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## Research Article

### Screening for HBsAg and HCV Antibodies among Military Personnel in the Niger Delta of Nigeria

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## Abstract

Despite the high job-related risk of exposure to sexually -transmitted diseases including HBV and HCV among the military, there is paucity of data regarding Hepatitis B and C viruses prevalence among military personnel in Nigeria. The aim of this present study therefore was to determine the prevalence of HBV and HCV among military personnel in the Niger Delta of Nigeria. In this cross-sectional case study, a total of One hundred and fifty military personnel aged 20 and 55 years attending the Nigerian Army Hospital, Air Force Clinic and Police Clinic in Port-Harcourt in the Niger Delta of Nigeria were consecutively recruited for the study. Samples were tested for HBV and HCV using Acon Diagnostics (USA) HBsAg and anti-HCV kits. Results of the study showed an overall HBV and HCV prevalence rate of 4% and 0% respectively. The prevalence of HBV was significantly higher among subjects in the 20-39 years age group (4%) compared to 40-55 (3.85%) ( $p = 0.05$ ). The HBV prevalence was investigated based on gender of subjects. The HBV prevalence was concentrated among male subjects (4.76%) compared to female (0%) military personnel ( $p = 0.001$ ). There is need for the development of a strategic plan that integrates STIs into existing prevention and control programme particularly among the military to foster behavior change through information dissemination. Policies should be instituted to make condoms regularly available and freely distributed among military personnel to reduce the risk of HBV and other sexually transmitted infections. There is the need for an effective voluntary counseling and testing (VCT) and sentinel surveillance survey among military personnel. A fully integrated and comprehensive care and support system including provision of universal access to hepatitis B vaccination, treatment and support for military personnel should be establishment.

**Keywords:** HBsAg; HCV; Military Personnel; Niger Delta; Nigeria

## Introduction

HBV and HCV are significant public health problems. World-wide, about two billion people are estimated to be infected

with hepatitis B virus (HBV), 360 million have chronic infection, and a significant 600 000 die each year from HBV-related liver disease or hepatocellular carcinoma [1]. Hepatitis C virus (HCV) infection is responsible for approximately 8000

to 10 000 deaths each year in the United States [2]. HBV and HCV are associated with a serious mortality, morbidity and financial burden worldwide [3].

HBV and HCV are highly contagious infections and can be transmitted from one infected individual to another by blood-to blood contact, during child birth, through unprotected sex, sharing of needles as well as the use of contaminated and poorly sterilized body piercing and tattoo equipment [4]. HBV is ten times more infectious than HIV infection and it is a major cause of primary liver cell carcinoma in sub-Saharan Africa [5]. Nigeria is categorized as a medium-endemic country for HBV infection. The hepatitis B surface antigen (HBsAg) positivity in Nigeria varies between 3.9-12.5% [6-8].

An estimated 150–200 million people worldwide are infected with hepatitis C (originally identifiable only as a type of non-A non-B Hepatitis)[9-10]. Available data show that about 3% of the world population is infected with HCV, with the highest prevalence rate recorded in Africa [11]. The military community is considered a high-risk environment for STIs including HBV and HCV transmission. In Nigeria as elsewhere, personnel in the military are an important target for primary prevention interventions because they have a high risk of exposure to sexually transmitted infections (STI) including HBV and HCV. In peacetime, STI infection rates among armed forces are generally 2 to 5 times higher than in comparable civilian populations and are even greater in times of conflict [12].

There is paucity of data on the prevalence of HBV and HCV in the Nigerian military. It is not known to what extent HBV and HCV affect military personnel in Nigeria. The aim of this present study therefore was to determine the prevalence of HBV and HCV among military personnel in the Niger Delta of Nigeria.

## Subjects and Methods

### Study Design

This cross-sectional seroprevalence study was conducted in 3 military hospitals in Port Harcourt in the Niger Delta of Nigeria (Nigerian Army Hospital, Air Force Clinic and Police Clinic). One hundred and fifty consecutively recruited military personnel aged between 20-55 years constituted the subjects for this study.

