

# Seroprevalence of Viral Hepatitis (B and/or C) Among Health Care Workers (HCWs) in Federal Medical Center Jalingo

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## ABSTRACT

Health care workers are at risk population to viral hepatitis infection due to constant exposure to the source of infectious agent. This study aimed to determine the statuses of hepatitis B and C viral infections as both single and/or co-infection among HCWs in a bid to determine the level of endemicity of both viral infections for the study group as well as add to the burden of knowledge available for viral hepatitis. The population of the study included HCWs at Federal Medical Center, Jalingo. The sample size was calculated using Cochran's formula for determining sample size. Ethical clearance was obtained from the hospital management. Demographic data as well as blood samples were collected between December 2018- May 2019 from patients who met the inclusion criteria and willingly agreed to participate. Viral hepatitis tests were carried out using rapid diagnostic kits as described by the manufacture. Data collected were entered into Microsoft Excel 2016 and moved to statistical package for social science (SPSS) version 25 and R for analysis. Out of the 160 participants, 5.60% and 10.60% were found to be positive for HBV and HCV respectively. Only 0.6% of the entire population were found to be co-infected with both HBV and HCV. Participants within the age bracket of 18-34 were found to have the highest prevalence of both the viruses. Male participants had the highest prevalence for HCV as the female had the highest for HBV. The findings of this study confirms that HCWs are at risk population to viral hepatitis infection with intermediate and high prevalence being reported for HBV and HCV positivity respectively, though several other factors including

vaccination, knowledge, attitude and practices towards the viral infection by the participants might have played pivotal role in the endemicity.

**Key words:** health care workers; seroprevalence; hepatitis B virus; hepatitis C virus.

## INTRODUCTION

Viral hepatitis is an inflammation of the liver caused by a group of unrelated hepatotropic viruses (hepatitis A, B, C, D, and E) belonging to the family Hepatoviridae with unrelated modes of transmission. [1] Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) are still the most virulent strain of the hepatitis viruses and remains worldwide public health challenge [2] associated with viral hepatitis mortality and morbidity. [1] [3] reported that more than 250 million and 70 million people are estimated to be chronically infected with HBV and HCV respectively. Both infections account for 60% of cirrhosis and 80% of hepatocellular carcinoma. [4] In Nigeria, several prevalence figures have been reported for hepatitis B viral infection among different study groups and populations. For the general populace, 10%-15%, among surgeons 25.7%, voluntary blood donors 2.9%, infants 16.3%, and 12.3% for HIV patients. Reports for hepatitis C infections in Nigeria gave the following prevalence rate. About 2.1% for the general population, 12.3% for adult blood donors, 5% for sickle cell anemia

patients, and 11% for doctors and dentists. [5] Several risk factors have been associated with the acquisition of both viruses hence the variation in the prevalence of the infection in the different group/population. These risk factors include multiple sexual partners, sharing of sharps and drawing tattoos, unscreened blood transfusion, undertaking health procedures that require invasive techniques and several other sociocultural practices. [5] Healthcare profession is also part of risk factors due to exposure to blood and blood materials, accidents due to needle puncture and other sharp tools during work such as testing common tropical diseases which has high prevalence in the region. [6] Also, health care workers (HCW) in developing nations Nigeria inclusive are at high risk of viral infections like viral hepatitis due to the high prevalence of the diseases in such countries. [7] In addition to that, HBV and HCV have been recognized as common causes of occupational diseases transmitted from patients to HCWs and vice versa [8] as such, viral hepatitis have been recognized as an occupational hazard for nearly 50 years. [9]

Being amongst the high risk groups, coupled with the scarce studies on the prevalence of viral hepatitis among HCW, this population deserves serious attention in the form of regular screening of viral hepatitis statuses as this will go a long way in curtailing the chronic infection caused by the viruses whose natural course leads to liver cirrhosis, liver failure, and/or hepatocellular carcinoma in affected patients [10] thereby protecting the weak work force of the health industry of the country. Thus, this study aimed to determine the statuses of hepatitis B and C viral infections as both single and/or co-infection among health care workers in a bid to determine the level of endemicity of both viral infections for the study group as well as add to the burden of knowledge available for viral hepatitis.

