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AMONG POLICE OFFICERS IN OSUN STATE, NIGERIA**

OCCUPATIONAL HAZARD EXPOSURE AND HEPATITIS B VACCINATION UPTAKE AMONG POLICE OFFICERS IN OSUN STATE, NIGERIA

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ABSTRACT

Introduction: The high prevalence of hepatitis B infection among crime victims puts police officers regularly exposed to them as a matter of duty at higher risk of being infected. This study assessed occupational hazard exposures and hepatitis B vaccination uptake among police officers in Osun State, Nigeria.

Methods: The study adopted a descriptive survey design, and a multistage sampling technique to select 372 respondents from 4,743 police officers, calculated using Cochran's modified formula. Data were collected with a structured questionnaire having a Cronbach's alpha reliability score of 0.83. Data were analyzed using descriptive statistics of frequencies and percentages. Inferential statistics with Chi-square was used to test the hypothesis at a 0.05 level of significance.

Results: Most respondents had over 20 years of work experience. While 58% had good knowledge of hepatitis B infection prevention practices, only 28% reported good preventive practices, and 324 (87%) had not been

vaccinated against the disease. Key hazards identified included needle stick injuries (11%) and exposure to blood from suspects' wounds (47.1%). There was a significant relationship between knowledge level and preventive practices regarding hepatitis B.

Conclusion: This study explained the need for interventions to improve vaccination coverage, hazard mitigation, and adherence to preventive practices among police officers in Osun State.

Keywords: Hazard Exposures, Hepatitis B, Knowledge, Police Officers, Preventive Practices

INTRODUCTION

Hepatitis B infection develops when the Hepatitis B virus (HBV) infects the liver. The disease is often asymptomatic in many carriers who can unknowingly spread the virus and can progress into a chronic, life-threatening condition, leading to severe complications such as cancer of the liver or liver cirrhosis.¹

In 2022, about 254 million people were living with chronic hepatitis B infection, and about 1.2 million new infections occurred globally each year. In the same year, hepatitis B was responsible for around 1.1 million deaths, primarily due to its long-term effects, including liver cancer and cirrhosis.²

Africa has the highest hepatitis B prevalence globally, at 7.5%, with 82.3 million people living with chronic infection.³ A systematic review and meta-analysis of hepatitis B prevalence in Nigeria (2010–2019) estimated that 20.1 million Nigerians are infected with HBV.⁴

Hepatitis B is transmissible through contact with infected body fluids, including saliva, blood, semen, serum, or vaginal fluids.² This mode of transmission places individuals with multiple unprotected sexual partners, newborns of hepatitis B-positive mothers, healthcare workers, and public safety officers who can be exposed through body fluids and needle-stick injuries at higher risk of Hepatitis B-infections.¹ Hepatitis B is also prevalent among individuals who inject drugs, practice tattooing, or engage in skin-piercing practices which are practices common among criminals.^{2,5}

In Africa, crime victims have the highest prevalence of hepatitis B compared to the general population, with the highest recorded rate at 13.14%.^{4,5,6} The prevalence is 13.7% among inmates of the federal capital of Nigeria and 16.3% among inmates in Borno state.^{7,8} Police officers are the key public safety professionals responsible for maintaining law and order, protecting people's lives and properties, exposing criminal activities and arresting offenders.⁹ In fulfilling these roles, they are frequently exposed to crime victims, some of whom may be carriers of hepatitis B. They also face the risk of contracting blood-borne infections such as hepatitis B, hepatitis C, and HIV from puncture wounds or lacerations sustained while carrying out work-related duties including body searches, inspecting belongings, or executing detention orders,

where they may come in contact with contaminated sharps.¹⁰

A study conducted in Mexico found that approximately one-sixth of officers reported experiencing a needle stick injury while on duty, with 14.3% reporting such injuries within the past year.¹⁰ Other studies also reported incidences of saliva spitting, blood contact, and human bites among police officers, which are other major means of HBV transmission.^{11, 12}