### Study Area

The Niger Delta, as now defined officially by the Nigerian government, extends over about 70,000 km<sup>2</sup> (27,000 sq mi) and makes up 7.5% of Nigeria's land mass. Historically and cartographically, it consists of the present day [Bayelsa](#), [Delta](#), [Rivers](#), [Abia](#), [Akwa-Ibom](#), [Cross River State](#), [Edo](#), [Imo](#) and [Ondo](#) States. About 31 million people of more than 40 ethnic groups includ-

ing the [Bini](#), [Efik](#), [Esan](#), [Ibibio](#), [Igbo](#), [Annang](#), [Oron](#), [Ijaw](#), [Itseki-ri](#), [Yoruba](#), [Isoko](#), [Urhobo](#), [Ukwuani](#), and [Kalabari](#), are among the inhabitants in the Niger Delta, speaking about 250 different dialects. The Niger Delta is the oil-producing South South region of [Nigerian](#).

### Inclusion criteria

Inclusion criteria included; being a serving military personnel, age ( $\geq 18$  years), willingness to give a verbal informed consent and no previous history of blood transfusion.

### Exclusion criteria

The following individuals were excluded from this study; military personnel  $< 18$  years, non-military personnel, non-consenting military personnel and military personnel who has had a previous blood transfusion.

### Statistical Analysis

The data were collected in a Microsoft® Excel spreadsheet and analyzed using the Statistical Package for Social Science (SPSS) version 20.0 (SPSS, Chicago, IL, USA). Values were expressed as percentages and as mean  $\pm$  SD. P-values  $\leq 0.05$  were considered statistically significant.

### Sample Collection and Method

Five milliliters of blood was collected under strict biosafety measures from each participant into an EDTA anticoagulated tube. For HBV, the surface antigen (HBsAg) was detected using the Acon Laboratories (USA) HBsAg kit. For HCV, the antibody against HCV (anti-HCV) was detected using Acon Laboratories (USA) anti-HCV kit. Reactive tests were repeated at least once to avoid false positive results. The kits were used in accordance with the manufacturer's standard operating procedure.

### Ethical consideration

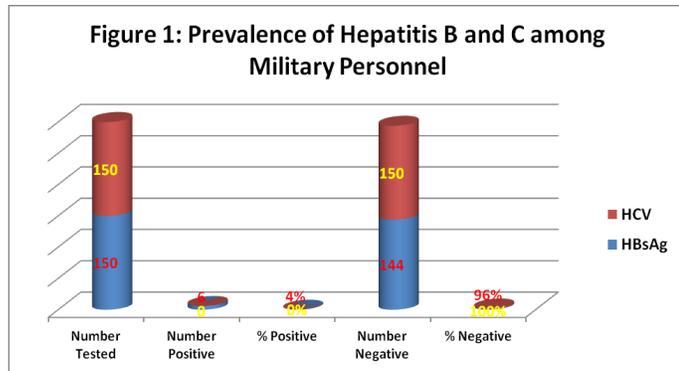
Ethical approval was given by the Ethical Committee in the Department of Medical Laboratory Science of Rivers State University of Science and Technology. All participants were given verbal explanation on the objectives and methodology of the research. Verbal informed consent was obtained from all study participants.

### Results

Subjects for this study included one hundred and fifty military personnel aged 20-55 years (mean age 39.36  $\pm$  5.2) made of 126 (84%) males and 24 (16%) females. Out of the 150 military subjects tested, 6 (4%) were found positive for HBsAg and none were subjects were positive for HCV antibodies. The prevalence of HBV was significantly higher among mil-

itary personnel in the 20-39 years 5(83.33%) compared to those in the 40-45 years 1(16.67%) was in the 40-55 years age group (p=0.05). The prevalence of HBV was concentrated among males subjects 6(4.76%) compared to females 0 (0%) (p= 0.001).

diers were positive for HbsAg [16]. Previous report indicates that HBV prevalence vary from 0% among Brazilian military personnel, 0.3% among Greek military recruits, 2.8% among Turkish recruits, 4% among Saudi Arabia soldiers and 2.82 among paramilitary personnel in Punjab [17-21] respectively. Similarly, See comment in PubMed Commons belowa previous report among 3,343 military personnel from the Peruvian Air Force indicated HBsAg prevalence of 0.33% [22]. A study among 17545 subjects to compare the prevalence of hepatitis viral markers among soldiers from Turkey, blood donors from Northern Cyprus, and soldiers from Northern Cyprus indicated HBsAg positivity rates of 2.16% in group I, 3.00% in group II and 2.71% in group III respectively [23]. A previous report among 1897 young adult male military recruits in Southern Taiwan indicated that 11.3% were positive for HBsAg. Similarly, a previous report indicated that viral hepatitis infections is significantly higher among military recruits with tattoos [20].



