

Full Length Research Paper

# Seroprevalence of HBV infection among patients attending Okayama Friendship Rural Hospital, Bhaluka, Mymensingh

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Accepted 24 August, 2021

Hepatitis B virus (HBV) infection is a serious public health problem in around the globe. Even though South Asia and Bangladesh have a moderate prevalence rate of Hepatitis B virus, we are in great risk due to population mobility and the modes of transmission of virus through various ways. Current magnitude of HBV infection at rural areas of Bangladesh is unknown, and could be on the increase due to urbanization and industrialization with a change in lifestyle. During the study period of between 2<sup>nd</sup> of October and 27<sup>th</sup> of November, 2015 at the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh a total of 354 patients came for various reasons and out of them only 60 patients were included in the study. Out of these, 04 had positive hepatitis B surface antigen (HBsAg). The Seroprevalence of HBsAg was thus 6.6% among the patients attending Okayama Friendship Rural Hospital, Bhaluka, Mymensingh. In fine, this study has found that the seroprevalence of HBV infection among patients at Okayama Friendship Rural Hospital, Bhaluka, Mymensingh was 6.6%, which is of moderate intensity, and hence it is suggestive of the need to adopt the WHO recommendations in our set up.

**Keywords:** Seroprevalence, HBV infection.

## INTRODUCTION

The World Health Organization (WHO) considers hepatitis B virus (HBV) to be second to tobacco among the carcinogens (WHO 2002). Hepatitis B infection is caused by HBV which is a DNA virus belonging to a family called *Hepadnaviridae* which can cause acute or chronic infection (Kasper et al., 2005). It is estimated that 2 billion people

worldwide have been affected of which 350 million people have chronic infection, and 10% of these are in sub-Saharan Africa and East Asia (1, 3).

These chronically infected patients may develop complications of liver cirrhosis and hepatocellular carcinoma. The clinical manifestations of HBV infection in

acute infection are either prodromal, or icteric and recovery (Kasper et al., 2005). After the incubation period which varies depending to the type of virus, patients clinically present with chills, headache, nausea, vomiting and may precede jaundice (Kasper et al., 2005; Cunningham et al., 2005). The liver becomes tender and enlarged with a right upper quadrant pain.

Splenomegaly and adenopathy may also occur in 10% to 20% of cases (Kasper et al., 2005). The recovery to normality clinically and biochemically is a rule in Hepatitis A Virus (HAV) and in almost all HBV infections (Kasper et al., 2005; Hasslett et al., 1999). However, some do remain chronically infected especially with HBV and HCV and may progress to liver cirrhosis and, or to hepatocellular carcinoma (Kasper et al., 2005; Hasslett et al., 1999). Reported consequences of HBV infection in pregnancy include an increased likelihood of occurrence of pre-term delivery and low birth weight (Cunningham et al., 2005). Furthermore, HBV infection has been reported to be associated with threatened preterm labour, antepartum haemorrhage as well as gestational diabetes mellitus (Tse et al., 2005).

Diagnosis of HBV infection is confirmed by demonstrating specific antibodies and/or antigen in serum of patients (WHO 2002). The most important laboratory test for diagnosis of HBV infection is HBsAg which is the first antigen to appear, and appears during the incubation period, the prodrome, as well as during acute disease (Kasper et al., 2005; Levinson 1998). It appears after infection and disappears after one to two months following jaundice. During convalescence it falls to undetectable levels and if it persists for more than 6 months then this indicates a carrier state and a risk for chronic hepatitis and hepatocellular carcinoma (10). Presence of HBsAg means that the patient is potentially infectious. Antibodies to HBsAg (Anti-HBs) replace HBsAg as the acute infection resolves, and this indicates immunity in almost 80% of cases after the acute infection (Cunningham et al., 2005). This Anti-HBs also appears after HBV vaccination. Some lose these antibodies that are acquired after acute HBV infection and may become susceptible to disease HBV (Cunningham et al., 2005).

During the window period, and when the HBsAg has disappeared and HBsAb has not yet appeared, Hepatitis B core antibody (HBcAb) is detectable and can be used for diagnosis.

Acute or chronic infection can be differentiated by the presence of Immunoglobulin M (IgM) to HBcAg in acute infection, and Immunoglobulin G (IgG) in chronic infection (Kasper et al., 2005). After the appearance of HBsAg in one or two weeks, the HBcAb starts to be detectable. Very rarely HBcAg will be detected since it is within the HBsAg.

