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Prevalence of Hepatities B and C among Blood Donors at Akwanga General Hospital, Nasarawa State

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Abstract

Hepatitis B virus (HBV) and hepatitis C virus (HCV) remains a major glob health problem. More than three-quarters of HBV infections occur in Africa, As and Middle East. HCV causes an acute and necro inflamatory disease of liv Blood serves as a vehicle for transmission of blood-borne pathogens includi hepatitis viruses. Determination of the prevalence of HBV and HCV among bloo donors in particular will certainly help in reviewing the screening procedures a making health policy decisions. The study aims at investigating the prevalence HBV, HCV and associated risk factors among blood donors at Akwanga gene Hospital. A cross-sectional study will be conducted to determine the prevalence HBV and HCV infections among blood donors. The blood samples were screen for HBV and HCV. All serum samples were tested for HBsAg and anti-HCV usi rapid screening kit method according to the manufacturer's instruction. T overall prevalence of hepatitis B, hepatitis C virus and their co- infection amo blood donors at Akwanga general Hospital was found to be 24.7%, 16.7%, 9.3

respectively. For risk factors of hepatitis B, it was more prevalent among tho that have multiple sex partners (36.7%) and least was recorded among those th shear sharp object(21.9%), for hepatitis C, it was more prevalent among those th have previous history of transfusion (24.1%) and least was recorded among tho that have family history of hepatitis (8.7%) and for their co- infection, it was mo prevalent among those that have multiple sex partners (14.3) and least w recorded among those that have diagnosis history of hepatitis (5.9).

Keywords: Hepatitis B virus (HBV), Hepatitis C virus (HCV), Transmission and Prevalence

Introduction

Hepatitis B infection is one of most common infectious diseases of the world infecting two billion people including an estimated 400 million chronically infected cases (Nkrumah *et al*., 2011). Individuals with chronic infection are at high risk of developing liver cirrhosis and hepatocellular carcinoma. Hepatitis C virus infection is another common chronic blood borne infection with an estimated 3.9 million persons infected with the virus and has a high rate of development of liver cirrhosis. Infection by Hepatitis B virus (HBV) and Hepatitis C virus (HCV) cause serious mortality, morbidity and financial burden and are thus a major global health problem (Nkrumah *et al*., 2011). HCV is recognized as the primary cause of transfusion-associated non-A-non-B viral hepatitis worldwide and is endemic in West Africa (Eboumbou *et al*., 2014).

In Nasarawa state, the current blood safety guidelines necessitate blood banks to routinely perform serological testing for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and *T. pallidums* (Eboumbou *et al*., 2014). Blood transfusion therapy is used among patients with severe anemia due to various medical, surgical or obstetric conditions, and in patients undergoing transplantation of an organ. Blood transfusion is beneficial and safe for the recipient when it is performed in strict compliance with immunological and hygienic standards, and following a strict guidelines.

Over the years, mortality and morbidity has shown an increase trend causing a major problem both to the family and the wider community. Hepatitis B and C have been implicated in most cases due to the present of hepatitis virus. Despite the enormous public health interventions to combat this situation, it seems to be no major improvement hence, this study seeks to investigate the current prevalence of hepatitis B and C amongst blood donors attending blood bank at the Akwanga general hospital.

Epidemiology of Hepatitis B Virus

On the basis of the HBV carrier rate, the world can be divided in to high, medium and low endemicity regions (Elsheik *et al*., 2007). In high endemic areas, like central Asian republics, Southeast Asia, Sub-Saharan Africa and the Amazon basin, the HBV carrier rate is over 8%. In low endemic regions, like the United States, Northern Europe, Australia and parts of South America, HBsAg prevalence is less than 2%. The Middle East, some Eastern European countries and the Mediterranean basin are considered areas of intermediate endemicity with a carrier rate between 2% and 8% (WHO, 2012).

Diagnosis of Hepatitis B Virus infection

The diagnosis of hepatitis B virus (HBV) infection was revolutionized by the discovery of Australia antigen, now called hepatitis B surface antigen (HBsAg). HBV diagnosis is accomplished by testing for a series of serological markers of HBV and by additional testing to exclude alternative etiological agents such as hepatitis C viruses. Serological tests are used to distinguish acute, self-limited infections from chronic HBV infections and to monitor vaccine- induced immunity. Nucleic acid testing for HBV-DNA is increasingly being used to quantify HBV viral load and measure the effectiveness of therapeutic agents (Krajden *et al*., 2005).

