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Prevalence of hepatitis b and c from samples received from the various wards in Niger delta university teaching hospital (nduth), Okolobiri for haematological analyses

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Abstract
Hepatitis B and C viral infections are major public health problems world-wide and are more prevalent in the developing countries. This study was conducted to find out the prevalence of HBV and HCV infection among samples received from the various wards in Niger Delta University Teaching Hospital (NDUTH), Okolobiri Bayelsa State for haematological analysis. A total of 178 samples was received at NDUTH Okolobiri and were screened of hepatitis B and C. One step hepatitis B surface antigen test strip and hepatitis C virus test strip was used to detect antigen to HBV and antibodies to HCV in patient serum. The study showed the prevalence of HBsAg and HCV to be 10.67% and 3.93% respectively. The prevalence of HBsAg was higher in males 5 out of 20 (25%) than in females 14 out of 158 (8.86%). The prevalence of HCV was also higher in males 1 out of 20 (5%) than in females 6 out of 158 (3.8%). Among the different age groups, HBV and HCV were found to be more common in the 41 to 50 (36.36%) and 61 to 70 years (12.5%) age groups. The present study provides preliminary information about high HCV and HBV prevalence. The finding from the current study will be helpful for better management and control of viral hepatitis among patients seeking hospital care.

Keywords: Prevalence of hepatitis B, Prevalence of hepatitis C, Samples, Various Wards of NDUTH

1. Introduction

Hepatitis is a general term meaning an inflammation of the liver. The condition can be self-limiting or can progress to fibrosis (scarring), cirrhosis or liver cancer. The liver is the largest gland in the human body. It helps the body digest food, store energy and remove poisons (Centres for Disease Control and Prevention (CDC) 2010).[a] There are five main types of hepatitis that are caused by a virus which are A, B, C, D and E. However, hepatitis can also be caused by alcohol and some other toxins and infections, as well as autoimmune processes. Viral hepatitis can be acute or chronic. Acute hepatitis lasts under six months, while chronic hepatitis lasts for years if not properly treated (Nordquist, 2014) [7].

Hepatitis B Virus (HBV) belongs to the family hepadnaviridae and genus orthohepatodnavirus. It is the only hepadnavirus causing infection in humans. Hepatitis B viral infection is a major public health problem world-wide and is more prevalent in the developing countries. More than 2 billion people are infected with hepatitis B virus world-wide, while 280 million are chronic carriers, harbouring the virus in the liver. This virus is responsible for about 80% of all cases of primary liver cancer, which is one of the leading causes of death in Asia and Africa. Sub-Sahara Africa, Asia, the Pacific, the Amazon, Southern part of eastern and Central Europe are areas of high endemicity with the prevalence rate of about 7% (Emechebe *et al.*, 2009) [5].

Hepatitis B is an infectious hepatitis caused by the hepatitis B virus (HBV). Transmission of HBV occurs when blood or body fluid of an infected person enters the body of a person who is not immune. This can happen through sexual contact with an infected person or sharing needles, syringes, or other injection drug equipment. Hepatitis B can also be passed from an infected mother to her baby at birth. The infection has two possible phases which are acute hepatitis B and chronic hepatitis B. Acute hepatitis B refers to newly acquired infections. Affected individuals notice symptoms approximately 1-4 months after exposure to the virus. Chronic hepatitis B is an infection with hepatitis B virus that lasts longer than 6 months. Once the infection becomes chronic, it may never go away completely (Emechebe *et al.*, 2009) [5].

Symptoms of hepatitis B include; fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, joint pain, jaundice, grey-coloured stools (CDC, 2010)[a]. There are broadly three strategies for dealing with hepatitis B virus infection in developed countries, immunization, antiviral drugs and immunostimulatory therapy with alpha-interferon for those affected (Emechebe *et al.*, 2009) [5].

