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PREVALENCE OF HEPATITIS B VIRUS INFECTION AMONG HEALTH CARE WORKERS IN TAMALE TEACHING HOSPITAL

BY

CHIMSI IBRAHIM

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DECLARATION

I, CHIMSI IBRAHIM, duly declare that apart from references to works of other people, which have been duly acknowledged, this dissertation has been written independently by me and has not been submitted for the award of any degree in any institution.

…… ……..

(CHIMSI IBRAHIM) DATE

STUDENT

…….. …….

(PROF. ISABELLA A. QUAKYI) DATE

SUPERVISOR

DEDICATION

This work is dedicated to my dear wife, Tiyumba and my son, Iman for their support and encouragement.

ACKNOWLEDGEMENT

I am grateful to Almighty Allah for his favour and blessings.

I would like to begin by thanking my academic supervisor, Prof. Isabella A. Quakyi for her guidance, love and care.

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To my family especially, Fatima, Budali, Issifu and his wife Ruhana, Allah bless you all for your support.

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
HBV	Hepatitis B Virus
HCV	Hepatitis C virus
HIV	Human Immunodeficiency Virus
HCW	Health Care Workers
HBsAg	Hepatitis B Surface Antigen
anti-HBe	anti Hepatitis B e-antibody
anti- HBc	anti Hepatitis B core
anti- HBs	Hepatitis B surface antibody.

DEFINITION OF OPERATIONAL TERMS

ITEM	DEFINITIONS
Healthcare workers	All people involved in the management of patients and are exposed to patient's body fluids.
Prevalence	Refers to the number of cases of diseases including old and new that are present in a particular population at a given time.
Incidence	Refers to the number of new cases that develop in a given period of time.

ABSTRACT

Background: Health Care Workers are at higher risk of Hepatitis B Virus infection which according to WHO has thrice the risk of the general population. This study was conducted with the aim of establishing the prevalence of Hepatitis B Virus infection among Health Care Workers in Tamale Teaching Hospital. The objectives of the study were; determine Hepatitis B serological test status among Health Care Workers, determine the level of awareness of Hepatitis B Virus infection among HCWs and to identify control measures of HBV infection in Tamale Teaching Hospital.

Methods: The study was an analytical cross-sectional study. A total of 510 participants, consisting of 255 HCWs and 255 comparison group were recruited for this study. Blood samples were taken from all the 510 participants by a phlebotomist and micropoint HBsAg Gold Rapid test kits were used to test for Hepatitis B Virus. Outpatient department (OPD) patients were selected as comparison group (general population) to compare with Healthcare workers. The study also utilized pre-tested, structured and self-administered questionnaires.

Results: The study findings showed the prevalence of HBV infection among Healthcare workers was 26.3% and 14.5% for the comparison group. The study revealed that category of staff does not have an association with prevalence of HBV infection. However, the findings showed significance association between prevalence of HBV infection and participants educational status. The level of awareness of HBV was higher in the Health care workers than the comparison group. The results showed low usage of retractable syringe and needle as a control measure.

Conclusion: The study showed there was high prevalence of HBV infection among HCWs in Tamale Teaching Hospital, compared to the comparison group. Even though the level of awareness was found to be high among respondents, the control measures in place were not adequate. The study recommended that the Hospital emphasized on control measures such as use of retractable syringe and needles, and adherence to the universal vaccination policy.

CHAPTER ONE

INTRODUCTION

1.1 Background

Hepatitis B Virus (HBV) infection is a vaccine-preventable liver infection that can be transmitted through contact with the body excretes such as blood, saliva, sweat, urine and fecal matter of an infected person (Sondlane et al., 2016). It is generally acquired early in life and develops to chronic Hepatitis B which leads to life threatening diseases like inflammation of the liver, liver cancers and scaring of the liver (Robotin, Kansil, Porwal, Penman, & George, 2014).

Hepatitis B viral infection is considered a major public health burden with about 250 million people being chronic carriers, of which an estimated 700,000 people die each year globally (Mueller et al., 2015).