Treatment and Prevention of Hepatitis B Virus

Acute hepatitis B infection does not usually require treatment because most adults clear the infection spontaneously (Hollinger & Lau, 2006). Early antiviral treatment may only be required in less than 1% of patients, whose infection takes a very aggressive course (fulminant hepatitis) or who are immune compromised.

On the other hand, treatment of chronic infection may be necessary to reduce the risk of cirrhosis and liver cancer. Chronically infected individuals with persistently elevated serum alanine aminotransferase, a marker of liver damage, and HBV DNA levels are required for therapy (Lai & Yuen, 2007).Vaccination is the most effective measure to reduces the global incidence of hepatitis B (WHO, 2012).

Epidemiology of Hepatitis C Virus

HCV is endemic worldwide, with an estimated global prevalence of 3% (170 million). There is great variation in the geographical distribution of HCV, with the highest prevalence in Africa and Asia, and lower prevalence in industrialized countries (Shepard *et al*., 2005).HCVis four to five times more prevalent than HIV globally and is the commonest chronic blood-borne infection in the United States with three to four million people infected by HCV every year (Shepard *et al.,* 2005). Even within developing nations, there is great variation in prevalence. Some of this variation may be explained by differences in study and reporting methods. Actual to variation in risk factors in different parts of the world. Injection drug use is the single most important risk factor in developed regions of the world. Unsafe therapeutic injections and blood transfusions are important risk factors in developing nations where these practices occur (Norderstedt *et al*., 2010).

Diagnosis of hepatitis C virus infection

Diagnostic tests used for the detection of HCV infection include the HCV antibody enzyme immunoassay, recombinant immunoblot assay, and quantitative HCV RNA polymerase chain reaction (PCR) (Ghany *et al*., 2009).The most widely used initial assay for detecting HCV antibodies is the enzyme immunoassay. A positive enzyme immunoassay should be followed by a confirmatory test. Recombinant immunoblot assays a confirmatory test for a positive enzyme immunoassay, detects antibodies to individual HCV antigens and has a greater specificity. It is used in conjunction with viral load tests to distinguish between a resolved infection and a false positive enzyme immunoassay (Scott & Gretch, 2007).

Now a day the diagnosis of hepatitis C infection uses two assays: 1) serologic assays that detect human antibodies generated as a response to hepatitis C virus (HCV) infection. A positive HCV antibody test indicates HCV infection at some point in time, but it does not differentiate whether the person has resolved or current HCV infection. This assay includes Enzyme Immunoassay (EIA), Chemilumin escence Immunoassay (CIA), Point-of-Care Rapid Immunoassays and Recombinant Immunoblot Assay (RIBA) (Gretch, 1997).Molecular HCV RNA Tests: Molecular diagnostic tests for hepatitis C specifically detect HCV RNA and the process is commonly referred to as a Nucleic Acid Test (NAT) or Nucleic Acid Amplification Test (NAAT). The HCV NAT becomes positive approximately 1 to 2 weeks after initial HCV infection. The NAT test has become the gold standard supplemental test for patients who have a positive HCV EIA screening test. The NAT can determine whether a patient with a positive HCV antibody test has current (active) or resolved HCV infection. In addition, the NAT can be used to diagnose individuals with acute HCV infection. It could be Qualitative HCV RNA and Quantitative HCV RNA (Gretch *et al*., 1997). NAT for the detection of HCV RsNA remains the gold standard for diagnosing active HCV infection (Moghaddam *et al*., 2012).

Quantitative viral load tests measure the amount of virus in blood. Quantitative studies provide information on initial viral load, viral load reduction with therapy, and a sustained virologic response, defied as undetectable HCV by PCR six months after stopping therapy (Ghany *et al*., 2009).

Prevention of Hepatitis C Virus

There is no vaccine against HCV. Research is in progress but the high mutability of the HCV genome complicates vaccine development (Simmonds, 2006). In absence of a vaccine, all precautions to prevent infection of HCV should target reduction of transmission of the virus. The only means of protection are the implementation universal precautions and safe injection practices. Screening and treatment of blood products is the only way to prevent transfusion associated cases (Van, 1999). HCV carriers should be strongly discouraged from drinking alcohol because there is evidence that acts as a cofactor in developing more severe liver injury (Madhava *et al*., 2002).

