

Prevalence of Hepatitis B Core Antibody in Medical Health care Workers in Nnewi, Anambra state, Nigeria

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ABSTRACT

Antibody to hepatitis B core antigen (HBcAb) is the most sensitive marker of previous hepatitis B contact. HBsAg infection is a serious global health issue, number of people have had the infection in the past without been aware. This study was aimed at finding the prevalence of HBcAb among the medical health care workers (MHCWs) in Nnamdi Azikiwe university teaching hospital (NAUTH) in Nnewi, south east Nigeria. One hundred (100) medical health care workers, comprising of 20 medical doctors, 20 medical laboratory scientists, 20 nurses, 20 theater attendants and 20 ward attendants were used for the study, using the HBV diagnostic panel kit (Diagnostic Automation/ Cortez Diagnostic Inc, USA). The result showed that 34% of the medical health care workers were positive for HBcAb, greater positive number were seen the females than the males. The non-vaccinated Medical Health care worker showed higher prevalence in positive HBcAb.

Keywords: HBcAb, Medical health care works, NAUTH, Nnewi.

INTRODUCTION

Hepatitis B virus (HBV) is a major causative agent of hepatocellular carcinoma (HCC) and it remains a major public health problem worldwide⁽¹⁾. Viral hepatitis causes both acute and chronic infection with significant complications. Up to 400 million people worldwide have hepatitis B surface antigen (HBsAg)-positive chronic viral infection, which is primarily acquired by vertical transmission in high-endemicity countries⁽²⁾. HBV accounts annually for an estimated 1 million deaths worldwide⁽³⁾. Transmission of HBV among adults occurs via contact with infected blood and body fluids such as semen, vaginal fluids and saliva. Antibody to hepatitis B core antigen (anti-HBc or HBcAb) is the most sensitive marker of previous hepatitis B contact⁽⁴⁾. It is the earliest antibody in response to HBV infection, appearing as IgM anti-HBc, and it persists for life as IgG anti-HBc after 6 months of the infection⁽⁵⁾. Isolation of anti-HBc signify either remote infection with waning anti-HBs

without viremia or infection with undetectable level of HBsAg. HBV infection is a serious global health issue, number of people have had the infection in the past, some are dead while some developed protective antibody which occur naturally or through immunization. A Medical Health care worker (MHCW) was defined as an individual who works in a health facility providing healthcare services or involved in maintenance of the health facilities. Health workers that are at-risk are those that who often come in contact with blood and body fluids from patients they are caring for while in the hospital. These included doctors and nurses who treat patients, laboratory personnel involved in sample collection, staff who handles hospital waste and soiled laundry, and mortuary attendants who handle dead bodies. Health facility is defined as a registered place, private or public, that offered healthcare services. When infection of HBV occurs, there follows the development of host immunity, the nature determines the course and type of disease and its consequences; some will develop persistent

HBsAg while others will clear the virus and become HBsAg-negative⁽⁶⁾. However, studies have shown that some HBsAg-negative individuals with HBcAb or circulating HBV-DNA or both could remain infectious^(7,8) and continue to spread the infection through HBsAg-negative-anti-HBc positive donors. Anti-HBc is the first antibody produced after HBV infection and the only detectable marker in the window period. The isolation of anti-HBc in serum in the absence of HBsAg may be due to resolved HBV infection which HBsAb becomes undetectable.

In Nigeria, the prevalence of HBcAb is 53.3%⁽⁹⁾, and the HBV screening programs often test only HBsAg and HBs, missing those individuals who have HBcAb as the only detectable marker⁽¹⁰⁾, hence this study will give us the prevalence of HBcAb in medical health care workers in Nnamdi Azikiwe University Teaching hospital (NAUTH), Nnewi, Anambra state, Nigeria.

MATERIALS AND METHOD

This is a cross sectional study to determine the prevalence of Hepatitis B core antibody in medical health workers in NAUTH, Nnewi. One hundred (100) medical health workers, comprising of 20 medical doctors, 20 medical laboratory scientists, 20 nurses, 20 theater attendants and 20 ward attendants were used for this study. Those vaccinated with Hepatitis antigen were 56 and those not vaccinated were 44. Two milliliters (2ml) of venous blood was collected from them into a clean plain sample bottle. The blood samples were allowed to clot and the serum collected for the analysis. The HBV diagnostic panel kit (Diagnostic Automation/ Cortez Diagnostic Inc, USA) for the qualitative detection of HBsAg, HBsAb, HBeAg, HBeAb and HBcAb was used, applying the principle of two site sandwich method for HBsAg and HbsAb while using the principle of competitive inhibition method for HBeAb and HBcAb. Two drops of the serum sample were added into the five different sample wells and allowed to react for 15minutes and the result read. The results were statistically analyzed using statistical package for social science, version 23 and expressed in as simple prevalence, using chi-square to determine the level of significance which is set at 95% (0.05) confidence interval.

