

## Hbsag and Anti-Hcv Prevalence among Apparently Healthy Population in Central Nigeria: A Pilot Study

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## Abstract

Viral hepatitis is a serious public health problem affecting billions of people globally. There is dearth of published information on HBV and HCV infections among apparently healthy population in Central Nigeria. This pilot study was aimed at determining HBsAg and anti-HCV prevalence among apparently healthy population in Central Nigeria. After ethical clearance, blood samples were aseptically collected from 400 recruited apparently healthy persons who gave informed consent and interviewed orally. The samples were centrifuged and screened for HBsAg and anti-HCV using the immunochromatographic technique (One step strips, Zhejiang Orient Gene Biotech Ltd, China). Chi square statistical test (Smith's Statistical Package version 2.80, Claremont, California, USA) was carried out to determine possible association with risk factors studied. A general prevalence of infection with Hepatitis B and C viruses in the study population was 36 (9.0%). The prevalence of HBV infection was 5.5% while HCV infection was 3.5%. The viral infections did not show any statistically significant association with studied risk factors, although, there was arithmetic differences between the studied risk factors ( $p > 0.05$ ). This study revealed an intermediate HBV prevalence and low prevalence of HCV in apparently healthy population at community level. Therefore, health awareness on the transmission of these viral agents should be an intervention strategy in the area.

## Keywords

Prevalence; HBsAg; Anti-HCV; Apparently Healthy Population; Nigeria

## Introduction

Hepatitis B Virus (HBV) is a double-stranded circular DNA virus of complex structure, classified as an Orthohepadnavirus in the family *Hepadnaviridae* while Hepatitis C Virus (HCV) is a single stranded linear ssRNA virus in the family *Flaviviridae* [1]. It has multiple genotypes [1]. Hepatitis B and C viruses are among the principal causes of severe liver disease, including Hepatocellular Carcinoma (HCC) and cirrhosis-related end-stage liver disease [2,3]. The World Health Organization (WHO) has estimated that there are 360 million chronically HBV infected people and 5.7 million HBV-related cases worldwide [3]. HBV is highly infectious and transmitted mainly via blood, body-fluid contact, and vertical transmission [4]. The HBsAg in serum is the first seromarker to which shows acute or chronic active HBV infection. The hepatitis B vaccine had been available since 1982 and has being highly efficient in the prevention of HBV transmission and has brought about remarkable changes in the global epidemiology of HBV infection [3,5]. HCV infection is also common worldwide [6]. Its transmission routes are similar to HBV and it is estimated that about 3% of the world's population is infected with HCV, with about 4 million new infections annually. Hepatitis C generally shows no symptoms, with an 80 % chance of progression to persistent infection [3,7]. Chronic HCV infection progresses at a variable rate to cirrhosis in 15 to 20 % of patients, who then have a 1 to 4 % annual risk of developing hepatocellular carcinoma in 20–30 years [7,8]. Infections with HBV and HCV in the same host range from 9% to 30% with respect to geographic region [3,9]. These percentages may underscore the true number of people with HBV/HCV infection as there is a well-known entity of occult HBV infection in population with chronic hepatitis C [9,10]. Individuals with both HBV and HCV infections show a large spectrum of virologic profiles. The presence of HCV infection may reduce HBV life cycle and it has been reported that HBV/HCV coinfecting population have lower HBV DNA levels, reduced activity of HBV DNA polymerase, and reduced expression of HBsAg and hepatitis B core antigen in the liver [11,12]. Moreover, those persons with chronic HBV infection who become superinfected with HCV may undergo seroconversion of HBsAg. Several studies have reported that HBV can reciprocally inhibit HCV replication as well [13]. Specifically, HBV DNA replication has been reported to correlate with reduced HCV RNA levels in coinfecting persons [2,14]. Thus, HBV or HCV can play role in inhibiting each other concurrently and overlapping their dominance. Both viral agents are capable of inducing seroconversion of the other [5]. However, there is paucity of published data

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on these viral infections among apparently healthy population in Nigeria. In view of the aforementioned, this pilot study became imperative to determine HBsAg and anti-HCV prevalence among apparently healthy population in Central Nigeria.

## Materials and Methods

### Study Area and Population

This study was carried out in Akwanga, Nasarawa State. It is more than 100 Km away from Abuja the Federal Capital Territory in the Guinea Savannah region. Akwanga is located between latitude 8°55'0" N and longitude 8°23'0" E and has an area of 996 Km<sup>2</sup> [15].

