	32 (9.1)	18 (5.1)
Others	4 (1.1)	8 (2.3)
Primary	65 (18.6)	21 (6)
Secondary	109 (31.1)	122 (34.9)
Tertiary	140 (40)	185 (52.9)

MI I=Mentally ill individuals, BDs=Blood donors

while in control the prevalent was 10.9%. This finding is in contrast to a finding from a study done in USA where a prevalence of 23.4% was found among patients with severe mental disorders, a prevalence that was five times the overall prevalence among normal population for hepatitis B.^[4] In Brazil, however, a prevalence of 1.64% for HBsAg, 14.7% for anti-HBc were reported among psychiatric patients.^[21] In Taiwan a sero-prevalence of hepatitis B infection was 18.1% among institutionalized psychiatric patients and the disease was higher in male than in female psychiatric patients.^[19] In another study involving mentally disordered inpatient and patients with Down's syndrome a global hepatitis B virus positivity of 22.4% were recorded in Brazil.^[22] Also study from Singapore showed prevalence of 12.7% for HBsAg, 63.4% for surface antibody, and as high as 69% for

HBV core antibody which is a more sensitive test of infectivity.^[23] However, lower prevalence was reported from Portugal with a HBsAg prevalence of 1.6%^[24] and 4.5% in Northern Ireland among psychiatric patients.^[25] Nigeria is reported among nation in hyper-endemic zone for hepatitis B viral infection and the prevalence varies from different part of this country. The prevalence of hepatitis B in Nigeria is put between 9 and 39%^[7,8,26] In this present study, the sero-prevalence of hepatitis B is 10 and 10.9% among MII and BDs, respectively, though there was no statistically significant difference when compared with prevalence among the blood donors ($P > 0.05$), these findings further confirmed Nigeria as a hyper-endemic zone for hepatitis B infection. The prevalence of HBV in this study was high both in the mentally ill and the blood donors but fell within the national prevalence figure of 9-39% of the population. The reason for the high prevalence of HBV infection in Nigeria has been previously said to be due to late inclusion of HBV immunization in the National Program on Immunization (NPI) in 2003 and despite this the vaccine is not widely available.^[26]

More of blood donors consumed alcohol, smoked cigarette than MII, might be the facts that MII are on follow-up and under close supervision. The MII was engaged in extramarital sex, homosexuality, and sex trade and had received more blood transfusion than the BDs and these probably contributed to the prevalence recorded. Other serological markers of hepatitis B infection such as anti-HBsAg and anti-HBc antibodies were not assayed for in this study.

The sero-prevalence of hepatitis C in this study among MII and BDs was 12.6 and 1.1%, respectively. The observed prevalence of 12.6% among MII was statistically significant ($P = 0.001$). The result is similar to the finding of 19.4% among person with mental disorders in Australia and similar to 14.5% reported in Egypt.^[10] The prevalence of 19.6% was reported among patients with mental disorders

Table 2: Lifestyles/Risk behaviours of respondents

Variables	MII (N=350) n (%)	BDs (N=350) n (%)
Alcohol consumption		
Yes	11 (3.1)	37 (10.6)
No	339 (96.9)	313 (89.4)
Cigarette smoking		
Yes	8 (2.3)	19 (5.4)
No	342 (97.7)	331 (94.6)
Anal sex		
Yes	6 (1.7)	3 (0.9)
No	344 (98.3)	347 (99.1)
Blood transfusion		
Yes	40 (11.4)	13 (3.7)
No	310 (88.6)	337 (96.3)
Extramarital sex		
Yes	59 (16.9)	105 (30.0)
No	291 (83.1)	245 (70.0)
Sex trade		
Yes	12 (3.4)	1 (0.3)
No	338 (96.6)	349 (99.7)
Oral sex		
Yes	11 (3.1)	6 (1.7)
No	339 (96.9)	344 (98.3)
Self-injection		
Yes	-	1 (0.3)
No	350 (100)	349 (99.7)

MII=Mentally ill individuals, BDs=Blood donors

Table 3: Hepatitis B screening

	MII (N=350) n (%)	BD (N=350)	χ^2	P value	OR (95% CI)
Positive	35 (10.0)	38 (10.9)	0.061	0.8048	0.91 (1.88-0.44)
Negative	315 (90.0)	312 (89.1)			