Transmission of Hepatitis B virus occur mostly among babies and teenagers in Africa and East Asia, by perinatal route, whereas in more industrialized nations, amounts of new infection and acute diseases are mainly among young adults and spread mostly via injection of drugs and high- risk sexual behavior (Samayoa et al., 2006).

Chronic Hepatitis persistently makes a major impact on the global burden of illnesses. The chance of developing the disease is associated with the age at acquiring the infection. The effective measure to prevent HBV spread is vaccination(Joshi et al., 2014).

The first WHO region to accept a provincial goal for Hepatitis B control was Western Pacific Region (WPR) with a population of 1.8 billion in 2007 which was reported in September 2005 and to be achieved by 2012 (Rani, Yang, & Nesbit, 2009).

HCWs are more prone to contact with blood-borne diseases occupationally than other professionals and risk acquiring diseases such as Hepatitis C, Hepatitis B and HIV. The most contagious among these diseases is Hepatitis B which also happen to be the most preventable

among them. Vaccination against Hepatitis B infection is low among HCWs due to reasons such as; low level of awareness, lack of risk assessment and inability to prioritize the health of HCWs both among government and private health facilities. Post-exposure management such as reporting of incidence, getting tested for Hepatitis infection and vaccination which happens to be the best control strategy are not available for HCWs who are exposed (Singhal, Bora, & Singh, 2009).

Hepatitis B (HBV) and C viruses (HCV) are among the most common blood borne pathogens. According to WHO, 5% of healthcare workers (in central Europe), are at risk and are injured with HBV contaminated sharps per year (Rybacki, Piekarska, Wiszniewska, & Walusiak-Skorupa, 2013).

Hepatitis B Virus (HBV) infection is one of the leading causes of infectious death, claiming the lives of thousands of Ghanaians each year. Donors of blood in Tamale Teaching Hospital that falls within the age group of 20-29 years recorded the highest number of Hepatitis B positive cases with 69.35% of all positive cases among voluntary donors (Konlan, Aarah-Bapuah, Kombat, & Wuffele, 2017).

1.2 Statement of the Problem

Hepatitis B infection is among the first ten (10) health problems worldwide and is the tenth main cause of deaths. It is known that HBV is among the most frequent blood-borne pathogens. Occupational exposure to HBV refers mainly to health care workers (HCWs) because of frequent contact with bodily secretions.

Globally, more than two billion people have evidence of Hepatitis B Virus infection and there are an estimated 350 million chronic carriers of this infection (Singhal et al., 2009). India has 50 million cases of Hepatitis B Virus infection and represents the second largest chronic carriers of Hepatitis B infection. Hepatitis B prevalence ranges between 2 to 8% within the general population in India, which placed it in the intermediate endemicity zone of

HBV. Sero-prevalence is two to four times greater among Health Care Workers (HCWs) than the general population (Singhal et al., 2009). In the United States the estimated occurrence of HBV infection among HCWs was approximately 10 times greater than among the general population(Wu et al., 2016). According to WHO, HCWs in the central part of Europe are exposed to at least one sharps injury contaminated with HBV per year.

According to Mueller et al. (2015) the Sub-Saharan countries have the highest infection rates of HBV , ranging from 5% to 8% , with high human immunodeficiency virus (HIV) and HBV co-infection (15%) rates. The region also has critical scarcities of health workers; despite shouldering 24% of the global disease burden, it has only 3% of the global health workforce. Morbidity and mortality related to chronic infectious diseases, such as HIV and potentially HBV, contribute to low workforce among health workers. HBV genotype, Hepatitis A, Hepatitis D and Hepatitis E are in circulation across Africa with the predominant genotype varying by region. Hepatitis D is considered to be sub-viral because it can only propagate in the presence of Hepatitis B virus. Genotype A accounts, for up to 90% of infections in cohorts from countries as geographically distant as Nigeria, Kenya, South Africa and Zimbabwe (Robotin et al., 2014). While many of these countries have implemented universal HBV vaccination for infants, there is limited visibility on what is happening related to protecting health workers from an infection that can easily be prevented with a three dose regimen of the HBV vaccination.