Nevertheless, Hepatitis B is a disease that can be prevented through vaccination. The vaccine bestows 20 years or even lifetime immunity on the immunized.¹³ Other preventive practices for hepatitis B are safe sex practices with the use of condoms, avoidance of multiple sexual partners, and the use of universal precautions such as hand hygiene, the use of personal protective equipment (such as needle-resistant gloves and disposable goggles) when there is a risk of exposures to needle prick, blood and body fluid and safe handling of contaminated surfaces and equipment.^{2,3}

Studies on hepatitis B among public safety officers in Nigeria had been carried out among the FRSC officers. Prevalence studies on hepatitis B have also been conducted among police applicants, healthcare workers, and their students, with a paucity of information on the knowledge and practices of hepatitis B prevention among police officers.^{13,14}

This study aimed to determine the occupational hazard exposures and hepatitis B vaccination uptake among Police officers of Osun State. The specific objectives of the study were to determine the occupational hazard exposures, knowledge, and preventive practices of hepatitis B and hepatitis B vaccination uptake among police officers of Osun State.

METHODS

This study used a descriptive cross-sectional design to assess the occupational hazard exposures and hepatitis B vaccination uptake

among police officers in Osun State. Osun state is located in southwestern Nigeria and has Osogbo as its state capital. The study was conducted in the Osun State police command which is an arm of the Nigerian Police Force tasked with the maintenance of public safety and order, law enforcement, and crime prevention in Osun State. The command operates under eight area commands and has a staff strength of 4,743. Each area command is supervised by an assistant commissioner of police. The eight area commands are located in Osogbo, Ilesa, Ile-Ife, Ikire, Ila-Orangun, Ibokun, Iwo, and Ikirun. The command headquarters is located in Osogbo. Each area command oversees several divisional police stations with a total of 47 divisional police stations across the state, ensuring a presence in every Local Government Area.

As at 2021, the total population of police officers in Osun State was 4,743. The sample size for this study was calculated using Cochrane's modified formula for a finite population.

$$n = n_0 / 1 + n_0 - 1 / N \quad \text{Where } n_0 = Z^2 \times P \times (1 - P) / e^2$$

n = sample size, n_0 = sample size for infinite population, and N = total population (4743 police officers), P = percentage of police officers who had knowledge of hepatitis B was taken to be 50%, P , therefore = 0.5, Z = 1.96. n = 356, and with a 10% attrition rate added, = 392 participants.

The Inclusion criteria were junior and senior ranked police officers who worked and lived within Osun State and also consent to the study. A multistage sampling technique was used to recruit participants as follows: firstly, 75% (6) of the 8 area commands in Osun state were randomly selected through balloting. The commands selected were Ife, Ilesha, Iwo, Ikire, Osogbo, and Ikirun area commands. Secondly, the sample size for each selected command was then determined by a proportionate sampling technique based on the population of police officers under each command.

All members of every division under each area command gather monthly at the divisional headquarters for a monthly meeting. The required number of eligible participants for each of the area commands was then randomly selected through balloting (those who consented were allowed to pick from many wrapped papers on which 'in for the study' or 'out' were written, and those who 'picked in for the study' were recruited) at the monthly meetings of each of the selected six area commands. The meetings were held at different week days.

Data was collected over two months with the use of a structured questionnaire consisting of four sections as follows:

Section A: socio-demographic data of the respondents,

Section B: occupational hazards exposures among police officers,

Section C: knowledge of hepatitis B infection, consisting of 9 questions having both yes or no and multiple-choice responses. This section contained questions on the knowledge of the level of infectivity of hepatitis B, individuals at higher risk, mode of transmission, prevention, and signs and symptoms of hepatitis B. The maximum obtainable score for the section is 21 marks. A score of 0 to 7 signifies low/poor knowledge, a score of 8 to 14 signifies moderate knowledge, and a score of 15 to 21 signifies good knowledge of hepatitis B.

Section D: contained questions on the preventive practices of hepatitis B infection among police officers. A Likert scale instrument with Never (0), Rarely (1), Occasionally (2), Always (3), and Frequently (4) as the responses was used. The maximum obtainable score was 28. A score of 1 to 9 was rated poor practice, 10 to 18 moderate and 19 to 28 as good practice.