**Table 1.** Age- related prevalence of HBV and HCV among Military Personnel.

Age Group (Years)	Number Tested	Number (%)HBsAg Positive	Number (%) HCV Positive	p-value
20-39	124	5 (4.0)	0	0.05
40-55	26	1 (3.85)	0	
<b>Total</b>	<b>150</b>	<b>6 (4.0)</b>	<b>0</b>	

**Table 2.** Gender- related prevalence of HBV and HCV among Military Personnel.

Gender	Number (%) Tested	Number (%) HBsAg Positive	Number (%) HCV Positive	p-value
Male	126 (84)	6 (4.76)	0 (0)	0.001
Female	24 (16)	0 (0)	0 (0)	
<b>Total</b>	<b>150 (100)</b>	<b>6 (4)</b>	<b>150 (100)</b>	

**Discussion**

In this study we observed HBV prevalence of 4% among our cohort of military personnel. Previous report among the Nigerian population, blood donors and HIV-infected persons indicated HBV prevalence of 13.6% [13], 9.3% [14] and 9.7% [15] respectively in the population, among blood donors and among persons living with HIV/AIDS. Our finding is consistent with a previous report among 400 male Saudi National Guard working in Jeddah which indicated that a total of 16 (4.0%) sol-

The reasons for the high prevalence of HBV among military personnel in Nigeria are multifactorial. Most personnel in the Nigerian military are often posted to peace missions in countries where the prevalence of these viruses are high. This personnel are potentially exposed to these infectious diseases in their course of duty in these foreign missions Previous report among Brazilian military personnel indicated that in countries where Brazilian military personnel have recently been posted such as Colombia and Haiti have high HBV prevalence of 18.6%

[24] and 4.4% [25-27] respectively. Peacekeeping has become an important role for military forces the world over. National armies are increasingly requested to contribute troops and support staff to war zones and post-conflict milieu. During the past two decades, Nigerian troops have been involved in peacekeeping operations in many countries, including Congo, Cote d'Ivoire, Liberia, Sierra Leone, and Sudan. The United Nations Department of Peace Keeping Operations recommends that military personnel infected with STIs should not be deployed to peacekeeping operations and that all countries contributing peacekeepers provide their troops with standardized guidelines and training on prevention and control of STIs [28]. According to UNAIDS during peacetime, STI rates among armed forces are generally two to five times higher than in comparable civilian populations; in times of conflicts, they can be more than 50 times higher [29]. There are several risk factors responsible for the increased susceptibility of military personnel to HBV; danger and risk taking are integral parts of their profession, military personnel tend to be young, single, and sexually active, they are highly mobile and stay away from their families and home communities for extended periods, they are influenced by peer pressure rather than social convention, they are inclined to feel invincible and take risks and they have more ready cash than other males where they are deployed particularly when on peace mission and hence are surrounded by opportunities for casual and commercial sex. Factors like mobility, age group and opportunities for casual sex by military personnel is believed to make soldiers an especially high-risk group for sexually transmissible infection like HBV. There are other factors responsible for the high prevalence of HBV observed among our cohort of military personnel. An important knowledge, attitudes, and practices (KAP) survey [30] of the Nigerian Armed Forces conducted in 2001 indicated a low prevalence of condom use and high incidence of STIs. Indeed, evidence suggests that some soldiers consider the acquisition of an STI to be a symbol of sexual prowess and proof of manhood. These high risk behaviours can be attributed to several factors; military personnel are often posted far from their wives or husbands for a protracted period of time. Boredom or peer pressure may create an appetite for casual or commercial sex. Military culture and training encourage willingness to take risks and courage, and this may lead military personnel to participate in risky sex. Alcohol or drugs taken to relieve boredom or tension further increase that likelihood. The existence of high risk homosexual activity is also a major predisposing factor. The status conferred by a uniform might provide greater opportunities for casual sex. Also, the chance of infection through wounds or contaminated blood is higher during conflict. Young recruits (both male and female) are vulnerable to sexual violence and exploitation by their superiors. Tattoos are common among military personnel and creates an added risk particularly for HBV [22] because tattoo sterilization requirements were poor in some settings and did not exist back in the 1970s when artists often using the same nee-

dles and inkwells many times over [31-32].