Investigations to be done among patients with HBV infection include the demonstration of Hepatitis B e antigen (HBeAg) which arises during the incubation period, prodrome, acute and to certain patients with chronic phase. It is an important indicator of transmissibility and is replaced by HBeAb, whose presence indicate low transmissibility (10). DNA polymerase is detected during the incubation period and early in the disease, and is a more sensitive and quantitative test (for the detection of viral load), although it is very expensive as it needs PCR (Cunningham et al., 2005). Estimation of serum transaminases could also be done, which typically rises from 400 to 4000U/L. Similarly, bilirubin also usually rises in clinical jaundice (Cunningham et al., 2005).

## **METHODOLOGY**

### **Study area**

This study was conducted at the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh which is managed by Prof. Dr. Aftabuddin (PhD-Japan, Post doc-France). The study is conducted on Fridays.

On an average 53 patients attended at the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh during the study on each Friday, of whom 65% were male and 35% were female patients. Most of these patients would come for a consultation with some minor ailments.

Among the usual services provided at the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh are health education given by Nurses and paramedics who record weights and blood pressure readings at each visit. These are done before the patient enters a Doctor's room. Routine blood tests are performed by Medical Technologists and Pathologist as recommended by the Doctors.

### **Study design**

This was a Clinic based cross-sectional study.

### **Study population.**

The study population was all general patients attending Okayama Friendship Rural Hospital, Bhaluka, Mymensingh.

### **Inclusion criteria**

Patients attending antenatal Okayama Friendship Rural Hospital, Bhaluka, Mymensingh for the first time and consent.

## Exclusion criteria

Patients who had prior history of Hepatitis B Vaccination and attending the clinic for the first visit and who didn't consent to the study.

## Study Period

The study was conducted between 2<sup>nd</sup> of October and 28<sup>th</sup> of November, 2015.

## Sample size

Sample size for this study was calculated using the formula for cross-sectional study. Based on the 2-8% prevalence of HBsAg infection in Bangladesh, 60 people from different age, sex, occupation and education level were included.

## Sampling technique

Patients attending the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh were asked for consent and then enrolled until the desired sample size was reached.

The Research Assistants and researcher did not want to interfere with the regular services received by the patients. Therefore, the patients coming from each of the doctor's consultation room were asked to participate in the study by the Research Assistant and the investigator.

Following their consent, each was interviewed individually and blood sample was taken. Research Assistant ensured that all the patients coming out of Doctor's rooms were appropriately directed for study inclusion. The research assistant or the researcher picked another patient after finishing the previous one. This continued until the end of Doctor's consultation at the clinic.

## Data collection method

Patients who consented to participate were subjected to a face-to-face interview with the investigator/assistant whereby pre-test counseling was done, and then the questionnaire was filled in to obtain information on socio-demographic characteristics. After this a venipuncture was performed and blood collected in a vacutainer tube. Five mls of blood was collected for Hepatitis B serology.

A mark was put in the clinic card of all enrolled patients to avoid repeat inclusions during their subsequent visits.

## Laboratory investigations

Serological testing for HBV was performed at Okayama Friendship Rural Hospital, Bhaluka, Mymensingh by Medical Technologists and Pathologist.

## HBsAg detection

This was performed using Immuno-chromatographic tests strips (Bioline HBsAg strip). The presence or absence of HBsAg in the sample was determined by comparing the test bands produced. Samples with a control band and test band were considered positive for HBsAg.

**Bioline HBsAg One Test:** -The Bioline HBsAg One Test is a qualitative, solid phase, two-site sandwich immunoassay for the detection of HBsAg in serum or plasma. The membrane is pre-coated with anti-HBsAg antibodies on the test band region and anti-mouse antibodies on the control band region. During testing, the serum sample reacts with the dye conjugate (mouse anti-HBsAg antibody colloidal gold conjugate) that has been coated in the test strip. The mixture then by capillary action, reacts with anti-HBsAg antibodies on the membrane and generates a red band. Presence of this red band indicates a positive result while its absence indicates a negative result. Regardless of the presence of HBsAg, as the mixture continues to migrate across the membrane to the immobilized goat anti-mouse region a red band at the control band region will always appear. The presence of this red band serves as verification for sufficient sample volume and proper flow and as a control for the reagents.

## RESULTS

During the study period of between 2<sup>nd</sup> of October and 28<sup>th</sup> of November, 2015 at the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh a total of 354 patients came for various reasons and out of them only 60 patients were included in the study. Out of these, 04 had positive hepatitis B surface antigen (HBsAg). The Seroprevalence of HBsAg was thus 6.6% among the patients attending Okayama Friendship Rural Hospital, Bhaluka, Mymensingh.