MII=Mentally ill individuals, BD=Blood donors, CI=Confidence interval

Table 4: Hepatitis C screening

	MII (N=350) n (%)	BD (N=350)	χ^2	P value	OR (95% CI)
Positive	44 (12.6)	4 (1.1)	33.972	0.0001	12.44 (5.33-29.03)
Negative	306 (87.4)	346 (98.9)			

MII=Mentally ill individuals, BD=Blood donors, CI=Confidence interval

Table 5: Socio-demographic and risk characteristics of sub-cohort with hepatitis B

Variables	MII (N=35) n (%)	BD (N=38) n (%)	P value
Gender			
Male	24 (68.6)	38 (100)	$\chi^2=11.55$
Female	11 (31.4)	-	$P=0.0007$
Marital status			
Single	22 (62.9)	21 (60)	$\chi^2=0.54$
Married	11 (31.4)	17 (40)	$P=0.765$
Divorced	2 (5.7)	-	
Widowed	-	-	
Mean age	39.68±10.634	32.0±12.806	$P=0.215$
Education			
Illiterate	1 (2.9)	1 (2.6)	$\chi^2=0.17$
Primary	4 (11.4)	2 (5.2)	$P=0.996$
Secondary	12 (34.3)	16 (42.2)	
Tertiary	18 (51.4)	18 (47.4)	
Others	-	1 (2.6)	
Smoking			
Yes	0	2 (5.3)	$\chi^2=0.42$
No	35 (100)	36 (94.7)	$P=0.513$
Alcohol			
Yes	1 (2.9)	5 (13.2)	$\chi^2=1.36$
No	34 (97.1)	33 (86.8)	$P=0.245$
Blood transfusion			
Yes	3 (8.6)	2 (5.3)	$\chi^2=0.01$
No	32 (94.4)	36 (94.7)	$P=0.925$
Self- injection			
Yes	-	-	
No	35 (100)	38 (100)	
Number of sexual partners			
0	21 (60.0)	17 (48.6)	$\chi^2=1.53$
1	10 (28.6)	19 (54.3)	$P=0.676$
2	3 (8.5)	2 (5.7)	
3	1 (2.9)	-	
Extramarital sex			
Yes	11 (31.6)	5 (13.2)	$\chi^2=2.53$
No	24 (68.4)	33 (86.8)	$P=0.112$
Same gender sex			
Yes	1 (2.9)	-	NA
No	34 (97.1)	38 (100)	
Oral sex			
Yes	1 (2.9)	-	NA
No	34 (97.1)	38 (100)	
Anal sex			
Yes	-	-	NA
No	35 (100)	38 (100)	
Sex trade			
Yes	1 (2.9)	1 (2.6)	$\chi^2=0.43$
No	34 (97.1)	37 (97.4)	$P=0.513$

NA=Not applicable MII=Mentally ill individuals, BD=Blood donors

in USA.^[4] Previous study in Nigeria has reported the prevalence of hepatitis C among the blood donors in Northern Nigeria to be between 2.5 and 6.5%.^[27] Another study in Lagos by Lesi and Kehinde^[28] conducted among children and adults with sickle cell anaemia (SCA) using third generation Enzyme immune sorbent assay (EIA) kit showed 5% prevalence. Adewuyi^[29] in Ilorin also documented 5% prevalence among 60 multi-transfused SCA patient and 4.7% prevalence among 64 non-transfused

Table 6: Socio-demographic and risk characteristics of sub-cohort with hepatitis C