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV). Hepatitis C virus is a single-stranded RNA virus, which causes both acute and chronic hepatitis infection. Acute HCV infection is usually asymptomatic, and is only very rarely associated with life-threatening disease. About 15-45% of infected persons spontaneously clear the virus within 6 months of infection without any treatment (World Health Organisation (WHO), 2014) [a].

Hepatitis C virus infection is a major cause of morbidity and mortality. The World Health Organization (WHO) estimates that about 3% of the world populations (200 million people) have so far been infected with the hepatitis C virus, of which about 50% will become chronic carriers and are at risk of liver cirrhosis and liver cancer. Chronic infection with HCV is often asymptomatic,

and can lead to liver cirrhosis and hepatocellular carcinoma. Thus, most infected people are unaware of their HCV statuses (Ibrahim, Pondei, 2014) [6].

Hepatitis C is found worldwide. The most affected regions are Central and East Asia and North Africa. There are multiple strains of the HCV virus and their distribution varies by region. The hepatitis C virus is most commonly transmitted through infected blood, sexually, vertically from mother to child, injecting drug use through the sharing of injection equipment such as needles and syringes or the use of contaminated inadequately sterilized medical equipment (Esan *et al.*, 2014). The incubation period of hepatitis C virus is 2 weeks to 6 months. There is no vaccine for hepatitis C, therefore prevention of HCV infection depends upon reducing the risk of exposure to the virus in health care settings and in high-risk populations (for example, among people who inject drugs) (WHO, 2014) [b].

2. Aim of the study

To determine the prevalence of hepatitis B and, C among samples received from the various wards in Niger Delta University Teaching Hospital, Okolobiri for haematological analyses.

3. Objectives of the study

1. To access the status of Hepatitis B and C virus infection in patients.
2. To raise awareness of the virus among patients.
3. To use the outcome of the current prevalence rate to promote the need for universal safety precautions among laboratory staff.

4. Materials and Method

Study Area

The study was carried out at the Niger Delta University Teaching Hospital (NDUTH), Okolobiri, a semi-urban community in the Yenagoa Local Government 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.

Reagents

Hepatitis B surface antigen test strip manufactured by ABON Biopharm Company Limited, Hangzhou. Lot number 1155995602, and Hepatitis C virus test strip manufactured by ABON Biopharm. Lot number 1155996501, were used in the research work.

Subjects

Hundred and seventy eight (178) consecutive patients (males and females) who were attending the NDUTH, Okolobiri from July to November 2014 were studied. All were screened for HBsAg and anti-HCV by standard methods. Demographic data such as age and sex were also recorded.

Sample collection

1.5ml of blood was collected from each patient by clean venepuncture and dispensed into a sterilized plain vacutainer and allowed to clot naturally at room temperature. The clotted blood samples were spun in a centrifuge at 250 rpm for 5 minutes to separate the serum which was used for the analysis.

5. Methodology

Screening for Hepatitis B surface antigen (HBsAg), and antibodies to Hepatitis C virus (anti-HCV) were assessed using ABON rapid test strips (ABON Biopharm). All test procedures were carried out according to the manufacturer's instructions.

Principle for detection of Hepatitis B Surface Antigen in serum (HBsAg)

The one step Hepatitis B surface Antigen test strip is a qualitative, lateral flow immunoassay for the detection of HBsAg in serum. The membrane is pre-coated with anti-HBsAg antibodies on the test line region of the strip. During testing, the serum specimen reacts with the particle coated with anti-HBsAg antibody. The mixture migrates upward on the membrane chromatographically by capillary action to react with anti-HBsAg antibodies on the membrane and generate a coloured line. The presence of this coloured line in the test region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a coloured line will always appear in the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

Principle for detection of hepatitis C virus (HCV) in serum

The one step hepatitis C virus test strip is a qualitative, membrane based immunoassay for the detection of anti-HCV in serum. The membrane is coated with recombinant HCV antigen on the test line region of the strip. During testing, the serum specimen reacts with the protein A coated particle. The mixture migrates upward on the membrane chromatographically by capillary action to react with recombinant HCV antigen on the membrane and generate a coloured line. Presence of this coloured line indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a coloured line will always appear at the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

Procedure for detection of HBsAg and HCV

The test strip was removed from the sealed pouch and used as soon as possible. With arrows pointing toward the serum, the test strip was immersed vertically in the serum for at least 15 seconds ensuring not to pass the maximum line (MAX) on the test strip when immersing the strip. Thereafter the test strip was placed on a non-absorbent flat surface, the timer was started and the test strip was observed for appearance of red lines. The result was read at 15 minutes and recorded.

