

Seroprevalence of Hepatitis B Virus in the Adentan Municipality of the Greater Accra Region Of Ghana

¹Osisioqu Udochukwu Emmanuel ²Awotwi Charles ³Osisioqu Winifred Selasie

¹Department of Science Laboratory Technology, Wa Polytechnic, Ghana.

²Department of Medical Laboratory Technology, Radford University College, Ghana

³Pentecost Hospital, Madina Estate, Madina, Ghana

Abstract

Hepatitis B infection is endemic in many developing countries including Ghana. It is also known that there are differences in the prevalence in communities of different socioeconomic levels. This study was conducted in a suburb of Accra to determine the relative seroprevalence of hepatitis B. Serum samples were collected between January and February 2015 during a cross-sectional survey of individuals from Adenta and tested for Hepatitis B surface antigen (HBsAg) using a commercial test kit (One Step HBsAg Test Device, InTEC Products, INC, China) after obtaining their informed consent. A total of 240 subjects had their samples collected for testing. There were 140 males and 100 females. A higher prevalence of HBsAg seropositivity was detected among the males as compared to the females. Majority of the participants were knowledgeable of the virus but most had not been vaccinated against the virus due to the high cost of the vaccine. In general, the seroprevalence of HBsAg was found to be low within the community.

Keywords: Seroprevalence, HBsAg, Vaccine, Seropositive

1. Introduction

Hepatitis refers to a group of viral infections that affect the liver. There are five main hepatitis viruses, referred to as types A, B, C, D, and E. The most common types are the A, B, and C. Most of the people infected with these viruses are unaware of their infection because viral hepatitis, particularly Hepatitis B virus, can persist for decades without symptoms. Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus. It is a major global health problem. It can cause chronic liver disease and chronic infection and puts people at high risk of death from cirrhosis of the liver and liver cancer. Hepatitis B virus (HBV) infection is associated with a wide variety of clinical manifestations including jaundice, hepatomegaly, anorexia, abdominal and gastric discomfort, etc. [4,7]. First discovered in 1967, HBV of the *Hepadnaviridae* family is a human blood-borne virus which is strictly hepatotropic [2-13].

Most people with chronic hepatitis B in Ghana were infected at birth or in childhood. Hepatitis B is often framed as a sexually transmitted infection among medical and public health sectors. This inconsistency has significant implications for its treatment and monitoring. Communities play an important role in providing information about hepatitis B. Communities most affected by chronic hepatitis B in Ghana are often affected by the virus in a context of highly disrupted lives; where access to health care services may have been non-existent, and where hepatitis B is not seen as a priority. People with hepatitis B report no pre or post test discussion and little or no information is provided at the point of diagnosis. This fundamentally affects how people with hepatitis B understand and respond to their infection. People with hepatitis B often report their diagnosis as shocking with little understanding of how infection occurred or the implications of being infected. Few resources are available for people with hepatitis B or their families that would assist in understanding their infection and how to promote their health and well-being.

Hepatitis B is a major cause of liver disease worldwide [11]. Despite education, campaigns and availability of effective drugs e.g. interferon alpha, lamivudine, adefovir [14] and vaccines [17], the disease is still a major global health problem. A vaccine against hepatitis B has been available since 1982. Hepatitis B vaccine is 95% effective in preventing infection and its chronic consequences, and was the first vaccine against a major human cancer. Transfusion of infected blood, unprotected sex and mother to child transmission are 3 key transmission routes of HBV in Ghana [15]. Hepatitis B is a contagious disease. Transfusion - transmitted HBV infection has become a major mode of transmission of HBV in high prevalence areas in sub Saharan Africa [10]. Blood safety therefore remains an issue of major concern in transfusion medicine in Sub Saharan Africa [10]. There is high incidence of blood-demanding health situations in Ghana resulting from anemia, malnutrition, accidents, surgical and obstetrical emergencies associated with blood loss, etc. The higher the demand for blood transfusion services, the higher the possibility of transmitting Hepatitis B virus and other blood-borne pathogens through contaminated blood. Illiteracy, lack of adequate health information,

low socioeconomic situation in the region, inadequate trained health personnel and some inappropriate cultural practices linked with transmission dynamics including polygamy tend to augment the disease transmission.