The study was carried out among 400 apparently healthy individuals in Akwanga who agreed to participate in the study. A representative sample size was determined using the formula propounded by Naing, [16]. Permission was sought from parents/guardians of participants below 18 years. Their sociodemographic information was obtained by use of oral interview prior sample collection.

### Sample Collection

Three ml of blood sample was collected from each participant by venipuncture into a labeled plain tube. This was allowed to clot at room temperature and spun for 5 minutes at 3,000 rpm. The resultant sera were harvested into well labeled cryovials and stored at -20°C until ready for use.

## Laboratory Assay

### HBsAg Detection

A rapid chromatographic immunoassay which is a qualitative sandwich test was used for screening the sera for HBsAg. The test kit (HBsAg one step strips, Zhejiang Orient Gene Biotech Ltd, China) utilizes a combination of monoclonal and polyclonal antibodies to detect HBsAg in serum. The test procedure and result interpretation were carried out according to the manufacturer's instructions.

### Anti-HCV Detection

A rapid chromatographic immunoassay kit (HCV one step strip, Zhejiang Orient Gene Biotech Ltd, China) was used for the detection of anti-HCV in serum. This kit uses recombinant proteins and synthesized peptides derived from core and structural regions of HCV for the detection of anti-HCV in serum. The test procedure and result interpretation were carried out according to the manufacturer's instructions.

### Statistical Analysis

The data obtained were subjected to descriptive statistical analysis using Smith's Statistical Package (SSP version 2.80, Claremont, California, USA). Chi-square statistical test was used to determine associations and coinfections. Values obtained were considered statistically significant at  $P \leq 0.05$ .

## Results

Four hundred apparently healthy individuals were recruited for this study. Among them were 174 (43.5%) males and 226 (56.5%) females. The overall prevalence of hepatitis in these individuals was 36 (9.0%). The prevalence of HBsAg was 22(5.5%) while anti-HCV was 14(3.5%). Males and females had higher infection rates for HBV and HCV respectively ( $p > 0.05$ ). HBsAg was highest among those aged 21-30 years and 31-40 years (7.0%) and lowest among those aged less than 10 years (0.00%). Anti-HCV was highest among those aged 11-20 years (11.1%) and least among those aged >41 years (0.00%). The prevalence of HBV and HCV infections in relation to marital status, occupation, educational status, alcohol consumption and smoking habit did not show any statistically significant association ( $p > 0.05$ ) (Table 1).

## Discussion

Checking persons without symptoms is significant in detecting disease and quick intervention of silent killers like HBV and HCV

infections. This study was aimed to determine the prevalence and associated risk factors of HBsAg and anti - HCV antibodies among apparently healthy population in Central Nigeria.

The seroprevalence of hepatitis carriage among participants in this study was 36 (9.0%). This is higher than findings of Dawurung et al. in Maiduguri who reported 8.5% among students of a University but lower than findings of 14.8% among Health care workers in Ondo, 26.6% among people of a local community in Keffi, 12.8% among blood donors in Sudan, 46% among patients in Mongolia and 28.83% in a rural population in Pakistan [2,5,9,10,12,17]. These differences might not be unconnected with the fact that some of the studies were not from the same study population and geographical variation.

HBsAg the seromarker used for HBV detection in this study was found in 22 (5.5%) of the apparently healthy persons. This prevalence is higher than findings of 4.5% among students of a University in Maiduguri but lower than reports of 13.3% in Keffi, 6.7% in Ondo, 12.0% among population in Benue [2,12,17,18]. Reports from other countries found 40.7% among patients in Mongolia, 9.3% among blood donors in Sudan, 9% among internally displaced persons of war in Pakistan, 4.3% among adult female population in Pakistan, 3.5% among general healthy population in Pakistan [5,9,19,20].

These differences in prevalence might be as a result of the difference in study group, geographical variability especially as it affects socio-cultural practices, endemicity of the viruses and sensitivity of method used for testing. The relatively high rate reported in this study is very likely to be a reflection of their low uptake of HBV vaccine in the area. Worthy of note is also the fact that the prevalence recorded in this study did not account for occult HBV infection which is often found in HBsAg negative patients.