Treatment of Hepatitis C virus infection

Treatment of acute hepatitis is mainly supportive, consisting of bed rest and balanced diet with small frequent nitrous meals and hospitalization reserved only for cases of sever disease (Madhava *et al*., 2002).The goal of treatment is to achieve a sustained viral response (SVR), defined by the absence of viremia 6 month after stopping the medications; SVR is associated with improved histology and decreased risk of morbidities (Backmund *et al*.,2005).The complications of HCV infection can be prevented by antiviral therapy based on the use of a combination of pegylated interferon and ribavirin that yields a sustained eradication of infection in 40% to 50% of cases. The use of serological and virological tests has become essential in the management of HCV infection in order to diagnose infection, and most importantly guide treatment decisions and assess the virological response to antiviral therapy (Gessoni & Manoni, 2005).

A dramatic improvement in HCV therapy followed the introduction of oral medicines that directly inhibited the replication cycle of HCV. These medicines, called direct acting antiviral drugs (DAAs), target three important regions within the HCV genome: NS3/4A protease, NS5A and NS5B RNA-dependent polymerase. These medicines have led to higher sustained virological responses (SVRs) than interferon-based regimens, are shorter in treatment duration, are orally administered and have fewer side-effects. Individual DAAs vary in therapeutic efficacy, genotypic efficacy, adverse events and drug–drug interactions (DDIs), and must be used in combination with at least one other DAA (WHO, 2016).

Data Analysis

Data was analyzed using Most soft excel, result was presented as percentage and frequency on table and charts.

Socio-demographic Characteristics of the Study Participants

Among the study participants, 45(30%) were of the age group 20-29 years and least 32(21.3%) of the age group 50-59. For level of Occupation, most 50(33.3%) are unemployed and least 25(17) are student. For level of education, most 52(34.6%) were primary school leavers and least 20(13.3%) had secondary school level. For marital status, 85(56.6%) were single and the least 65(43.3%) were married (Table 1).

Table 1: Socio-demographic Characteristics of the Study Participants

Parameter		Frequency	Percentage (%)
Age (years)	20-29	45	30
	30-39	38	25.3
	40-49	35	23.3
	50-59	32	21.3
Occupation	Civil Servant	30	20
	Business	45	30
	Unemployed	50	33.3
	Student	25	17
Marital status	Single	85	56.6
	Married	65	43.3
Level of education	Non formal	50	33.3
	Primary	52	34.6
	Secondary School	20	13.3
	Tertiary	28	18.6

Overall Prevalence of Hepatitis B and C Virus Infection

For hepatitis B, 37 were positive giving an overall prevalence of 24.7%. Hepatitis C, 25 were positive with a prevalence of 16.7% and for their co-infection 14 were positive with an overall prevalence of 9.3% as shown in (Figure 1).