The face and content validity of the questionnaire were ensured through an extensive literature review and a careful review by experts in the field of infection control. All identified corrections were incorporated. To ensure the reliability of the instrument, a pilot study was conducted with 10% of the sample population. A total of 39

questionnaires were administered to police officers attending monthly meetings at the Ila Area Command. The reliability coefficient obtained was 0.761.

Data was collected over two months on meeting days at all 6 selected area commands by the researcher and the research assistant. From the 392 questionnaires administered, 372 were completed and successfully retrieved as the study population.

Data were entered into the Statistical Product and Service Solutions (SPSS) version 25 and analyzed using the descriptive statistics of frequencies and percentages. Inferential statistics, which was Chi-square, was used to test the hypothesis at a 0.05 level of significance. The results were presented using frequency tables and charts.

The principles of beneficence, non-maleficence, and confidentiality were maintained. Data collection approval with number AB: 3380/OSS/NPMS/VOL.1/85 was obtained from the State police command.

RESULTS

Table 1 shows the socio-demographic characteristics of respondents of the study. The majority 107(28.7%) had work experience of more than 20 years, and were aged 26 to 32 years 108(29.2%), married 173(46.6%), of male gender 238 (64%), Christians 242(65.0%), from Yoruba ethnic group 323(86.7%), and presently in the rank of inspector of police 121(32.5%).

Table 2 shows the occupational hazards among police officers. Majority of the respondents, 331(89%), had never had a needle prick injury in the course of discharging their duties as police officers. Out of the 11% who had ever had needle prick injuries, the major scene that exposed them to the injury was property search 14(3.8%), the prick took place majorly between 1-2 times, 31(8.3%) and 23(6.2%) ever reported the incidence. Majority 24 (6.5%) reported to a superior officer and only 8(2.2%) took the

Table 1: Socio-demographic Characteristics of the Respondents (n = 372)

Variables	Frequency	Percentage
Present Rank		
Deputy Commissioner	1	0.4%
Chief Superintendent of Police	6	1.7%
Superintendent of Police	14	3.8%
Deputy Superintendent of Police	12	3.3%
Assistant Superintendent of Police	51	13.8%
Inspector of Police	121	32.5%
Sergeant	37	10.0%
Corporal	47	12.5%
Constable	82	22.1%
Work Experience		
below 5 years	95	25.4%
6-10 years	56	15.0%
11-15 years	57	15.4%
16-20 years	57	15.4%
above 20 years	107	28.7%
Age		
less than 25	45	12.1%
26-32	108	29.2%
33-39	84	22.5%
40-46	98	26.3%
47-53	26	7.1%
Marital status		
54-60	11	2.9%
Married	173	46.6%
Single	64	17.2%
Divorced	82	22%
Widowed	21	5.6%
Separated	32	8.6%
Gender		
Male	238	64%
Female	134	36%
Religion		
Christian	242	65.0%
Muslim	121	32.5%
Traditional	8	2.1%
Others	1	0.4%
Ethnicity		
Yoruba	323	86.7%
Igbo	23	6.3%
Hausa	12	3.3%
Others	14	3.8%

Table 2: Occupational Hazard Exposures

	Variable	Frequency	Percentage
Have you ever had a needle prick injury in the course of discharging your duty as a police officer?	Yes	41	11
	No	331	89
Occurrences that exposes to prick injury	during pat-down searches	10	2.7
	searches of property	14	3.8
	searches of vehicles	9	2.5
	Others	8	2.1
	None	331	89
How many times has needle prick injury occurred since you were employed	None	331	89
	1-2 time	31	8.3
	3-5	1	0.4
	More than 5	9	2.4
Was it ever reported	Yes	23	6.2
	No	18	4.8
	not applicable	331	89
To whom was it reported to	None	6	2.2
	Superior officer	24	6.5
	Medical officer	11	4.1
	Not Applicable	331	89
What were the steps taken	None	33	8.9
	Visit the Hospital	8	2.2
Other scenes that expose you to contact with blood or human body fluid in the course of duty	Human-Bite	40	10.8
	Wound on a suspect	175	47.1
	Spitting	34	9.2
	None	122	32.9

step of visiting the hospital to report the incidence while 33(8.9%) that had needle prick injuries did nothing. Majority 175(47.1%) responded that wounds on suspects exposed them to contact with blood or human body fluids in the course of duty.