## METHODOLOGY

### Study Design

This was a hospital based cross-sectional study conducted among HCWs at Federal Medical Center, Jalingo (FMCJ) located in Taraba State-Nigeria.

### Population of the Study

The population of the study included HCWs at Federal Medical Center, Jalingo.

### Sample size

The sample size was calculated using Cochran's formula for determining sample size. The formula is given by

$$n = \frac{z^2 pq}{e^2}$$

Where

n= is the sample size

p= is the estimated population proportion (0.90)

q= 1-p (0.10)

e= is the desired level of precision (0.05)

$$\text{Therefore, } n = \frac{(1.96)^2 \times 0.90 \times 0.10}{(0.05)^2} = 138$$

Hence, minimum sample size calculated was 138, but approximately 160 (after adding for non responders and % for factors to be studied)

### Data collection

Data collection was carried out between December 2018-May 2019 at Federal Medical Center, Jalingo-Taraba State. HCWs of FMCJ who fulfilled the inclusion criteria and agreed to willingly participate in the study were recruited until the target sample size was reached. Demographic variables like age and sex were obtained from the participants via oral interview.

### Data Quality Assurance

Before the commencement of data collection, the research team set aside a day for orientation to facilitators and blood sample collectors to ensure a common understanding of the tool and methods of data collection. During the study, collected

data were sorted and checked for errors and completeness. Overall data collection activities were supervised by the research team. For laboratory data, specimen quality was checked.

### Ethical clearance

The ethical clearance was obtained from the FMCJ ethical committee. A letter of permission was submitted to the Federal Medical Center administration body. The purpose and objectives of the study was explained to each study participants (HCWs). The participants were informed that there are interviews and blood sample collection for HBV and HCV screening. Written informed consent for participation was obtained from each study participant. The participation in the study was on a voluntary basis.

Participants were ensured that all data collected would be used only for the purpose of the research. Test results were kept confidential by using unique codes given to each study participant (HCW). All participants were informed of the result and those with a positive result were counseled and referred accordingly.

### Data Collection Plan

A designed template that captures socio-demographic characteristics and the key dependent variables such as HCWs hepatitis B or C virus status were also captured. Data collection from HCWs was facilitated by well trained staff of Hepatitis Counselling and Testing (HCT) department, Center for Initiative and Development (CFID) in Taraba state.

### Laboratory analysis

The blood samples collected in plain container were centrifuged at 1500 rpm for

15 min to separate the serum from the blood. The serum was used to screen for HBsAg and anti-HCV.

### HBsAg and HCV screening

The screening of HBV and HCV were performed using HBsAg and anti-HCV Rapid diagnostic test strip. A drop of the serum (10µl) was dropped on the test strip with a disposable pipette and a buffer solution was added to the blood on the strip immediately and allowed for ten minutes following manufacturer's instruction. Result was read after 5 to 10 minutes following the manufacturer's guide. For seropositive samples, two lines appeared on the control and test region while only one line at the control region appears for sero-negative samples respectively.

### Statistical analysis

Data collected were entered into Microsoft Excel 2016 and moved to statistical package for social science (SPSS) version 25 and R for analysis. The seroprevalence of HBV and HCV infection was analyzed and presented using descriptive statistics such as percentages, cross-tabulations, charts and graphs while Fisher's exact test was used to explore test of association between the variables. A 95% confidence interval for odd ratio was used, while a p-value of less than 0.05 was considered as statistically significant

## RESULTS

Table 1: Sex and Age distribution of participants (HCWs)

Variables	Categories	No. Of Participants	Percentage (%)
Gender	Male	84	52.5%
	Female	76	47.5%
Age Categories	18-34	69	43.1%
	35-51	71	44.4%
	52-68	16	10%
	69+	4	2.5%