Seroprevalence of HBsAg was significantly higher among middle age and male patients with respect to age and sex. Also unemployed patients showed higher seroprevalence compared to other occupations. Another

**Table 1. Baseline characteristics of patients who were enrolled in the study. According to their Age (N=60)**

Characteristics	Total	HBsAg +ve n(%)	HBsAg -ve n(%)	Seroprevalence
Age (years)				
Below 18	20	01 (5%)	19 (95%)	5%
18-30	20	01 (5%)	19 (95%)	5%
31 and more	20	02 (10%)	18 (90%)	10%

**Table 2. Baseline characteristics of patients who were enrolled in the study. According to their Sex (N=60)**

Characteristics	Total (100%)	HBsAg +ve n(%)	HBsAg -ve n(%)	Seroprevalence
Male	30	03 (10%)	27 (90%)	10%
Female	30	01 (3.33%)	29 (96.33%)	3.33%

**Table 3. Baseline characteristics of patients who were enrolled in the study. According to their Level of Education (N=60)**

Characteristics	Total (100%)	HBsAg +ve n(%)	HBsAg -ve n(%)	Seroprevalence
No formal education	08	01 (12.5%)	07 (87.5%)	12.5%
Primary	25	02 (8%)	23 (92%)	8%
Secondary	17	01 (5.88%)	16 (94.12%)	5.88%
College/ University	10	00 (0%)	10 (100%)	00%

**Table 4. Baseline characteristics of patients who were enrolled in the study. According to their Occupation and Employment status (N=60)**

Characteristics	Total	HBsAg +ve n(%)	HBsAg -ve n(%)	Seroprevalence
Employed	26	01 (3.84%)	25 (96.16%)	3.84%
Unemployed	09	01 (11.11%)	08 (88.89%)	11.11%
Student	13	01 (7.69%)	12 (92.31%)	7.69%
Housewife	12	01 (8.33%)	11 (91.67%)	8.33%
Others	00	00 (00%)	00 (00%)	00%

**Table 5. Baseline characteristics of patients who were enrolled in the study. According to their residence either rural or urban (N=60)**

Characteristics	Total (100%)	HBsAg +ve n(%)	HBsAg -ve n(%)	Seroprevalence
Rural	47	03 (6.83%)	44 (93.17%)	6.83%
Urban	13	01 (7.69%)	12 (92.31%)	7.69%

**Table 6. Seroprevalence of HBV infection among patients attending Okayama Friendship Rural Hospital, Bhaluka, Mymensingh**

Characteristics	Total Patients enrolled	HBsAg +ve	HBsAg -ve	Seroprevalence of HBsAg
Total	60	04 (6.66%)	56 (93.33%)	6.66%

noticeable difference was as an increased level of education showed lower seroprevalence of HBsAg.

However, there were no significant differences between those who tested positive and those who tested negative to HBsAg with respect to residence status whether urban or rural.

## DISCUSSION

This study has found that the seroprevalence of HBsAg among the patients at Okayama Friendship Rural Hospital, Bhaluka, Mymensingh was 6.6%.

This level of seroprevalence is in agreement with overall prevalence rate 2-8% given by WHO.

WHO defines low prevalence to be <2%, moderate prevalence as 2-8%, and high prevalence as >8% HBsAg positivity. The WHO therefore recommends universal immunization of all infants to be adopted by all countries irrespective of HBsAg prevalence (WHO 2002).

Despite the finding of a relatively stable prevalence of HBsAg as found in this study, it is important to note that there is great chance of increasing seroprevalence among Bangladeshi people due greater human mobility and human interaction between different parts of the country or even different parts of the world. Furthermore, industrialization means many people are living and working in a small area and thereby risk of HBV spreading through sexual contact or by other modes increases substantially.

## Study Limitations

This study was limited by the fact that it is a clinic based study and that patients attending the Okayama Friendship Rural Hospital, Bhaluka, Mymensingh are a select population of a specific region mostly from Mymensingh. Hence the results can't be generalized for the whole country. Furthermore, all the patients attending at Okayama Friendship Rural Hospital, Bhaluka, Mymensingh did not give their consent to participate at this study which could also affect the generalization of findings. However, the findings of this study have adequately shed light into the problem of hepatitis B infection among patients at Okayama Friendship Rural Hospital, Bhaluka, Mymensingh.

## CONCLUSION AND RECOMMENDATIONS

In conclusion, this study has found that the seroprevalence of HBV infection among patients at Okayama Friendship Rural Hospital, Bhaluka, Mymensingh was 6.6%, which is of moderate intensity, and hence it is suggestive of the need to adopt the WHO recommendations in our set up.

It is recommended that further larger studies be performed to support the findings, since the calculated sample size was based on a higher prevalence figure than the level found in the study.

This finding would suggest for the introduction of routine screening for high risk groups for HBV (e.g. Medical and Health Personnel, Frequent Blood Transfusion Receiver, Sex workers, Drug Abuser etc) and vaccination to all people especially young children so as to reduce and prevent the spread of infection. However more data is required from larger studies to support the findings so that ultimately this can be recommended as a policy.

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