Globally, Ghana is among the highest countries of prevalence of HBV infection, in the city of Kumasi, Ghana's second largest urban Centre is estimated to be 17% and the country's prison population prevalence is estimated to be as high as 25% (Mkandawire, Richmond, Dixon, Luginaah, & Tobias, 2013) . Unofficial estimates, which indicate that, about 4 million of Ghana's 24 million people have HBV, with prevalence rate of 18.5% in the Upper West

region, 94.4% of nurses in Ghana are occupationally susceptible to HBV infection, awareness of the risk of infection influenced staff performance at work.

1.3 Conceptual Framework

Figure 1 shows a model explaining the factors that could lead to infection of Hepatitis B Virus. The Independent variables include human, organizational and environmental factors interacting with an interface of collecting information and execution of tasks. There could be infection in the performance of the task to achieve an outcome.

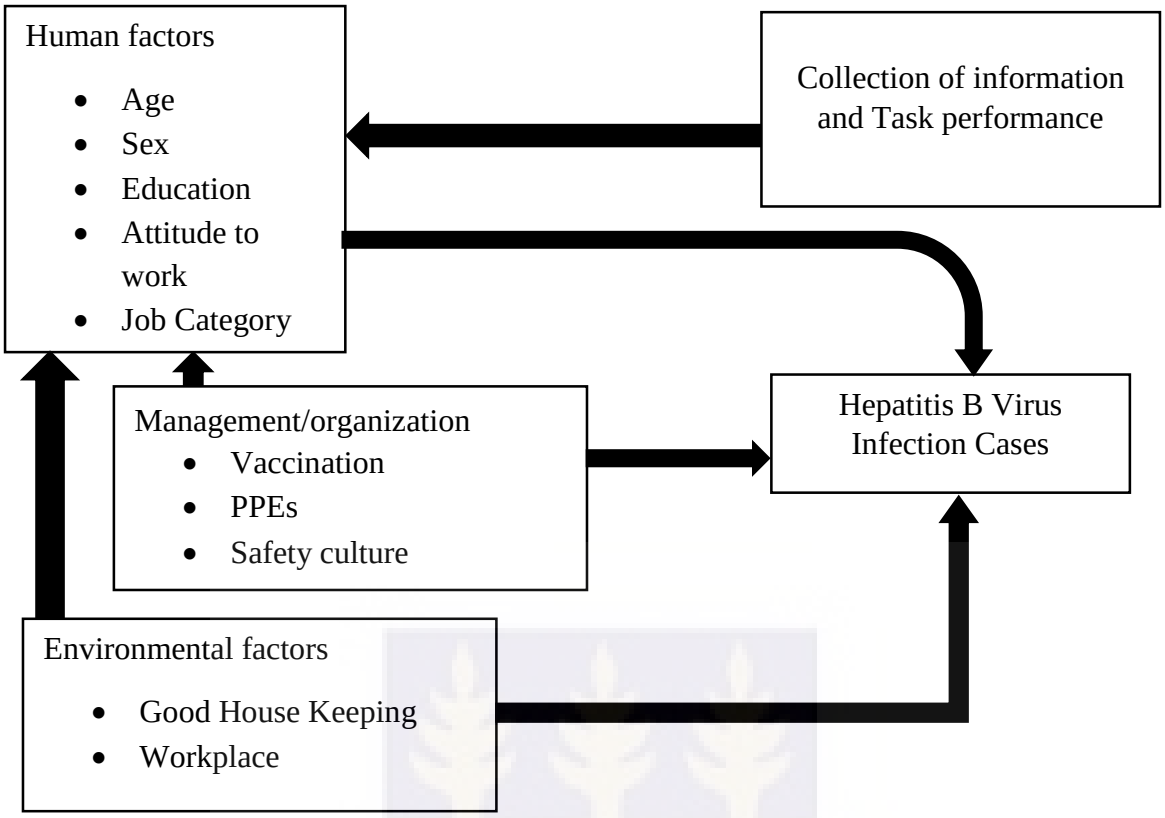

Figure 1.1: Conceptual Framework for Assessing Prevalence of Hepatitis B Virus (HBV) Infection

1.4 Justification

In Ghana, Health care workers in health facilities are constantly exposed to patients' body fluids which contributes to infection of diseases. Ghana is considered to be in the highest category for the prevalence of HBV infection (Konlan et al., 2017).