There is high prevalence of Hepatitis B virus (approx. 30%) among blood donors therefore for those infected with Hepatitis B virus, appropriate management has been shown to substantially reduce the risk of long-term liver damage, including cirrhosis and liver cancer.

Approximately, two million people contract hepatitis from unsafe injections annually. These infections can be averted through the use of sterile syringes that are specifically designed to prevent reuse [16].

The vaccine has an excellent record of safety and effectiveness. Since 1982, over one billion doses of hepatitis B vaccine have been used worldwide. In many countries, where 8–15% of children used to become chronically infected with the hepatitis B virus, vaccination has reduced the rate of chronic infection to less than 1% among immunized children.

Many practitioners however lack the adequate knowledge to identify individuals at risk of infection, thus hepatitis B remains under-diagnosed in Ghana. It is also under-treated, as many physicians lack sufficient knowledge of the pathways of care that are available to patients infected with Hepatitis B virus, limiting their ability to offer individualized advice to their patients.

Viral hepatitis should be considered as an urgent public health issue, and a comprehensive strategy (of course, in collaboration with the WHO and other development partners) is needed to prevent and control viral hepatitis on the continent. Recently, there has been greater awareness and education on the topic.

This study therefore was conducted to determine the impact of public education on the prevalence of hepatitis B infection among individuals living within the Adentan municipality of the Greater Accra region of Ghana and to propose possible interventions that will help minimize or possibly eliminate the infection in Ghana.

2. METHODOLOGY

2.1 Study design and population

The study was a cross-sectional survey and participants included all individuals who reside within the Adenta municipality that consented to participate in the study. The study recruited 240 individuals comprising 140 males and 100 females between the ages of 18 and 50 during the period of January and February 2015.

2.2 Collection and processing of specimen

A 2ml syringe and needle were used to bleed approximately 2 ml of blood from each donor, transferred into a vacutainer and centrifuged at 1500 rpm for 3 minutes to obtain serum. A test strip was immersed in each serum. The strips were removed after 10 seconds and placed on a dry clean non-absorbent table surface for 15 minutes after which they were visualized.

2.3 Interpretation of results

The test results were interpreted based on the following principles;

Negative test for HBV: Only one colored band appears on the control (C) region.

Positive test for HBV: In addition to a pink colored control (C) band, a distinct pink colored band also appears in the test (T) region.

Invalid test for HBV: A total absence of color in both regions.

2.4 Questionnaire

A well-structured questionnaire was used to collect data regarding some demographic characteristics of the participants and some lifestyles.

2.5 Statistical analysis

Results were computed in graphs and tables using Microsoft Excel and Microsoft word on the Microsoft Office 2010 package. The data was analyzed using SPSS and Stata (version 11.2) statistical package set at 95% Confidence Interval (and a p -value < 0.05 as considered statistically significant).

3. RESULTS

Out of 240 participants, 140 were male (58.3%) with 5 testing positive to the virus while the remaining 100 were female (41.7%) with 3 testing positive to the virus, thus making a total of 8 positive cases (3.3%)

prevalence) (figure 1). 234 (97.5%) participants indicated that they were quite knowledgeable about the virus and its menace while 6 (2.5%) participants admitted ignorance of the virus and its activities. The educational status (table 1) of the participants has little or no bearing on the infection. There was a significant correlation between the knowledge of the virus and the infection ($p=0.000$). 20 (8.3%) of the participants claimed to have been sexually inactive for the past ten years while 189 (78.8%) participants claimed to having only one sexual partner at a time for the past ten years. However, 31 (12.9%) participants admitted to having multiple partners within the last ten years most often at the same time. 6 of the participants who tested positive to the virus were among those with multiple partners while the other 2 participants were among those who have had no sexual partner within the last ten years. 49 (20.4%) participants in the study had received the complete dose of the vaccine against the virus before the study while the remaining 191 (79.6%) had not been vaccinated before the study.