Table 3 shows knowledge of hepatitis B infection among police officers in Osun State. Majority of the respondents knew of the route of transmission, means of prevention and protection by vaccination. Table 4 shows the preventive practices for Hepatitis B infection among respondents. The table shows that about one third wear gloves when contact with blood is anticipated, wear goggles when eye contact with a body fluid such as spitted saliva is anticipated, and always had an

educational section on hepatitis B prevention in the last 3 years. However, about one third also said gloves were never available to prevent body fluid contact within the station; never wore ordinary gloves when going out for a search patrol; never wore needle-resistant gloves when going out for a search patrol; never wore gloves when contact with a non-intact skin is envisaged, and never changed gloves for each suspect after interrogation. Only 107(28.7%) of the respondents occasionally screen for Hepatitis B Virus infection.

Table 5 shows that there is a relationship between the knowledge of Hepatitis B viral

Table 3: Knowledge of Hepatitis B infection among police officers

		Yes	No
		F (%)	F (%)
Hepatitis B Virus is the most contagious organism		298 (80.0)	74 (20.0)
Hepatitis B can be transmitted through	Contact between infected blood and an open wound or broken skin."	284 (76.3)	88 (23.8)
	Injury from contaminated sharps or needle sticks	274(73.8)	98(26.3)
	Sexual intercourse with the infected person	291(78.3%)	81 (21.7)
	Holding of hands of an infected person	194 (52.1)	178 (47.9)
Hepatitis B Viral infection is common among	Criminals	220(59.2)	152(40.8)
	People who inject drugs	209(56.3)	163(43.8)
	Individuals with multiple sexual partners	276(74.2)	96(25.8)
Hepatitis B Virus transmission can be prevented through	Frequent hand hygiene with soap and water when hands are soiled	172(71.7)	68(28.3)
	Hand hygiene with Alcohol base sanitizer when hands are soiled	267(83.8)	105(16.3)
	Wearing of needle-resistant gloves for search patrol	291(78.3)	81(21.7)
	Wearing ordinary gloves for a search patrol	215(57.9)	157(42.1)
	Wearing gloves when there is a risk of exposure to blood or body fluids	270(72.5)	102(27.5)
	Vaccination against hepatitis B infection	326(87.5)	46(12.5)
Vaccination against Hepatitis B confers lifelong protection against Hepatitis B infection on the vaccinated		280(75.4)	92(24.6)
People infected with hepatitis B for a long time are at increased risk of	Liver damage	301(80.8)	71(19.2)
	Liver cancer	280(75.4)	92(24.6)
	Death	305(82.1)	67(17.9)
Many people with chronic hepatitis B	May not experience symptoms for years	235(63.3)	137(36.7)
	May present with a yellowish eyeball	157(42.1)	215(57.9)
Is Hepatitis B curable?		231(62.1)	141(37.9)
Hepatitis B virus can survive in blood/ body fluid stain for as long as 6 months		228(61.3)	144(38.8)

prevention and its preventive practices among the respondents with a p-value< 0.034. Figure 1 shows the Hepatitis B immunization status of respondents; majority 324(87%) had not

been immunized against Hepatitis B. Out of the 13% that were vaccinated, 5% of the respondents had received one dose, 6 % had received two doses and only 2% of respondents received three doses.