Tamale Teaching Hospital (TTH) is chosen as a place of study because it serves as a referral Centre for the three Northern regions and parts of Brong Ahafo region and some neighboring countries such as Togo, Mali and Burkina Faso. Studies have also shown that the three northern regions have the highest burden of HBV infection in Ghana (Dongdem et al., 2012).

There is no formal mechanism in the Tamale Teaching Hospital where HCWs who are infected with HBV are reported. Hence HCWs who are infected go unreported.

Lack of education, inadequate information on health, financial factors, inadequate skilled healthcare professionals in the region, and the effects of some negative cultural practices associated with transmission dynamics such as multiple sex partners increases the risk of HBV transmission. Hepatitis b virus infection prevalence in voluntary donors and replacement visiting Tamale Teaching Hospital in 2009 was estimated as 10.79% and 11.5% respectively (Dongdem et al., 2012). There were high percentages among these donors representing a major part of the inhabitants within the Metropolis (Ayalew & Horsa, 2017).

Against this background, this study intends to determine the prevalence of Hepatitis B Virus (HBV) infection, in order to contribute to evidence based policy guideline for HBV control in health workers.

1.5 Research Questions

1. What is the serological status of HBV among healthcare workers in Tamale Teaching Hospital?
2. What is the level of awareness of HBV infection among HCWs?
3. What are the control measures of HBV infection in Tamale Teaching Hospital?

1.6 Study Objectives

1.6.1 General Objective

To determine the prevalence of Hepatitis B virus infection among Health care workers in Tamale Teaching Hospital.

1.6.2 Specific Objectives

i. To determine HBV serological status among Health Care Workers (HCWs) in Tamale Teaching Hospital.
ii. To determine the level of awareness of HBV among HCWs.
iii. To identify the control measures of HBV infection in Tamale Teaching Hospital.

CHAPTER TWO

LITERATURE REVIEW

2.1 Background

There are many diseases that are blood-borne, such as Hepatitis B, HIV and Hepatitis C viral infection that places workers in healthcare setting at a higher risk of occupational exposure. Among these diseases, Hepatitis B is not only the most transmissible infection, but also the only one that is preventable by vaccination (Varsha, Dhrubajyoti, Bora, & Singh, 2011).

Hepatitis B Virus infection is an important work-related hazard among healthcare workers. Studies have shown that, healthcare workers have up to four-fold increased risk of acquiring HBV infection than the general population (Mueller et al., 2015). Awareness of these risks, and compliance with basic preventive measures can significantly reduce the risk of acquiring HBV, which is the concern of public health program.

In Ghana, the prevalence rate of HBsAg has been reported to be in the range of 8-15% in urban areas and some parts of rural Ghana, a scenario suggesting endemicity of the diseases (Mutocheluh et al., 2014)

2.2 The Hepatitis B Virus

Hepatitis B virus is in the family of hepadna-virus, which include; duck hepatitis virus, wood chuck virus and ground squirrel hepatitis virus. It is a partially double-stranded DNA virus, with the virion particle measuring 42nm in diameter. An envelope composed of viral-encoded proteins and host-derived lipid components. A core particle made up of the nucleocapsid protein, the viral genomes and the polymerase protein. Hepatitis B Virus is a blood-borne virus that infects the liver. In the acute state, the infection occurs within a short time and possibly cleared by the immune system. However, sometimes, the virus persists for a longer time (more than six months) and cause chronic infection. The presence of Hepatitis B surface antigen (HBsAg) can be detected by serological testing which indicates an infection of HBV

(Rani et al., 2009). Before Hepatitis B antigen was discovered, it was diagnosed in relation to infection occuring between 60-180 days when human blood or plasma fractions are injected and the use of unsterilised sharps. The virus replication occurs through reverse transcriptase, double-stranded DNA with a positive strand (Singhal et al., 2009). Hepatitis B viral infection have signs and symptoms that ranges from mild to severe. These signs and symptoms usually manifest within one to four months after infection, although they can show as early as two weeks post-infection. Young children at the age of one to nine usually do not have symptoms. The signs and symptoms of Hepatitis B infection may include;

1. Abdominal pain
2. High temperature
3. Musculoskeletal pain
4. Nausea and Vomiting
5. General fatigue
6. Dark colouration of the urine and
7. Yellow colouration of the palms and soles and the whites of the eyes (jaundice)

As stated earlier HBV infection can either be acute or chronic.