Figure 1: Prevalence of Hepatitis B amongst the participants

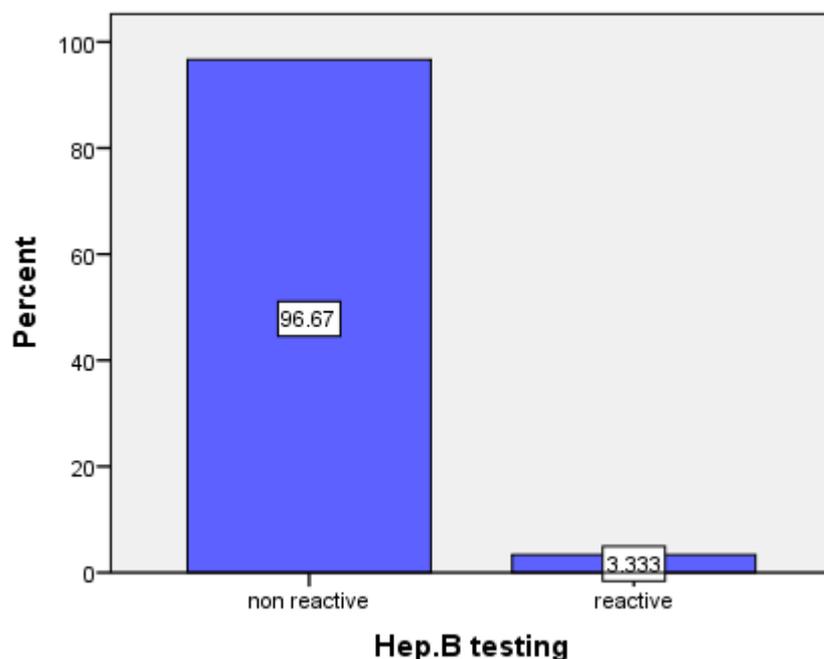


Table 1: Educational status of participants in the study

Level of education	Percentage
Primary	17.5
Junior high school	16.7
Senior high school	23.8
Tertiary	17.9
Other (vocational)	17.1
No formal education	7.0
Total	100

4. DISCUSSION

The One Step HBsAg Test is a qualitative immunoassay that detects HBsAg in blood serum. The decline in the seroprevalence of Hepatitis B virus infection in this study is in conflict with some studies conducted in rural areas in developing countries where it was considered endemic [6,8,9,12,20]. The low prevalence (3.3%) obtained during the study among the participants suggests the hepatitis B education is yielding positive results. However, the high cost of the testing and vaccination may have contributed to more than 2/3 of the participants not being vaccinated. Most developing countries are facing multiple threats to the safety of blood

supply because the cost of HBsAg screening is borne by the patients and their families who do not enjoy health coverage [1]. Generally also, there is no prevention of transmission between mother and child. A survey conducted in the northern region of Ghana showed that the high prevalence of HBsAg markers in donors who were >10 years was consistent with the concept that most primary Hepatitis B virus infections were transmitted either vertically or horizontally before age 10 [5]. This may account for the two participants who had no sexual partners within the last ten years but tested positive to the virus. Other factors such as blood transfusion may also play a role in the acquisition of the virus. The reason for the slight gender imbalance, i.e. more males (140) than females (100), cannot be directly inferred from this data; however, within the context of the study area, the males were more proactive and independent in decision making and volunteering than the females. This probably explains the slight difference in gender. The literacy rate of the people in the study area was well above average but this had no significant bearing on the reduced prevalence of the virus. Public sensitization/awareness about the viral disease and its mode of transmission may have contributed to the relatively low prevalence of Hepatitis B virus infection. In Ghana, local prevalence of the disease may vary widely, possibly as a consequence of lifestyle and socioeconomic variations even in closely related settlements.

5. Conclusion

The prevalence of Hepatitis B virus infection in the Adenta Municipality is low (3.3%). Notwithstanding this, it is important to note that proper management of hepatitis B requires a combination of:

1. *Prevention*: vaccination of newborns is the most effective means of preventing hepatitis B. Targeted prevention of risk groups, accompanied by strong educational campaigns, is also important and should be strengthened.
2. *Screening of individuals at risk*: Given the absence of symptoms in the early stages of hepatitis B, many individuals do not know that they are infected. Screening programmes are thus necessary to contain the risk of infection by allowing individuals who are Hepatitis B virus -positive to follow the right course of care for themselves and take appropriate measures to avoid infecting others.
3. *Diagnosis and monitoring*: Hepatitis B is under-diagnosed in Ghana. Once diagnosis is ascertained, it is critical that individuals are monitored regularly to determine whether the disease has progressed and whether treatment should be initiated.
4. *Treatment*: There have been important advances in the development of antiviral therapies to treat patients with hepatitis B, as are reflected in recent WHO guidelines. Early treatment is critical to prevent the progression of liver disease.