Similarly, the anti-HCV prevalence in this study was 14 (3.5%). This is similar to the reports of 3.5% among blood donors in Sudan but lower than the findings of 8.1% among Health care workers in Ondo, 13.3% among a local community in Keffi, 4.0% among students of a university in Maiduguri [2,9,12,17]. Similar studies from other countries recorded higher rates than the present study. It was 5.3% among patients in Mongolia, 13.8% among a general healthy population in Pakistan, 22.68% among rural population in Pakistan, and 91% among internally displaced persons of war in Pakistan but it was lower than report of 0.05% among adult female population in Pakistan [5,10,19,20,21].

Several prevalence studies have found high HCV prevalence but with no apparent risk factors [1,4]. Differences in the prevalence of HCV in this study may reflect the difference in its geographical distribution, the methodologies and clinical setting of subjects as well as the different sensitivities of tests employed.

On the whole, the prevalence of HBV and HCV in the study population might be a reflection of the infections in their community and thus suggesting that the risk of predisposition to infection is similar for every member of their community.

Gender was not found to be associated with the viral prevalence ( $p > 0.05$ ). HBsAg seropositivity was higher in male than female while anti-HCV seropositivity was higher in female than male. This agrees with the report of Pennap et al. in Keffi and Dawurung *et al.* in Maiduguri which reported statistically significant association between gender and the viral prevalence [12,17].

The reason for the higher HCV female predilection might be connected with the fact that females are traditionally more likely to have had ear piercings at infancy as well as native aesthetic scarifications hence enhancing the chance for HCV transmission especially as unsterilized sharp objects are often used for such protocol.

The age stratification in this study did not show any statistical significance in age specific prevalence. HBsAg and anti-HCV were detected highest among subjects aged 21-40 years and 11-20 years old respectively. This was in consonance with a study in Maiduguri and Sudan, although among a different study population rather than what is used for this study [9,17]. This might be suggestive to some vertical transmission and being sexually active which could enhance

| Risk factors        | Number Examined | Number Positive |         |             |         |
|---------------------|-----------------|-----------------|---------|-------------|---------|
|                     |                 | HBsAg (%)       | p value | Anti-HCV(%) | p value |
| Gender              |                 |                 |         |             |         |
| Male                | 174             | 12(6.9)         | 0.4725  | 6 (3.4)     | 0.9731  |
| Female              | 226             | 10 (4.4)        |         | 8 (3.5)     |         |
| Age (Years)         |                 |                 |         |             |         |
| < 10                | 24              | 0 (0.0)         |         | 2 (8.3)     |         |
| 20-Nov              | 36              | 2 (5.5)         | 0.7688  | 4 (11.1)    |         |
| 21-30               | 172             | 12 (7.0)        |         | 6 (3.5)     | 0.2850  |
| 31-40               | 86              | 6(7.0)          |         | 2 (2.3)     |         |
| >41                 | 82              | 2 (2.4)         |         | 0 (0.0)     |         |
| Marital Status      |                 |                 |         |             |         |
| Single              | 178             | 6 (7.7)         | 0.5715  | 2 (2.6)     | 0.2436  |
| Married             | 322             | 16 (5.0)        |         | 12 (3.7)    |         |
| Occupation          |                 |                 |         |             |         |
| Students            | 76              | 8 (10.5)        |         | 6 (7.9)     |         |
| Civil servants      | 76              | 2 (2.6)         | 0.6706  | 2 (2.6)     |         |
| Artisans            | 100             | 4 (4.0)         |         | 2 (2.0)     | 0.6483  |
| Traders             | 68              | 4 (5.9)         |         | 2 (2.9)     |         |
| Farmers             | 80              | 4 (5.0)         |         | 2 (2.5)     |         |
| Educational Level   |                 |                 |         |             |         |
| Primary             | 96              | 0 (0.0)         |         | 2 (2.1)     |         |
| Secondary           | 48              | 4 (8.3)         |         | 2 (4.2)     |         |
| Tertiary            | 30              | 2 (6.7)         | 0.4723  | 0 (0.0)     | 0.8822  |
| Non formal          | 104             | 8 (7.7)         |         | 4 (3.8)     |         |
| None                | 122             | 8 (6.6)         |         | 6 (4.9)     |         |
| Alcohol consumption |                 |                 |         |             |         |
| Yes                 | 104             | 8 (7.7)         |         | 6 (5.8)     | 0.3209  |
| No                  | 296             | 14 (4.7)        | 0.4485  | 8 (2.7)     |         |
| Smoking Habit       |                 |                 |         |             |         |
| Yes                 | 48              | 4 (8.3)         | 0.5436  | 2 (4.2)     | 0.8552  |
| No                  | 352             | 18 (5.1)        |         | 12 (3.4)    |         |

**Table1:** Prevalence of HBsAg and Anti-HCV among apparently healthy population in Central Nigeria with respect to socio demographic variables studied.

their behavioral acts towards sex and related matters.