Interpretation

When two distinct red lines appeared- one in the control region(C) and one in the test region (T), it is considered positive. When only one red line appeared in the control(C) region and no other apparent red or pink line appeared in the test (T) region, it was considered negative. All interpretations were according to manufacturer's instructions.

Quality control

The use of external positive and negative controls were tested as a good laboratory practice to confirm the test and to verify proper test performance. Also all other necessary quality control

measures were taken to ensure reliability of results.

Data analysis technique
Simple descriptive statistical tools were used.

6. Results

The study examined 178 blood samples from patients in the various wards in NDUTH Okolobiri, Bayelsa State. The age of patients ranged from 1-70 years (mean±SD, 31.6±11.5) years. Out of 178 patients, 20 (11.24%) were males and 158 (88.76%) were females, giving a male and female ratio of 1:7.9 respectively. The detail results are as shown below:

Table 1: Frequency distribution of hepatitis B surface antigen (HBsAg) according to wards

Ward	HBsAg		Total
	Negative (%)	Positive (%)	
A/E	5 (83.3)	1(16.7)	6 (3.37%)
ANC	96 (87.7)	11 (10.3)	107 (60.11%)
ANW	4 (100)	0	4 (2.25%)
CHEW	4 (100)	0	4 (2.25%)
CHOP	1(100)	0	1 (0.56%)
CLINIC	1(100)	0	1 (0.56%)
FMW	2 (100)	0	2 (1.12%)
FSW	3 (100)	0	3 (1.69%)
GOPD	12 (85.7)	2 (14.3)	14 (7.87%)
L/W	12 (100)	0	12 (6.74%)
MOPD	6 (60)	4 (40)	10 (5.62%)
O/G	13 (92.9)	1(7.1)	14 (7.87%)
Total	159 (89.33)	19 (10.67)	178 (100)

Key: A/E = Accident and emergency, ANC = Antenatal clinic, GOPD = General outpatient department, MOPD = Male outpatient department, O/G = Obstetrics and gynaecology

Table 2: Frequency distribution of hepatitis B surface antigen (HBsAg) status according to gender.

SEX	HBsAg		Total
	Negative (%)	Positive (%)	
Male	15 (75)	5 (25)	20 (11.24%)
Female	144 (91.14)	14 (8.86)	158(88.76%)
Total	159 (89.33)	19 (10.67)	178 (100)

$p<0.05$

Table 3: Frequency distribution of hepatitis B surface antigen (HBsAg) according to age groups

Age group	HBsAg		Total
	Negative (%)	Positive (%)	
1-10	4 (100)	0	4 (2.25%)
11-20	11 (91.67)	1 (8.33)	12 (6.74%)
21-30	76 (90.48)	8 (9.52)	84 (47.19%)
31-40	50 (89.29)	6 (10.71)	56 (31.46%)
41-50	7 (63.64)	4 (36.36)	11 (6.18%)
51-60	3 (100)	0	3 (1.69%)
61-70	8 (100)	0	8 (4.49%)
Total	159 (89.33)	19 (10.67)	178 (100)