In order to further reduce the aforementioned prevalence, it is recommended that the Ghana Health Service and NGOs plan major Hepatitis B virus vaccination campaigns and educate people about risk factors for infection and benefits of immunization.

References

1. Allain J-P, Candotti D, Soldan K, Sarkodie F, Phelps B, Giachetti C, Shyamala V, Yeboah F, Anokwa M, Owusu-Ofori S, Opore-Sem O (2003): The risk of hepatitis B virus infection by transfusion in Kumasi, Ghana. *J Am Soc Hematol*, 101:2419-2425.
2. Blumberg BS, Gerstley BJS, Hungerford DA, London WT, Sutnick AI (1967): A serum antigen (Australia antigen) in down's syndrome, leukemia and hepatitis. *Ann Intern Med*, 66:924-931.
3. Blumberg BS, Sutnick AI, London WT, Millman I (1971): The discovery of Australia antigen and its relation to viral hepatitis. *Perspec Virol*, 7:223-240.
4. Centres for Disease Control and Prevention. Vaccine information statement [<http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-hep-b.pdf>] website
5. Goldstein ST, Zhou F, Hadler SC, Bell BP, Mast EE, Margolis HS (2005): A mathematical model to estimate global hepatitis B disease burden and vaccination impact. *Int J Epidemiol*, 34:1329-1339.
6. Kiire CF (1996): The epidemiology and prophylaxis of hepatitis B in sub-Saharan Africa: a view from tropical and subtropical Africa. *Gut*, 38:5-12.
7. Liang TJ (2009): Hepatitis B: the virus and disease. *Hepatology* 49:13-21.
8. Mast EE, Weinbaum C, Fiore A, Alter MJ, Bell BP, Finelli LF, Rodewald LE, Douglas JM, Janssen RS, Ward JW (2006): A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP)

Part II: immunization of adults. *MMWR Recomm Rep*, 55:1-33.

9. Ndumbe PM, Nyouma E (1990): Transmission of hepatitis B virus by blood transfusion in Yaounde, Cameroon. *Br Med J*, 301:523-524.
10. Ogbu O, Uneke CJ (2009): Hepatitis B virus and blood transfusion safety in sub-Saharan Africa. *Internet J Infect Dis* 7(2)
11. Reherrmann B, Nascimbeni M (2005): Immunology of hepatitis B virus and hepatitis C virus infection. *Nat Rev Immunol*, 5:215-229.
12. Sarkodie F, Adarkwa M, Candotti D, Acheampong JW, Allain JP (2001): Screening for viral markers by EIA in volunteer and replacement donors in Kumasi, Ghana. *Vox Sang*, 80:142-147.
13. Schaefer S (2007): Hepatitis B virus taxonomy and hepatitis B virus genotypes. *World J Gastroenterol*, 13:14-21.
14. Soriano V, Barreiro P, Nunez M (2006): Management of chronic hepatitis B and C in HIV-coinfected patients. *J Antimicrob Chemother*, 57:815-818.
15. Tieroyaare D.J; Kampo S; Soyiri I.N; Nsobila A.P; Ziem J.B.; Sagoe K; (2009) Prevalence of hepatitis B virus infection among blood donors at the tamale teaching hospital, Ghana. *Univ of Ghana collections*
16. WHO 2014. WHO calls for urgent action to curb hepatitis
17. World Health Organization. Hepatitis B: Immunization, Vaccines and Biologicals [http://www.who.int/immunization/topics/hepatitis_b/en/index.html] website
18. World Health Organization. Hepatitis B: Fact Sheet № 204 [<http://www.who.int/mediacentre/factsheets/fs204/en>] website