Table 4: Preventive Practices of Hepatitis B Infection among Respondents

	Never	Rarely	Occasionally	Always	Frequently
	F (%)	F (%)	F (%)	F (%)	F (%)
I wear gloves when contact with blood is anticipated	63(17.1)	53(14.2)	93(25.0)	114(30.8)	48(12.9)
I wear goggles to avoid splashing of blood or body fluids into my eye during suspect interrogation	77(20.8)	59(15.8)	77(20.8)	126 (33.8)	33(8.8)
I wear needle-resistant gloves when going out for a search patrol	138(37.1)	61(16.3)	71(19.2)	71(19.2)	31(8.3)
I ensure that a single pair of gloves is not used for multiple suspect interrogations if there is any exposure to blood."	147(39.6)	56(15.0)	53(14.2)	94(25.4)	21(5.8)
I wash my hands with soap and water after contact with blood and body fluids	31(8.3)	26(7.1)	85(22.9)	163(43.8)	66(17.9)
I clean my hands with alcohol base sanitizer after contact with blood and body fluids	23(6.3)	26(7.1)	96(25.8)	174(46.7)	53(14.2)
I disinfect surfaces stained with blood immediately.	49(13.3)	57(15.4)	112(30.0)	132(35.4)	21(5.8)

Table 5: Relationship between Knowledge of Hepatitis B viral infection prevention and preventive practices among respondents

Variables	Preventive practices				Chi-square	Df	p-value
Knowledge	Poor	Moderate	Good	Total			
Poor	4(19.04)	25(16.6)	57.4()	53(14.2)			
Moderate	4(19.04)	50(33.1)	14(20.6)	105(28.3)			
Good	13(61.9)	76(50.3)	49(72.0)	214(57.5)			
Total	21(8.8)	151(62.9)	68(28.3)	372(100)	10.413 ^a	4	.034

Figure 2 shows the overall knowledge of hepatitis B prevention among respondents with 58% (216) of the respondents having good knowledge. The overall level of preventive practices of hepatitis B infection among respondents is shown in figure 3. The figure shows that the vast majority of the respondents 63% had fair preventive practices against hepatitis B virus.

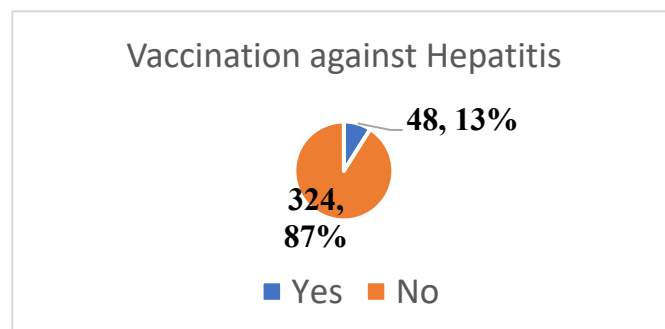


Figure 1: Respondent's Hepatitis B immunization status

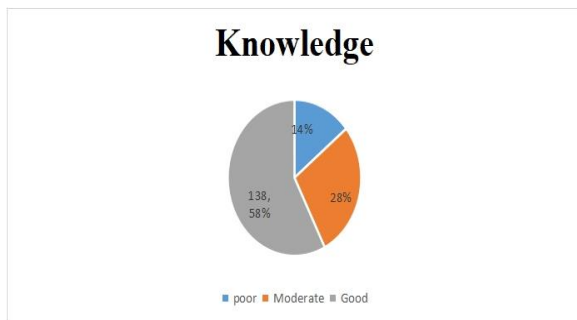


Figure 2: Overall knowledge of Hepatitis B prevention among respondents

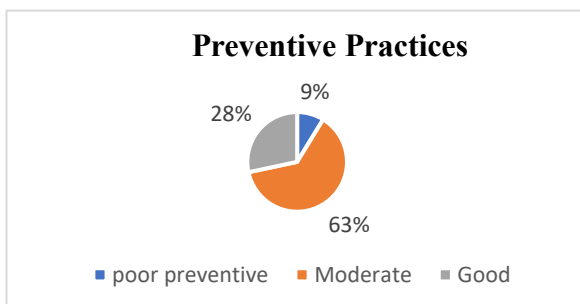


Figure 3: Preventive Practices of Hepatitis B Infection among Respondents

DISCUSSION

The study showed most respondents were in the age range of 26 to 32 years, a key demographic parameter for productivity in any sector. The study findings also show that more than 50% of respondents did not have spouses due to being single, divorced, widowed, or separated. These findings further showed that individuals engaged in a highly stressful professions such as security personnel often face challenges in maintaining a long-term relationship.