- Acute HBV infection; in acute Hepatitis B viral infection, the virus may not last in the body for more than six months. Infections are normally cleared completely by the immune system. At acute stage, the virus can be passed on to others. Acute infections mostly occur among adults and may progress to chronic infection.
- Chronic Hepatitis B infection; in chronic Hepatitis b viral infection, the virus stays in the body for more than six months. The immune system cannot completely clear the virus from the body. The infection may last a lifetime and can progress to complications such as liver cirrhosis and liver cancer.

2.3 Human Factors

Level of education, type of profession, age, marital status and unavailability of vaccine and accessibility determines significantly, vaccination status of HCWs (Ayalew & Horsa, 2017). It is clear from other literature that healthcare workers carry the burden of Hepatitis B viral infection more than the general population. However, within the healthcare workers, there are particular job categories that face more risk than others. The Healthcare workers risk of acquiring the occupational related disease (HBV infection) has shown to have a relationship with factors such as degree of exposure to the infected body fluids or blood, contaminated sharps and the duration of employment in settings that have high risk of infection. Occupational group that have high chance of infection among others include; Nurses, Doctors, Laboratory Technicians and Mortuary attendants (Singhal et al., 2009). These particular HCWs are exposed to needle stick injuries and failure of Personal Protective Equipment (PPEs) example gloves that leads to infection with the Hepatitis B virus directly. Marital status contributes to the risk of infection of Hepatitis B, especially in the northern part of the country where polygamy is mostly practice even within healthcare workers.

2.4 Personal Protective Equipment (PPE)

Adherence to standard techniques and precautions strictly, that avoid direct contact of the skin and mucous membrane to blood and other body fluids of patients can prevent Hepatitis B virus infection in the healthcare setting (Setia et al., 2013).

Wearing of gloves during a procedure is an important personal protective measure to practice during a procedure. This is especially important when handling potentially infectious materials or when coming in to contact with contaminated fomites or surfaces. It is also necessary for HCW to wear gloves when his skin is not intact. However, some HCWs tries to wash or decontaminate gloves for re-use, which increases the risk of infection. It is also indicated that, some HCWs receive their phone calls with contaminated gloved hands during

procedures which may increase the risk of HBV infection. Other HCWs have the feeling that wearing gloves protects them from a needle/sharp injury which is not possible, hence, care should be taken be when working with these sharps (Mathur, Dwivedi, Hassan, & Misra, 2011).

2.5 Good House Keeping

Health Care Workers are exposed to medical waste which is posing a growing problem to them worldwide, jeopardizing the health of staff, patients, disposal workers and all those who comes in contact with these hazardous materials discarded by hospitals. Inadequate training of Health Care Workers on proper handling of medical waste and the implications on the environment when disposed of inappropriately may have consequences on our health (Mathur et al., 2011). Some HCWs do not segregate sharps from other medical consumables, which poses a high risk for HBV infection. Syringe and needles, sutures and surgical blades among other sharps are supposed to be discarded in safety boxes while contaminated gloves and face mask are supposed to be discarded in dust bins. However, is often common to see HCWs discarding contaminated materials (sharps and non-sharps) in the same bin.

2.6 Test Status

Hepatitis B specimen testing includes measurements of some Hepatitis B virus (HBV)-specific antigens and antibodies. Diverse serologic “markers” or groupings of markers are used to recognize dissimilar phases of HBV infection and to define whether a person carries an acute or chronic HBV infection. Test status can also determine a person’s resistance to HBV infection as a result of previous infection or vaccinaton, and as to whether the person is susceptible to infection.

Hepatitis B Virus (HBV) has a protein on the surface of it called Hepatitis B surface antigen (HBsAg) ; this antigen can be detected when the levels of it in serum is high during acute or chronic infection. The presence of HBsAg in serum indicates infection, antibodies produced

by the body normally as an immune response to the presence of this antigen. Many HCWs know their test status but few others in the hospitals do not see the need to know their test status. Hepatitis B reactive healthcare workers, who does not know the status risk passing the virus to patients.