Marital status was not statistically significant with the viral infections ( $p > 0.05$ ). The viral agents were higher in singles for HBV and married for HCV. This report is in consonance with the findings of Philip and Oti which reported no statistically significant difference of marital status with the viral prevalence, although, it was on a different study group and the infections was higher among the divorcees [22]. The present study finding might be unconnected with the fact that both viruses are sexually transmitted and indulging in unprotected sex among the singles as they often have multiple sex partners could have enhanced the transmission of these viruses. It is documented that sero-epidemiological studies of different populations do show marked variations and differences [23].

The viral infections were not statistically associated with occupation of the individuals. Students recorded the highest prevalence of the infection with HBV and HCV. This finding was not in agreement with the reports of Elfaki *et al.* among blood donors in Sudan [9]. The student's population is vulnerable especially when it comes to transmission of these viral agents. They are found indulging in promiscuous and risky behaviors which necessitates spreading of the viruses. For example, engagement in unprotected sex, using sharp objects to pierce and tattoo their bodies, drug abuse and alcoholism etc.

In a related development, educational status was not significant statistically with viral infections ( $p > 0.05$ ). Those subjects with secondary education and without any form of education had the highest prevalence for HBV and HCV infection respectively. A similar

study in Sudan among blood donors reported similar finding [9]. Education has been acknowledged to be advantageous in various areas of life which include making first hand decision and also sourcing for the right information concerning health and its related issues on possible ways of avoiding infectious agents [1].

Alcohol consumption and smoking habit were not probable risk factors for the viral infections among the population ( $p > 0.05$ ). Although, Hepatitis B and C viral infections were higher among those that drink alcohol and smokes, it was not statistically significant. Alcohol consumption and smoking habit are known causes of hepatotoxicity and liver cirrhosis in chronic cases of hepatitis [11]. In a retrospective study carried out in Korea, it was reported that smoking increases the risk of alcohol consumption and viral hepatitis [24].

## Conclusion

The present study shows a relatively high prevalence of HBV (5.5%) and a low HCV (3.5%) prevalence among apparently healthy population in the study area as described by WHO standard. None of the risk factors studied were significantly associated with the viral infections. This burden of the viral agents is a call for alert especially as overlapping infection with these hepatotropic viruses exposes them to liver damage complications and also leads to an overlap of their pathogenicity with a consequent screening and management challenge to the health personnel. This therefore, necessitates the need for general health awareness and mass screening of persons at risk to define infected population and halt transmission of the viral agents.

## Limitations

HBV DNA by Polymerase Chain Reaction (PCR) was not done due to availability of the technology. This may have increased the prevalence of HBV and HCV in our study as it would allow early diagnosis of these viral agents before HBsAg and anti-HCV were detectable in serum. More so, capturing other areas will have given us the general prevalence of the infections in the state.

## Ethical Approval

In line with the Helsinki Declaration which specifies the code of ethics for biomedical research involving human subjects, clearance for this study was obtained from the Health Research Ethics Committee of Nasarawa State Ministry of Health, Nigeria.