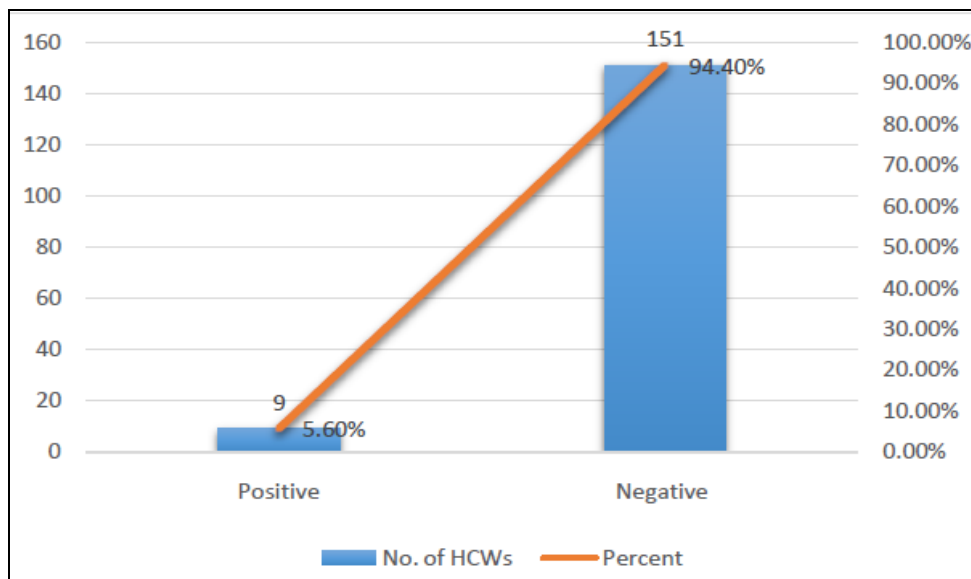
Table 2: Hepatitis B Status of Participants with their respective probability values

Variables		HBsAg		Total	Odd Ratio	C.I	P-Value
		Positive	Negative				
Gender	Male	4 (2.5%)	80(50%)	84	0.712	0.136-3.448	0.737
	Female	5(3.1%)	71(44.4%)	76			
Age Categories	18-34	6(3.8%)	63(39.4)	69			0.106
	35-51	2(1.3%)	69(43.1%)	71			
	52-68	0	16(10%)	16			
	69+	1(0.6%)	3(1.9%)	4			

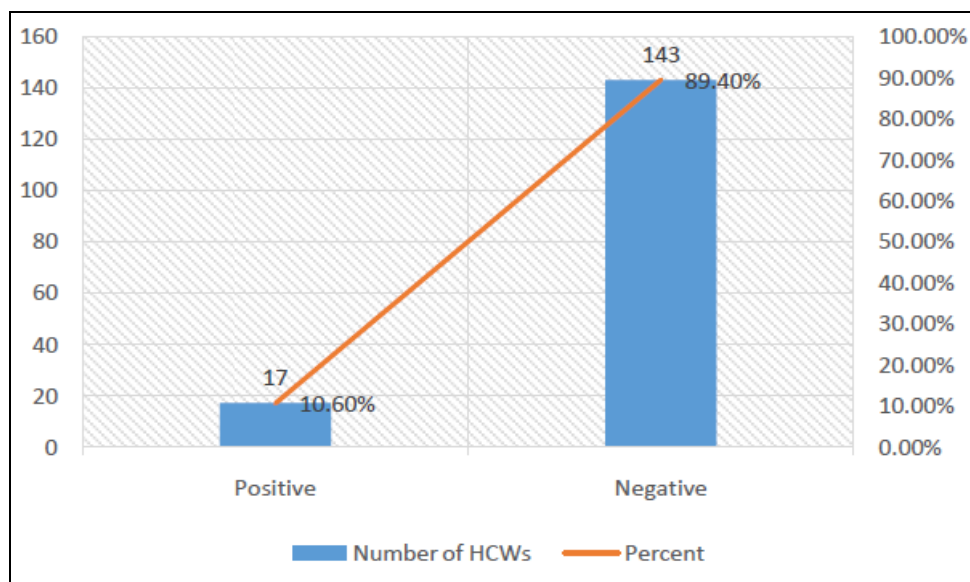
Key: O.R odd ratio, C.I. Confidence interval, P-Value Probability value