Table 4: Frequency distribution of Hepatitis C virus (HCV) according to wards

Ward	HCV		Total
	Negative (%)	Positive (%)	
A/E	5 (83.3)	1 (16.7)	6 (3.37%)
ANC	104 (97.2)	3 (2.80)	107 (60.11%)
ANW	4 (100)	0	4 (2.25%)
CHEW	4 (100)	0	4 (2.25%)
CHOP	1 (100)	0	1 (0.56%)
CLINIC	1 (100)	0	1 (0.56%)
FMW	2 (100)	0	2 (1.12%)
FSW	2 (66.7)	1 (33.3)	3 (1.69%)
GOPD	14 (100)	0	14 (7.87%)
L/W	10 (83.3)	2 (16.7)	12 (6.74%)
MOPD	10 (100)	0	10 (5.62%)
O/G	14 (100)	0	14 (7.87%)
Total	171 (96.07)	7 (3.93)	178 (100)

Key: A/E = Accident and emergency, ANC = Antenatal clinic, FSW = Female surgical ward, L/W = Labour ward

Table 5: Hepatitis C virus (HCV) prevalence according to gender

Sex	HCV		Total
	Negative (%)	Positive (%)	
Male	19 (95)	1 (5)	20 (11.24%)
Female	152 (96.2)	6 (3.8)	158 (88.76%)
Total	171 (96.07)	7(3.93)	178 (100)

Table 6: Frequency distribution of HCV according to age groups

Age group	HCV		Total
	Negative (%)	Positive (%)	
1-10	4 (100)	0	4 (2.25%)
11-20	12 (100)	0	12 (6.74%)
21-30	80 (95.2)	4 (4.76)	84 (47.19%)
31-40	54 (96.4)	2 (3.57)	56 (31.46%)
41-50	11 (100)	0	11 (6.18%)
51-60	3 (100)	0	3 (1.69%)
61-70	7 (87.5)	1 (12.5)	8 (4.49%)
Total	171 (96.07)	7 (3.93)	178 (100)

7. Discussion

In the present study, out of the 178 samples collected from patients in the various wards of Niger Delta University Teaching Hospital (NDUTH), Okolobiri 19 (10.67%) were positive for HBsAg and 7 (3.93%) were positive for anti-HCV (See tables 4.1 and 4.4). The results are comparable by WHO for Nigeria, with prevalence of HBV and HCV greater than 8% and 1.2% respectively. The HBV and HCV infection rate of 10.67% and 3.93% in this study is however higher than the 5.0% and 0.5% for HBsAg and HCV reported previously by Buseri *et al.*, 2010 among pregnant women in Nigeria.

Gender distribution in this study showed that 25% of males and 8.86% of females are positive to hepatitis B virus while 5% of males and 3.8% of females are positive for hepatitis C virus. This is in line with a previous study conducted by Jafar *et al.* (2014) which reported the prevalence rate of HBV in males to be 23.8%. This is also similar to what was reported by Okonko *et al. (2012*) who found HBsAg prevalence to be higher among males 10.2% than the females 5.9%. However the finding of the present study disagrees with that of Nwokedi *et al*. (2006), who reported that 5.6% of males and 7.4% of females respectively are seropositive to hepatitis C antibodies. The reason for the high

infection rate among the males may be due to habits such as multiple sexual partnership and polygamy which may be higher among the males.

In this study age groups of 41 to 50 and 61 to 70 years showed highest frequency of HBV and HCV related hepatitis. The finding of the present study disagrees with that of Jafar *et al. (2014*) who reported that age groups of 21 to 30 and 40 to 50 years showed highest frequency of HBV and HCV related hepatitis. The higher prevalence of HBV and HCV among relatively older people in this study might be the increased chances of infection in the mentioned age groups.

8. Conclusion

The prevalence of HBV and HCV in routine patients' blood samples sent to haematology laboratory was high and serves as a possible source of infection if not handled with caution. The data of the current study will help in the effective prevention and control measures against HBV and HCV infection.

Samples should be handled with care as they could be source of infection especially when blood comes in contact with those with open wounds. The public should be educated on the various notes of transmission of the virus, procedures involving unsterile or inadequately sterilized equipment. Blood and blood products from every patient should be treated as infectious and necessary precaution taken. All health workers and medical students should be immunized against hepatitis B.

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