RESULT

The result showed that out of the 100 samples that were studied, 34% were HBcAg positive and 66% were negative for both HBsAg and HBcAb testing (Figure 1).

The 34% MHCWs that were positive for HBcAb, 35.3% (12) were male while 64.7% (22) were female. Chi-square (χ^2) was used to test the significant difference in the association between gender and HBcAb and the result showed that there exists no significant difference in the association between gender and HBcAb with $\chi^2 = 1.585$, $df = 1$ and $p\text{-value} = 0.208$ which is greater than 0.05 (figure 2).

Among the healthcare workers that were HBcAb positive, 35.3% were theater attendants, 29.4% were nurses, 23.5% were ward attendants, 11.8% were Doctors, and none were positive among the scientists. χ^2 used to test the significant difference in the association between Health care workers showed that there exists a significant difference in the association between health care workers and HBcAb with $\chi^2 = 20.677$, $df = 4$ and $p\text{-value} = 0.000$ which is less than 0.05 (Figure 3).

The relation of the HBcAb positivity to Age were shown on figure 4, the 4 Doctors that tested positive to HBcAb, 50% were males were as 50% were females, 10 Tested positive among Nurses had 100% of them to be females, 12 tested positive among Theater attendants, showed 66.7% were males and 33.3% were females. Out of the 8 ward attendants that tested positive, 25.0% were males and 75.0% were females.

In relation to age, the 34 HBcAb positive health care workers showed that 41.2% were within the age of 25-30 years, 29.4% were within age 31-35, 23.5% are within age 36-40, whereas 5.9% are were 56 and not vaccinated were 44 within age 41-45 as shown in Figure 5.

Among the vaccinated medical health care workers, 4 (11.8%) tested positive for HBcAb; and 30 (88.2%) of the non vaccinated medical health care workers were also positive for HBcAb, as shown in Figure 6.

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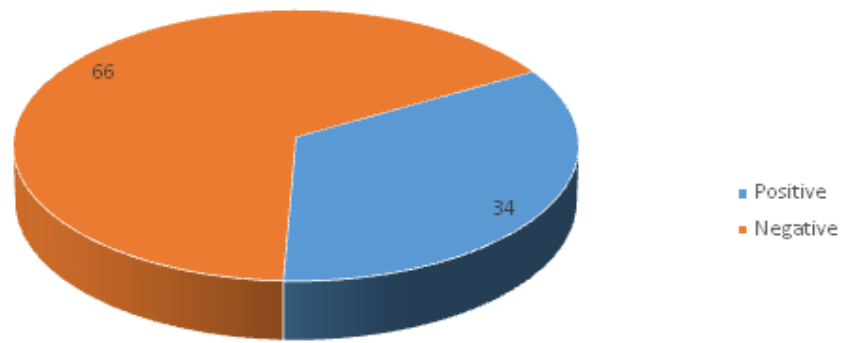