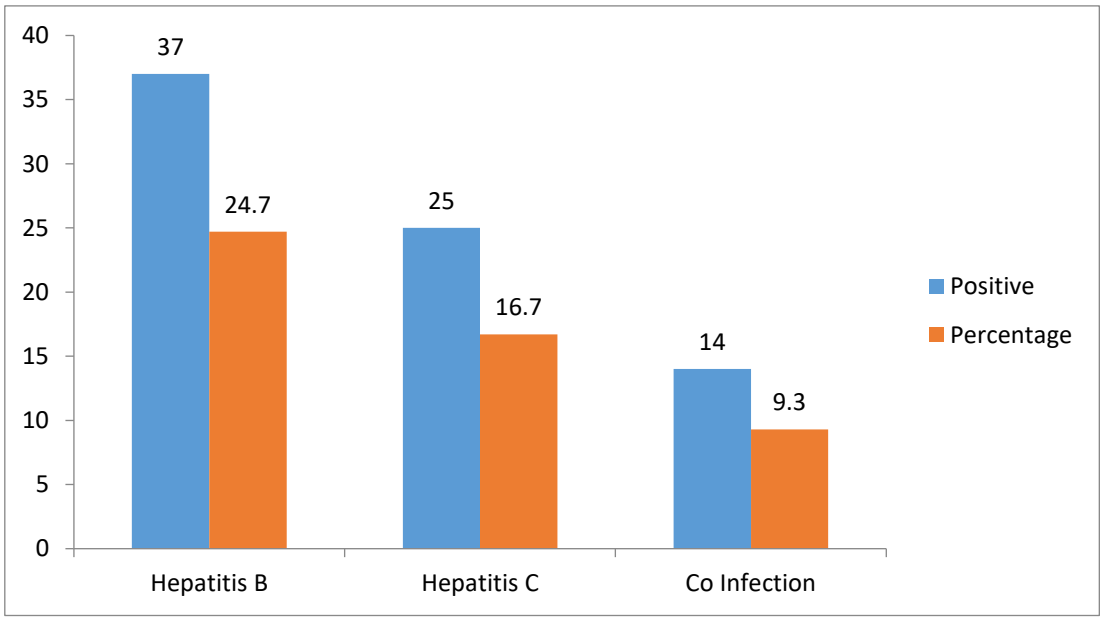


Figure 1: Overall Prevalence of Hepatitis B and C and their co infections

Prevalence of Hepatitis B and C Virus with Socio-demographic Variables

For prevalence of hepatitis B Virus with respect to age, the highest (31.1%) was recorded in the age group 20-29 years and least (12.5%) was among those of 50-59 years. For prevalence of hepatitis C Virus, the highest (20%) was recorded in the age group 40-49 years and least (13.2%) was among those of 30-39 years. . For prevalence of hepatitis B & C Virus, the highest (14.3%) was recorded in the age group 40-49 years and least (6.3%) was among those of 50-59 years as shown in (Table2)

Table 2: Prevalence of hepatitis B, hepatitis C and their co-infection with respect to age

Age (Years)	Frequency	Hepatitis B		Hepatitis C		Hepatitis B and Hepatitis C	
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. positive	Prevalence (%)
20-29	45	14	31.1	8	17.7	3	6.7
30-39	38	11	28.9	5	13.2	4	10.5
40-49	35	8	22.9	7	20	5	14.3
50-59	32	4	12.5	5	15.6	2	6.3

For prevalence of hepatitis B Virus with respect to education, the highest (40.6%) was recorded for those with none level and least (13.3%) was recorded for those in secondary level. For prevalence of hepatitis C Virus, the highest (28.1%) was recorded for those with none level and least (11.1) was those with secondary level. For prevalence of hepatitis B & C Virus, the highest (12.5%) was recorded for those with none level and least (6.7%) was those with secondary level as shown in Table 3.

Table 3: Prevalence of hepatitis B, hepatitis C and their co-infection with respect to level of education

Educational Status	Frequency	Hepatitis B		Hepatitis C		Hepatitis B and Hepatitis C	
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. positive	Prevalence (%)
None	32	13	40.6	9	28.1	4	12.5
Primary	38	12	31.6	7	18.4	4	10.5

Secondary School	45	6	13.3	5	11.1	3	6.7
Tertiary	35	5	14.3	4	11.4	3	8.6

For prevalence of hepatitis B Virus with respect to marital status, the highest (31.8%) was recorded for single and least (15.4%) was recorded for those that are married. For prevalence of hepatitis C Virus, the highest (20%) was single and least (12.3%) was recorded for those that are married. For prevalence of hepatitis B & C Virus, the highest (12.9%) was recorded for those that are married and least (4.6%) was recorded for those that are single. The difference was not statistically significant ($\chi 2 = 0.01$, $P = 0.09$) as shown in Table 4.

Table 4: Prevalence of Hepatitis B, Hepatitis C and their co-infection with respect to marital status

Marital status	Frequency	Hepatitis B		Hepatitis C		Hepatitis B and Hepatitis C	
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. positive	Prevalence (%)
Single	85	27	31.8	17	20	11	12.9
Married	65	10	15.4	8	12.3	3	4.6

For prevalence of hepatitis B Virus with respect to occupation, the highest (28.1%) was recorded for Business man and least (20%) was recorded for those that are civil servant. For prevalence of hepatitis C Virus, the highest (20%) was recorded for those that are unemployed and least (13.2%) was recorded for those that are student. For prevalence of hepatitis B & C Virus, the highest (13.3%) was recorded for those that are unemployed and least (5.3%) was recorded for those that are student as shown in Table 5.