**Table 3: Hepatitis C virus Status of Participants with their respective probability values**

Variables		Anti-HCV		Total	Odd Ratio	C.I	P-Value
		Positive	Negative				
Gender	Male	10(6.3%)	74(46.3%)	84	1.3297	0.429-4.362	0.618
	Female	7(4.4%)	69(43.1%)	76			
Age Categories	18-34	7(4.4%)	62(38.8%)	69			0.075
	35-51	7(4.4%)	64(40%)	71			
	52-68	1(0.6%)	15(9.4%)	16			
	69+	2(1.3%)	2(1.3%)	4			
HBsAg	Positive	1(0.6%)	8(5.0%)	9	1.054	0.02-8.788	0.961
	Negative	16(10%)	135(84.4%)	151			



**Fig. 1: Hepatitis B virus status among participants (HCWs)**



**Fig. 2: Hepatitis C status among HCWs**

## RESULTS

A total of 160 HCWs participated in the study out of which, 84(52.5%) were male while 76(47.5%) were female. 43.1% of the HCWs were in the age range 18-34 years, 44.4% were between age 35-51 years, 10% were between age 52-68 years while

the remaining 2.5% were above 69 years as shown in Table 1. Results of Hepatitis B screening among HCWs over the period under review are as shown in Figure 1. Out of the 160 samples screened among the HCWs, 9 were reactive to HBsAg, representing an overall prevalence rate of

5.6% while 151(94.40%) were not reactive to HBsAg. 4(2.5%) of the 84 male HCWs were reactive to HBsAg while 5(3.1%) of the 76 female HCWs were reactive to HBsAg as shown in Table 2. Table 2 also showed the distribution of HBV carriers according to age, those within the age group 18-34 years tend to have highest percentage of 6(3.8%) positivity followed by those between the age range of 35-51 years who were 71 in number and had 2 positive cases giving a percentage of 1.3% among that age group. The age group 52-68 years had no positivity case while 69 years and above had just 1 case representing 0.6% prevalence rate. Table 2 also showed the distribution of Hepatitis B virus status in relation to gender and age groups of HCWs. Table 2 also showed that HCWs age and gender were not statistically associated with being positive to HBsAg (OR=0.712(0.136-3.448), P-value 0.737 and P-value of 0.106) respectively. Also, Results of Anti-Hepatitis C screening among HCWs are presented Figure 2. Out of the 160 samples screened among the HCWs for Anti-HCV, 17 were reactive to Anti-HCV, representing an overall prevalence rate of 10.6% while 143(89.40%) were not reactive to HCV. Table 3 Showed that 10(6.3%) of the 84 male HCWs were reactive to HCV while 7(4.4%) of the 76 female HCWs were reactive to HCV as shown in Table 3. Table 3 also showed the distribution of HCV carriers according to age, those within the age group 18-34 and 35-51 years have highest bracket percentage of 7(4.4%) and 7(4.4) HCV positivity cases respectively. The age group 69 years and above had 2(1.3%) positive cases, while the age group with least figure is the age group between the range of 52-68 years who were 71 in number and had just 1 positive case giving a percentage of 0.6%. Furthermore, Table 3 also showed the distribution of Hepatitis C virus status in relation to gender and age groups of HCWs. Result from table 3 showed that HCWs sex were not statistically associated with being positive to HCV (OR=1.329 (0.429-4.362), P-value 0.618.

However, this implies that Male HCWs are 1.3 times more likely to react to anti-HCV compared to the female HCWs. The results of Age was not statistically significant (P=0.075). Finally, result from table 3 showed the prevalence rate of coinfection of HBV and HCV to be 1(0.6%) which was found to occur among female HCWs the summarized that HCWs who are positive to hepatitis B virus are 1.054 times more likely to also be positive to hepatitis C virus than the HCWs who are negative for HBV.