Fig1. HbcAb positivity among the medical health workers

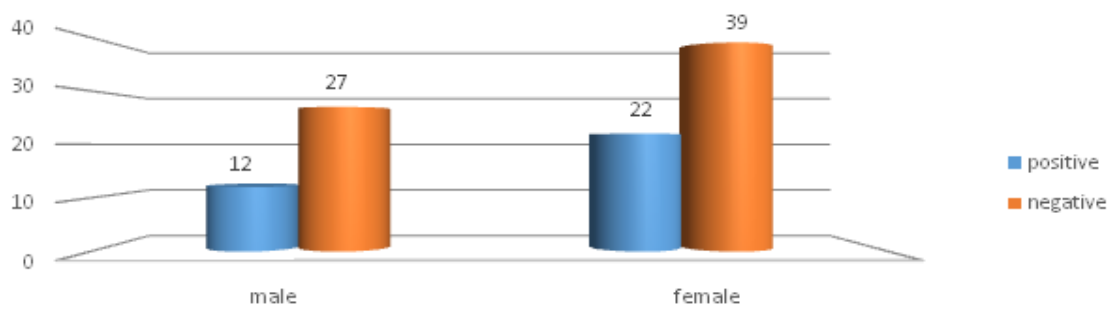


Fig2. HbcAb positive related to gender

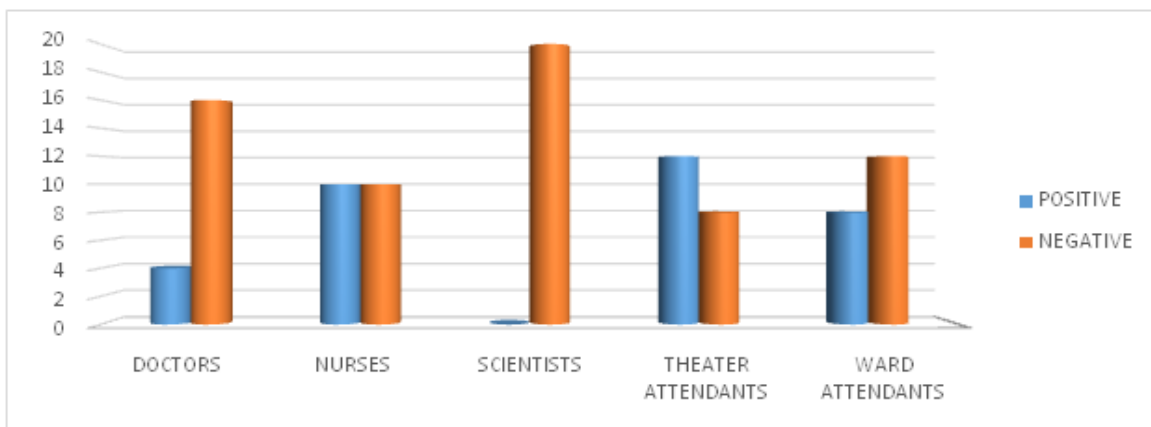


Fig3. HbcAb positivity in medical health care workers

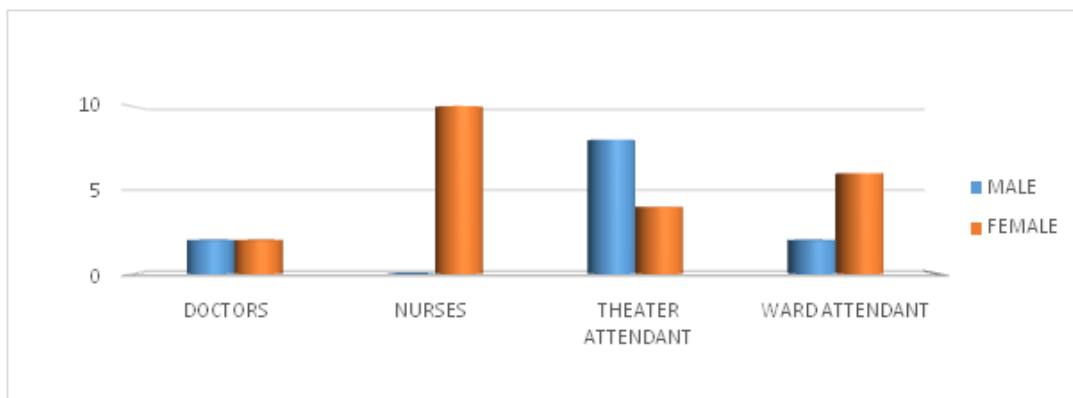


Fig4. HcAb positivity in different health care workers with relation to gender

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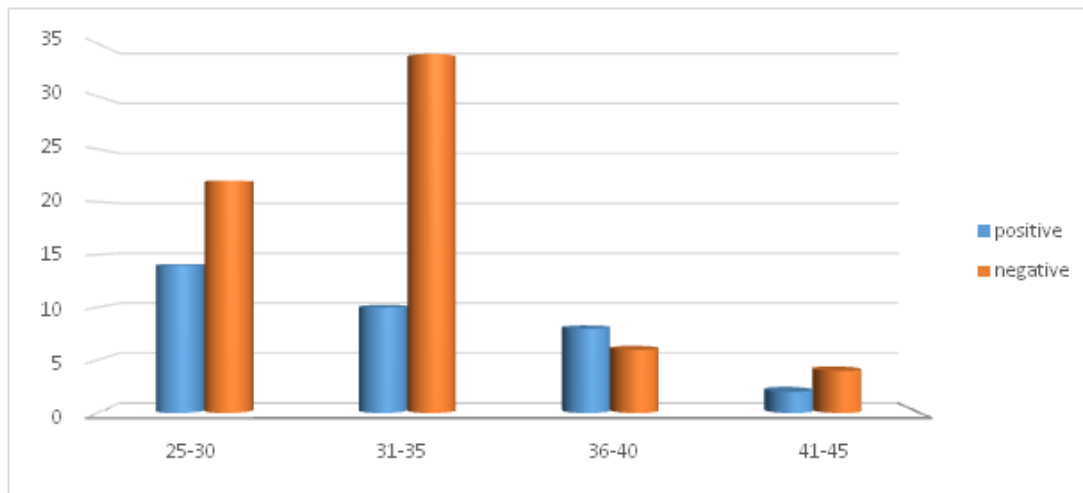