Universal HBV vaccination is one of the ways to potentially prevent infection among military personnel. Evidenced-based best practice in some countries recommend that HBV vaccination be provided for military personnel [33-35]. The Nigerian military should be able to implement this evidenced-based best practice to potentially reduce the risk of HBV infection among military personnel.

In this present study we observed a zero percent prevalence of HCV among our cohort of military personnel in the Niger Delta of Nigeria. Our finding is contrary to previous study which indicated HCV prevalence of 3.0% [36], (0.5%) [37] and 1.6% [38] in the population, among blood donors and among HIV-infected Nigerians respectively. Similarly previous report indicated anti-HCV prevalence was 0.7% [39] and (0.8%) [21, 22, 27] among Brazilian military personnel, Afghan National Army recruits, Peruvian Air Force and Pakistan Military Force respectively. A study among 17545 subjects to compare the prevalence of hepatitis viral markers among soldiers from Turkey, blood donors from Northern Cyprus, and soldiers from Northern Cyprus indicated anti-HCV positivity rates of 0.45% in group I, 0.45% in group II, and 0.56% in group III [23]. The prevalence of antibodies to hepatitis C virus (anti-HCV) was assessed among 4,978 Air Force recruits from all regions of Italy. Positivity to anti-HCV was found in 24 (0.48%) of study participants [40]. A previous report among 1897 young adult male military recruits in Southern Taiwan indicated that 2.5% were positive for HCV antibody. Viral hepatitis C infections was significantly higher among recruits with tattoos [20].

In this study, we observed a significant male gender predisposition to HBV infection among our cohort of military personnel. Our finding is consistent with a previous report among Turkish soldiers in Northern Cyprus which indicated that the male gender had a higher rate for HBsAg carrier status [23]. Similarly, Koulentaki and colleagues [41] in Greece observed a greater number of males than females were HBsAg positive.

In this study, we observed that the prevalence of HBV was significantly higher among younger military personnel (20-39 years) compared to older (40-55 years). Our finding is consistent with observation in the United States (U.S.) army [42] which indicates that a higher HIV prevalence occur among military personnel in the 25-35 years age group. Previous report [43] suggests that there is a significant risk of HIV-1 seroconversion and that it was more associated with age. Younger military personnel are more sexually active and are more likely to engage in high risk sexual behaviour which puts them potentially at risk for HBV and other STIs. Several factors place men and women in military services at increased risk of HBV infection. Most military personnel are in the age group at greatest risk of HBV infection (15-24 years age group). Secondly these predominantly young persons are typically posted to locations

away from their homes away from families for extended periods of time. They are more likely to engage in risk behaviors as a means of relieving the tension of loneliness including use of drugs and unprotected sex with commercial sex worker [44-45].

### Conflicts of interest

The authors disclose no conflict of interest, including any financial, personal or other relationships with people or organizations, that could inappropriately influence the finding of this study.

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### Conclusion

Our findings indicate a high HBV prevalence among military personnel in the Niger Delta of Nigeria and highlights the importance of HBV prevention efforts for uniformed services to prevent a rapid increase in the prevalence of HBV. There is need for the development of a strategic plan that integrates STIs into existing prevention and control programme particularly among the military to foster behavior change through information dissemination. Policies should be instituted to make condoms regularly available and freely distributed among military personnel to reduce the risk of HBV and other sexually transmitted infections. There is the need for an effective voluntary counseling and testing (VCT) and sentinel surveillance survey among military personnel. There is need for the establishment of a fully integrated and comprehensive care and support system including provision of universal access to hepatitis B vaccination, treatment and support for military personnel.

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