Variables	MII (N=44) n (%)	BD (N=4) n (%)	P value
Gender			
Male	25 (56.8)	3 (75)	$\chi^2=0.03$
Female	19 (43.2)	1 (25)	$P=0.861$
Marital status			
Single	21 (47.7)	3 (75)	$\chi^2=0.08$
Married	18 (40.9)	1 (25)	$P=0.994$
Divorced	4 (9.1)	-	
Widowed	1 (2.3)	-	
Mean age	39.68±10.634	32.0±12.806	$P=0.215$
Education			
Illiterate	6 (13.6)	-	$\chi^2=1.72$
Primary	8 (18.2)	-	$P=0.634$
Secondary	10 (22.7)	2 (50.0)	
Tertiary	18 (40.9)	2 (50.0)	
Others	2 (4.5)	-	
Smoking			
Yes	2 (4.5)	-	NA
No	42 (95.5)	4 (100)	
Alcohol			
Yes	2 (4.5)	-	
No	42 (95.5)	4 (100)	
Blood transfusion			
Yes	4 (9.1)	-	
No	40 (90.9)	4 (100)	
Self-injection			
Yes	-	-	NA
No	44 (100)	4 (100)	
Number of sexual partners			
0	32 (72.7)	2 (50.0)	
1	9 (20.5)	2 (50.0)	
2	1 (2.3)	-	
3	-	-	
4	1 (2.3)	-	
5	-	-	
6	1 (2.3)	-	
Extramarital sex			
Yes	12 (27.3)	1 (25.0)	$\chi^2=1.13$
No	32 (72.7)	3 (75.0)	$P=0.628$
Same gender sex			
Yes	2 (4.5)	-	NA
No	42 (95.5)	4 (100)	
Oral sex			
Yes	2 (4.5)	-	NA
No	42 (95.5)	4 (100)	
Anal sex			
Yes	-	-	NA
No	44 (100)	4 (100)	
Sex trade			
Yes	1 (2.3)	-	NA
No	43 (97.7)	4 (100)	

NA=Not applicable, MII=Mentally ill individuals, BD=Blood donors

SCA patients. Ejiofor *et al.*^[30] in Enugu using second generation EIAs kit reported 6.6 and 5.3% prevalence rates, respectively, among transfused and non-transfused children with SCA.

People with mental disorders were engaged in risky behaviors such as intravenous drug injection with shared needle, unprotected sex, and sex

trade making them more vulnerable to STIs such as HIV, Hepatitis B and C, and Syphilis.^[4,17] In this study, rate of sex trade, homosexuality and blood transfusion were higher in MII than in blood donors. Many of the married subjects were not living with their spouses and reasons given included mental illness and misunderstanding and these predisposes them to engage in sex trade and promiscuity as a means of livelihood and thus increased exposure to STIs. Individuals with MII are found more in the lower socio-economic class and lower education status than BDs and thus can easily be lured into sex for a token. Stigmatization, family rejection, high unemployment rate might predispose them to risky behavior such as sexual services as a means of obtaining food, money, and drugs. Trading sex is particularly worrisome behavior since it is highly correlated with the other STI risk behaviors: Drug use, sex with high risk partners, decreased condom use, the higher rate of intravenous drug use and needle sharing.^[15,17] According to Rosenberg *et al.*, individuals with mental illness who ever traded sex for money and/or drugs are more than five times likely to be infected with HIV and approximately twice as likely to have HBV and HCV infection.^[4]

Patient with mental disorder shows little knowledge as a regard mode of transmission of these diseases, and thus prone to STIs. Blood transfusion rate was also higher among MII than in BDs, and thus increases the risk of transmission of blood borne diseases especially if there is no proper pre-transfusion screening of blood for transmissible transfusion infections. Similarly, a US study also found that women with severe mental illness had significantly more unprotected vaginal intercourse than their male counterparts.^[21]

Chronic hepatitis B and C infections could result in the development of liver cirrhosis and hepatocellular carcinoma, the treatment of which is beyond the reach of common people including persons with severe mental illness who may not be gainfully employed and therefore may not be able to afford the treatment.

In conclusion, the sero-prevalence of hepatitis B is similar in person with mental illness and blood donor, but there was statistically significant difference in the prevalence of hepatitis C among the MII compared with the blood donors, we therefore recommend routine screening of all mentally ill patients for hepatitis C particularly those suspected to have engaged in some of the risky behaviors mentioned above. This will help in early detection and prevention of long-term complications of liver cirrhosis and hepatocellular carcinoma.

Limitation

This result cannot be generalized to entire Nigeria because it was done in a center only. The entire country could not be covered due to financial and logistic reason. A multi-center study would have been the best. We hope this would be done in the near future.

There was no local study on the prevalence of hepatitis infections among the mentally ill in Nigeria for comparison. This study therefore provides an opportunity that can be built and improved upon.

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