Most respondents generally had good knowledge of hepatitis B infection with 80% possessing knowledge about its contagious nature and various transmission routes. The majority correctly identified common transmission pathways, such as accidental blood contact, exposure through injured skin, contact with body fluids like saliva, urine, and sweat, sexual contact with an infected person, perinatal transmission, needle-stick injuries, and the sharing of sharp objects. Interestingly, while there was a clear understanding of the

major transmission routes, there was a misconception among nearly half of the respondents who believed that sharing cups and plates with infected persons is a risk, despite hepatitis B not being transmitted through casual contacts like this.

Respondents also demonstrated good knowledge of hepatitis B risk factors, with many indicating that infection is common among people who practice tattooing, inject drugs, or have multiple sexual partners. This finding is similar to the findings of Smith et al.⁴ who reported a high level of knowledge about hepatitis B among police officers, though it contrasts with Kolgelier et al.¹² who found a 12.3% knowledge level among respondents.

The study further showed that only 13% of the respondents had received at least one dose of the hepatitis B vaccine with only 2% being fully vaccinated. This implies that 98% of the respondents performed their duties without adequate protection from hepatitis B. This data underscores a significant gap in hepatitis B vaccination coverage among police officers, leaving the vast majority at risk of infection, particularly given their potential exposure to blood borne pathogens. The lower vaccination rate compared to the Federal Road Safety Corps, another group of public safety officers, as observed in the study by Ochu and Beynon), suggested that occupational exposure risk may influence vaccination uptake.¹⁴ Given that Federal Road Safety Corps officers regularly engage with accident victims and may thus encounter blood and body fluids more frequently, they might perceive a higher personal risk and consequently prioritize vaccination. This disparity highlights the need for targeted education and vaccination programs, particularly for groups with perceived lower exposure risks but who nonetheless face a concerning level of exposure to hepatitis B risk due to occupational hazards.

Specifically, 11% of the respondents experienced needle-stick injuries during property searches, directly increasing their vulnerability to blood-borne infections. Additionally, nearly half (47.1%) reported

direct contact with blood from suspects, further heightening their risk. These findings emphasize the urgent need for comprehensive safety protocols, such as mandatory hepatitis B vaccinations, and rigorous training on safe handling of interrogation equipment. Ensuring these measures could help significantly reduce the risk of transmission and improve overall occupational safety for police officers.

The pieces of evidence revealed by this study present a mixed picture of compliance with hepatitis B preventive practices and a significant gap in protective behaviors and resource availability. A substantial number of respondents do not wear gloves when anticipating contact with blood and 32.5% reported ever receiving educational sessions on hepatitis B prevention in the past three years. Hand hygiene practices also varied, with less than half washing hands with soap and water, and using alcohol-based sanitizer after contact with blood and body fluids. This indicates an unsatisfactory level of adherence with hand hygiene protocols.

Routine cleaning protocols seem to be somewhat better established, as about half call for thorough cleaning of interrogation areas and equipment after each use. Disinfection practices are somewhat less consistent and about two-fifths of respondents reported occasional hepatitis B screening among officers, suggesting a crucial need for more frequent and structured health monitoring. Overall, while knowledge and some preventive practices are in place, limited resources, inconsistent glove usage, and gaps in routine screening and disinfection represent areas needing attention for better hepatitis B protection and infection control.

This study showed that there was significant association knowledge of Hepatitis B viral infection prevention and preventive practices among respondents. This is in agreement with different studies done by Norman and Singh in which the authors concluded that adequate knowledge can lead to good practice.^{16,17}

CONCLUSION

This study has shown the need for interventions and continuous health education regarding hepatitis B in order to improve vaccination coverage, hazard mitigation, and adherence to preventive practices among police officers in Osun State.

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