## References

- Oti VB, Pennap GRI, Jibril SG. Seroprevalence and correlates of hepatitis B and C viruses among HIV infected children attending an antiretroviral therapy clinic in Keffi, Nigeria. *Adv Res Gastroenterol Hepatol*. 2017;8(2):555734
- Olorunfemi AO, Abimbola O, Babalola B, Isaac AA, Tolulope O, et al. Seroprevalence and knowledge of Hepatitis B and C among health care workers in a specialist Hospital in Nigeria. *Europ J Prev Med. Special Issue: Health care workers and globally emerging infectious diseases*. 2017;5(1):7-12
- World Health Organization. Global hepatitis report, 2017. 26 April 2017, Geneva, Switzerland.
- Pennap GR, Yahuza AJ, Abdulkarim ML, Oti VB. Prevalence of Hepatitis B and C viruses among human immunodeficiency virus infected children attending an antiretroviral therapy clinic in Lafia, Nigeria. *The Asia J Appl Micro*. 2016;3(4):38-43
- Baatarkhuu O, Uugantsetseg G, Munk-Orshikh D, Naranzul N, Badamjav S, et al. Viral hepatitis and liver diseases in Mongolia. *Euroas J Hepatogastroenterol*. 2017;7(1):68-72
- World Health Organization. Guidelines on Hepatitis B and C testing. 16 February 2017. Geneva, Switzerland.
- Riou J, Ahmed MA, Blake A, Vozlinsky S, Brichler S, et al. Hepatitis C virus seroprevalence in adults in Africa: a systematic review and meta-analysis. *JVH*. 2015;23(4):244-255
- Amira CO, Lesi OA. Seroprevalence of Hepatitis B and C infection among Nigerian subjects with chronic kidney disease. *J Clinic Sci*. 2017;14(2):58-61
- Elfaki AMH, Agab MA, Humida EHM, Eltalib KME, Elbedri YDH, et al. Seroprevalence of Hepatitis B and hepatitis C virus infection among Sudanese blood donors. *Int J Bas Clin Stud*. 2016;4(2):014-017
- Khalid A, Zahid M, Aslam Z, Bilal M, Haider A. Seroepidemiology of Hepatitis B and C virus in rural population of Tehsil Samundri, District Faisalabad, Pakistan. *Int J Virol Mol Biol*. 2015;4(2):19-22
- Yun EH, Lim MK, Oh JK, Park JH, Shin A, et al. Combined effect of socioeconomic status, viral hepatitis and life styles on hepatocellular carcinoma risk in Korea. *British Journal of Cancer*. 2010;103(5):741-746
- Pennap GR, Yakubu A, Oyige O, Forbi J. Prevalence of Hepatitis B and C virus infection among people of a local community in Keffi, Nigeria. *Afr J Microbiol Res*. 2010;4(4):274-278
- Al-Nabehehi BAH, Al-Shamahy H, Saeed WSE, Musa AM, El-Hassan AM, et al. Sero-molecular epidemiology and risk factors of viral hepatitis in Urban Yemen. *Int J Virol*. 2015;11(3):133-138
- Musa BM, Bussell S, Borodo MM, Samaila AA, Femi OL, et al. Prevalence of hepatitis B virus infection in Nigeria, 2000-2013: A systematic review and meta-analysis. *Nig J Clinic P*. 2015;18(2):163-172. doi: 10.4103/1119-3077.151035
- Akwa VL, Binbol NL, Samaila KL, Marcus ND. Geographical perspective of Nasarawa state. Onaivi printing and Publishing company.
- Naing NN. Determination of sample size. *Malays J Med Sci*. 2003;10(2):84-86
- Dawurung JS, Bukbuk DN, Ajayi BB, Baba MM. Prevalence of Hepatitis B and C virus coinfection among students of University of Maiduguri, Nigeria. *Arch Appl Sci Res*. 2012;4(4):1581-1584
- Mbaawuaga EM, Iroegbu CU, Ike AC. Hepatitis B virus (HBV) serological patterns in Benue State, Nigeria. *Open J Med Microbiol*. 2014;4(1):1-10
- Rauf A, Nadeem MS, Ali A, Iqbal M, Mustafa M, et al. Prevalence of Hepatitis B and C in internally displaced persons of war against terrorism in Swat, Pakistan. *Europ J Pub Health*. 2011;21(5):638-642
- Hakim ST, Noorali S, Ashby M, Bagasra A, Kazmi SU, et al. Seroprevalence of coinfection of Hepatitis B and Hepatitis C genotypes among adult female population of Karachi, Pakistan. *BJMP*. 2010;3(3):a335
- Ahmad A, Ahmad B, Ali A, Ahmad Y. Seroprevalence of HBsAg and anti-HCV in general healthy population of Swat district with frequency of different HCV genotypes. *Pak J Med Sci*. 2009;25(5):744-748
- Philip AA, Oti VB. Seroprevalence of Hepatitis B and C viruses among blood donors in a tertiary healthcare facility in North-Central Nigeria. *J Adv Microbiol*. 2017;4(2):1-16.
- Onyekwere CA, Hameed I. Hepatitis B and C viruses' prevalence and association with demographics: Report of population screening in Nigeria. *Trop Doct*. 2015;45(4):231-235. doi: 10.1177/0049475514560211
- Park B, Yung KW, Oh CM, Choi KS, Suh M, et al. Factors associated with alcohol consumption in Hepatitis B carriers: A Nationwide study in the Republic of Korea. *PloS One*. 2014;9(11):e110144. doi: 10.1371/journal.pone.0110144