2.7 Risk Factors

Some occupations exposes workers to the infection of HBV, an example is healthcare workers, which is a well –recognised factor in the delivery of health care. The chances of getting HBV infection in the health facility depends on the degree of contact with patients body fluids such as blood, urine and stool (Singhal et al., 2009). Central Europe has 5% of its HCWs being exposed to sharps injury that carries the risk of infection with HBV every year (Rybacki et al., 2013).

Studies have shown that, injuries due to needle pricks have the highest hazards to health care professionals (HCP) based on the rates at which blood-borne diseases are transmitted through needle sticks, it is assessed to be up to 100 times more for Hepatitis B virus (30%) as likened to HIV with (0.3%) and might be as great as 10% for Hepatitis C virus (Konlan et al., 2017). Many HCWs underestimates the risk needle stick injury poses on their health, and does not report to management for post exposure prophylaxis to be given. There is, of course, no way to eliminate the risk of hepatitis B infection entirely (Ristinen & Mamtani, 1998), but it can be reduced significantly, to lessen the burden of infection to HCWs. The likelihood of infection of Hepatitis B Virus declines by age at infection, from about 90% once infected perinatally up to 6 months of age to 20-60% among the ages of 6 months and 5 years, 25% of people who acquire HBV as children might get primary liver cancer or inflammation of the liver cell (cirrhosis) (Schweitzer, Horn, Mikolajczyk, Krause, & Ott, 2015).

Some other risk factors may include the following;

- Unprotected sexual intercourse with an infected person. Semen, blood, vaginal secretions and saliva are regarded as bodily fluids with high hepatitis B viral load.
- New born babies are infected during birth. In the course of delivery, blood and other secretions from the mother gets in to contact with the baby's skin and orifices. It is therefore recommended to vaccinate new-born babies to prevent infections.
- Unprofessional practices of sharing syringes and needles among patients pose a high risk of HBV infection. When a syringe and needle is used on an infected person and then used on a different person, the virus can be transmitted to him.
- Living with someone who has a chronic HBV also puts you at a high risk of getting infected.
- People born or living in a society with a prevalence of hepatitis B, such as the Amazon river basin and China are at a greater risk of infection.
- Diseases such as haemophilia or snake bites that demand that you replace clotting factors by transfusion of fresh frozen plasma exposes you to infection of HBV.
- The use of dialysis for blood filtration by people with kidney malfunctions are at risk of infection with HBV.

2.8 Vaccination Status

All healthcare workers who are greatly exposed to blood and other fluids at the work must be given Hepatitis B vaccine. Other categories of staff whose duty in the health facility does not greatly expose them to infection of these diseases such as receptionist and billing staff among others are exempted, though may also get vaccinated to achieve immunity. Vaccination of HBV antigen on adults is done in the region of the deltoid muscle (Hipgrave, Maynard, & Biggs, 2006).

Expectant mothers in works that poses great chances of Hepatitis B virus (HBV) infection should be vaccinated. The vaccine has no constituents which have proven to pose any danger

to the fetus in any stage during development. Expectant mothers who have HBV infection poses a significant risk of infecting the fetus or newborn through in-utero infection or during birth.

The vaccination series is in 3 doses. One shot every month for 3 months, followed by the booster dose later. These vaccinations are done prior to testing of Hepatitis B status to ensure non-reactive status to HBV surface antigen. The Hepatitis B vaccine injection series are not to be repeated when doses are not given in time, but should be continued to complete the series. Testing of status of HBV is necessary within a period of two months after third vaccination in the series, an anti-HBsAg serologic test result of > 10miu/ml indicates immunity. No doses are required when the immunity results are achieved. Instances where after taken the vaccine your serologic status does not show immunity, you need to repeat the 3 dose in series (Paul, 2001).

CHAPTER THREE

METHODOLOGY

3.1 Type of Study

The study is analytical cross-sectional study by means of pre-tested, structured and self-administered questionnaires. The study focused on the level of awareness of HBV among HCWs, the control measures of HBV infection and the sero-logical test status of HCWs in Tamale Teaching Hospital.