Table 5: Prevalence of hepatitis B, hepatitis C and their co-infection with respect to level of occupation

Occupation	Frequency	Hepatitis B		Hepatitis C		Hepatitis B and Hepatitis C	
		No. Positive	Prevalence (%)	No. Positive	Prevalence (%)	No. positive	Prevalence (%)
Civil servant	35	7	20	5	14.3	2	5.7
Business	32	9	28.1	6	18.8	4	12.5
Unemployed	45	12	26.7	9	20	6	13.3
Student	38	9	23.7	5	13.2	2	5.3

Prevalence of Hepatitis B, Hepatitis C and their co- infection with Respect to its Associate Risk Factors

For risk factors of hepatitis B, it was more prevalent among those that have multiple sex partners (36.7%) and least was recorded among those that shear sharp object(21.9%), for hepatitis C, it was more prevalent among those that have previous history of transfusion (24.1%) and least was recorded among those that have family history of hepatitis (8.7%) and for their co- infection, it was more prevalent among those that have multiple sex partners (14.3) and least was recorded among those that have diagnosis history of hepatitis (5.9).

Table 6: Prevalence of hepatitis B and C with Respect to its Associated Risk Factors

Risk factors	Frequency	HbsAg +ve (%)	Prevalence	Hcv +ve (%)	prevalence	HbsAg&Hcv +ve (%)	Prevalence
Shearing of sharp object	32	7	21.9	5	15.6	3	9.4
Previous history of transfusion	29	8	27.6	7	24.1	3	10.3
Multiple sex partner	49	18	36.7	8	16.3	7	14.3
Family history of hepatitis	23	0	0	2	8.7	0	0
Diagnosis history of hepatitis	17	4	23.5	3	17.6	1	5.9

Discussion

The results show that the overall prevalence of hepatitis B was 24.7%. This however is in conformity with Ghany *et al*. (2009) that reported the prevalence of Hepatitis B to be greater in areas of sub-Saharan Africa, Asia, and Latin America with a prevalence of greater than 8%. Nigeria is one of the countries in sub Saharan Africa and this high prevalence might be due to lack of education and sensitization on hepatitis B and its effects as well as negligence.

For hepatitis C the overall prevalence was found to be 16.7%. This is similar to the findings of Karoney *et al*. (2013) who had a prevalence of 15.3%.It is lower compared with Chukwurah *et al.* (2005) who had a prevalence of 17.6% in South-

East Nigeria and lower than that of Erhabor *et al*. (2006) where recorded a prevalence of 6.5% in Port Harcourt Nigeria.

For hepatitis B and C coinfection, a prevalence of 9.3% was recorded in the study which is in agreement with El-Magrahe *et al.* (2010) that had a prevalence of 9%. However, coinfection with these two pathogens suggests a positive trend as hepatitis B and C infection weakens the immune system

Following the study, the prevalence of hepatitis B virus was highest in the age group 30-39years with a prevalence of 28.9%. This might be due to fact this age group is most sexually active age group as hepatitis B virus is a sexually transmitted disease. For hepatitis C virus those of 40-49years had the lowest prevalence of 20%.

For prevalence of hepatitis B virus was highest in those with no formal education (40.6) and least was found among those in tertiary education (14.3%). This is in agreement with Perz *et al.,* (2004) who indicated that uneducated individuals have a higher prevalence of hepatitis B. For prevalence of hepatitis C virus, the highest prevalence (28.1%) was observed in no formal education and thee least prevalence of (11.1%) was in those of secondary school.

Conclusions

The overall prevalence of hepatitis B, hepatitis C virus and their co- infection among blood donors at Akwanga general Hospital was found to be 24.7%, 16.7%, 9.3% respectively.

Among the study participants, 45(30%) were of the age group 20-29 years and least 32(21.3%) of the age group 50-59. For level of Occupation, most 50(33.3%) are unemployed and least 25(17) are student. For level of education, most 52(34.6%) were primary school leavers and least 20(13.3%) had secondary school level. For marital status, 85(56.6%) were single and the least 65(43.3%) were married

For the prevalence of hepatitis B and C virus with respect to the factors that predispose blood donors to the virus, showed that those with multiple sex partners was the highest risk factor.

Recommendations

Based on the results obtained from the present study carried out, it is recommended that public health awareness is needed to be conducted in this community, churches, mosque and schools by the government on the modes of transmission, prevention and control of hepatitis B and C virus infection .Health talk should also be given to blood donors on the risk factors of hepatitis B and C, through social

media, radio and television e.g., Do not share needle or razor blade, If you need medical care, ensure that it is done by a reputable facility, Those that have not married always practice safe sex using condom correctly and consistently or abstain from intercourse. The government should make more effort to boost up hepatitis C virus screening among blood donors in Nigeria.

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