Fig5. *HbcAb positivity in different medical health care worker in relation to Age*

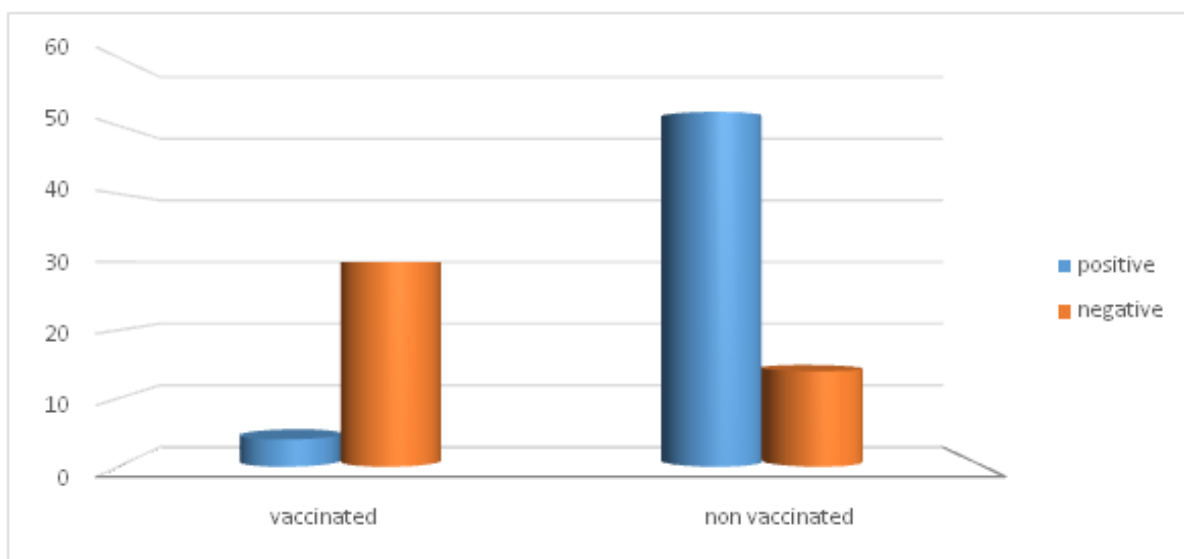


Fig6. *HbcAb positive among vaccinated and non vaccinated health care workers*

DISCUSSION

The main aim of the study is to investigate the prevalence of hepatitis B core antibody among Medical health care workers (MHCWs)

This study recorded 34 (34.0%) medical healthcare worker in NAUTH positive with HB core antibody (HBcAb). The 34 MHCWs in our study who tested positive for HBcAb were all HBsAg negative. This is in accordance with other studies^(11,13,14), who reported the presence of HBcAb in serologically silent HBV infection. The result obtained from this study was lower than the 70% that was recorded among health works in Albania⁽¹⁵⁾, and higher than the 1.6% obtained in Mexico⁽¹⁶⁾. Among MHCWs that were positive for HBcAb, the theatre attendants had the highest prevalence of 12 (35.3%), the nurses were 10 (29.4%), the ward attendants were 8 (23.5%), the doctors were 4 (11.8%), and the zero prevalence was seen among the

laboratory scientist. These figures are higher when compared with the prevalence among Polish surgeons (11.2%) and nurses (16.5%) surveyed in 2009 and also among MHCWs from the two largest clinical hospital in the capital-Warsaw (15.7%) surveyed in 2015⁽¹⁷⁾. The positive HB core antibody seen among theatre attendants, the nurses and ward attendants, could be attributed as some of the challenges facing health care sector in Nigeria in terms of inadequate infrastructure and protecting equipments within our hospitals. This study recorded that out of the 56 % of the studied group that had received hepatitis B virus vaccination, 11.8% of them had HBcAb in their serum, which might suggest naturally acquired immunity against HBV. Another possible explanation of this finding might be that some MHCWs were infected occupationally with HBV in the pre-vaccination era, or that they were not tested for the markers of a previous

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infection, such as anti-HBs and/or anti-HBc, before vaccination⁽¹⁶⁾.

The unvaccinated MHCWs with 88.8% positive for HBcAb indicate the possibility of a past infection of the hepatitis B virus (HBV).

CONCLUSION

The presence of antibody to the hepatitis B core antigen (anti-HBc) IgG in serum usually means a past infection of the hepatitis B virus (HBV). A relatively high sero prevalence of HBcAb was found in MHCWs in NAUTH, especially among theatre attendants and nurses. The study provides evidence of the protective effect of HBV vaccine, highlighting the need for universal vaccination of all MHCWs before they start their professional career. The high prevalence of HBcAb (11.8%) among previously vaccinated MHCWs might suggest naturally acquired immunity against HBV.

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