3.2 Study Site

The study was conducted at the Tamale Teaching Hospital (TTH). Tamale Teaching Hospital is situated in the Eastern portion of the Tamale metropolis covering a total surface area of 490,000 square meters, out of which 122,500 square meters have been developed. It is sited in a catchment zone which has a population of about 2.4 million. The hospital takes care of patients coming from Northern region, Upper East and Upper West regions, the northern part of Brong Ahafo region and the neighboring countries of La Cote d'ivoire, Burkina Faso and Togo.

The hospital is currently the largest National referral teaching and research hospital in the Northern region with an estimated staff strength of 1,876 employees and bed capacity of 475. The hospital shares boundaries with the Dohinayili community to the West and Dapkema JHS and Dabekpa community to the east. To the North is the Tamale –Yendi high way which it shares with the Kukou community in the opposite end and south is the Tamale Nurses' and Midwifery Training College.

The hospital functions as the only facility for the teaching of students from the Medical school and Health Sciences of the University for Development Studies (UDS) and the other health training schools in the region.

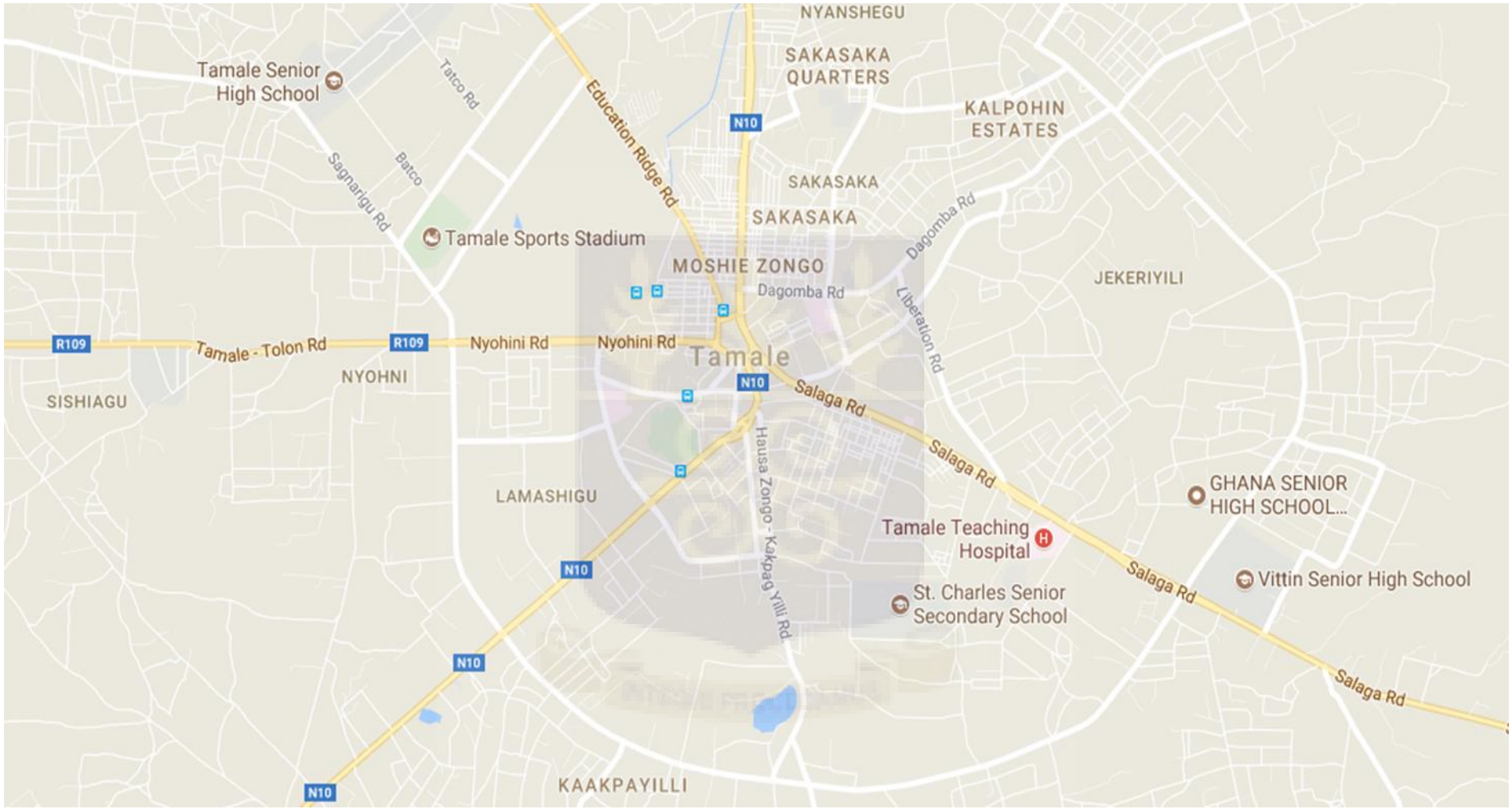

Figure 3.1: Map showing Tamale Teaching Hospital

3.3 Variables

3.3.1 Dependent

The dependent variable is the infection of Hepatitis B Virus.

3.3.2 Independent

The independent variables are the factors that cause Hepatitis B Virus infection. These factors comprise of human/personal factors (such as education, skills, age, sex, attitude and job category), managerial/organizational factors (such as safety culture, PPEs, surveillance) and environmental factors (such as level of cleanliness, working space and ergonomics).

3.4 Study Population

The study population for the research comprised of Health Care Workers (HCW) in Tamale Teaching Hospital (TTH) that have direct contact with patients body fluids and are at risk of infection and Out Patient Department (OPD) patients at Tamale Teaching Hospital with no direct contact with patients body fluids as the comparison group. The Hospital has a total of 1141 HCWs comprising 213 doctors, 740 nurses and midwives, 40 laboratory technologists, 29 anesthetists 42 radio technicians, 50 cleaners,and 27 pharmacy staff. Out of the study population, a statistically representatve sample was drawn.

3.5 Sample Size