## DISCUSSIONS

Different studies carried out in different places amongst different populations have reported varying results on the seroprevalence of HBV and HCV. Health care workers is one of the population of concern in the studies of viral hepatitis as they are exposed to reservoirs of the infectious agents, thence fall among the at risk populations. In this study, 9(5.6%) figure 1. of the total population of the study (160) tested positive for HBV which is considered as intermediate endemicity according to WHO classification of the prevalence of HBV infection. <sup>[11]</sup> This level of prevalence might be due to the population under consideration as they are among the educated and informed people regarding viral hepatitis consequently there is good overall knowledge of HBV and standard precautions and positive attitude towards standard precautions, they most have received vaccinations against viral hepatitis being key players in the area of vaccination, availability of post exposure prophylaxis and or effectiveness of the hospitals infectious disease prevention protocol. The finding of this study though relatively higher but comparable with 2.5% (6/240) among health care workers in Ethiopia reported by, <sup>[9]</sup> 4.4% reported among healthcare workers in Khartoum, Sudan, <sup>[12]</sup> and 2.9% reported among healthcare workers of a tertiary hospital in Rwanda. <sup>[13]</sup> However, it was lower than the prevalence of 7.3% reported among healthcare workers of Bule Hora Woreda,

Southern Ethiopia, [14] 8.7% reported among healthcare workers of the Najran region, South western Saudi Arabia, [15] 8.1% reported among healthcare workers of a tertiary hospital in Uganda [16] and 7.0% reported among healthcare workers of a tertiary hospital in Tanzania. [17] On the other hand, it was higher than the 1.0% and 0.4% prevalence reported among healthcare workers of a tertiary care hospital in India. [18] This could be because of the differences in regional endemicity, differences in the level of knowledge of HBV and standard precautions and attitude and practice of standard precautions and occupational exposure.

Out of the one hundred and sixty (160) participants, 17(10.60%) were found to be positive for HCV Figure 2. Which is considered high prevalence according to [19] classification of HCV endemicity. This may be due to the nature of means of transmission of the HCV which is mostly transmitted parenterally in adulthood by intravenous drug use, blood transfusion, or medically related parenteral exposures, but rarely through the placenta, breastfeeding, or sexual contact [9] lack of vaccine for HCV, [20] endemicity of HCV in the region [21] among others. The findings of this study with 10.60% prevalence was found to be higher than the 0.42% reported by [9] in the southwestern region of Ethiopia; 0% prevalence reported by; [15] in the Najran region, Southwestern Saudi Arabia, and 1.3% in Rwanda all in the same study population.

The prevalence of HBV 5.60% was found to be lower than 10.60% HCV prevalence reported in the study. This contradicts the findings of [9] Whose finding reported higher HBV 2.5% to 0.42% HCV in similar studies carried out in Ethiopia. Comparing the relationship of HBV and HCV amongst the population under consideration, no statistically significant difference ( $P=0.961$ ; OR 1.051(0.02-8.788)) was observed in the prevalence of the two viruses. The lack of statistical difference ( $P>0.05$ ) reported between the two viral

infection might be due to similar trend recorded in the general population in the region. However, only 0.6% (1) of the population was found to be co-infected with the viruses comparable to 0% reported by [9] in a similar studies which may also be due to similar trend of co-infection recorded in the general population.

Variations in the prevalence of these viruses across gender have been reported in literatures. In the present studies, 4(2.5%) of the male population were positive for HBV while 10(6.3%) were positive for HCV. Among the female population 5(3.1%) were found to be positive for HCV while 7(4.4%) were positive for HCV. The higher percentage of females to males positive for HBV reported in this study agrees with the report of [22] on similar study among students who reported 6.1% among females and 2.9% among males. However, this study could not provide a valid explanation for the reasons in variation of the infections across the gender.

The epidemiology of both HBV table 2 and HCV table 3. across age groups were found to be highest amongst the younger population of age group 18- 34 and decreases with age which agrees with the reports of [9] in a similar population and the reports of [22] on similar study among students. This might be due to their higher proportion in the general population coupled with high sexual activity associated with youthful age. [22]

## CONCLUSION

The findings of this study confirms that health care workers are at risk population to viral hepatitis infection with intermediate and high prevalence being reported for HBV and HCV positivity respectively, though several other factors including vaccination, knowledge, attitude and practices towards the viral infection by the participants might have played pivotal role in the endemicity. It is therefore recommended that healthcare workers should be routinely examined for the viral infection and post exposure prophylaxis be

administered when due. It is also recommended that more independent variables should be considered in similar studies as they are essential in making inferences and drawing conclusions.

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