A sample size of (510) participants was selected, (255 HCWs), and (255 as the comparison group). Convenient sampling was used to recruit the study participants.

3.6 Determination of Sample Size

The proportion of healthcare workers at risk of getting Hepatitis B in Tanzania Tertiary Hospital is estimated to be 31.1% (Mueller et al., 2015). Also, a confidence level of 95% and the desired level of precision set at 5% was used for sample size determination.

The sample size was calculated using the formular developed by Cochran to yield a representative sample for proportions (Cochran, 1977).

$$n_0 = \frac{z^2 pq}{e^2}$$

Where,

n_0 = the sample size

Z = standard normal deviate which is 1.96 at 95% confidence interval

P = the proportion of the population estimated to be at risk (0.311)

q = the proportion of the population not at risk (1-0.311=0.689)

e = the desired level of precision set at 5% (0.05)

3.7 Sampling Method

A proportional stratified sampling method was used to sample participants among healthcare workers for the study. Random sampling method was then used to select from each stratum to get the required sample size. Convenient sampling method was used to recruit people at the OPD as a comparison group. These people are healthcare seekers with similar age categories as the HCWs, and have no direct contact with other patients.

3.8 Data Collection Techniques

A structured questionnaire was used in collecting the data from each stratum among the study participants.The questionnaire comprised of both closed and open ended-questions that sought to determine the categories of HCWs exposed to Hepatitis B viral infection, the practices that expose them, Hepatitis B serological test status, Hepatitis B vaccination status and control measures available for Hepatitis B. Paticipant's Hepatitis B serological test status was determined by testing with the test kits. In the comparison group, the same questionnaire

was used with the exception of answers for the control measures, which was specifically meant for the healthcare workers and serological testing was done.

3.8.1 Sample Collection and Preparation

A 3cc syringe and needle was used by a phlebotomist to draw 3ml of whole blood from each participant. This was done under strict aseptic techniques, by tying a tourniquet on the upper arm of the participants. A clean swab with spirit was used to clean the site of venipuncture and whole blood was drawn. The sample was transferred in-to a red top collection tube that has no anticoagulant. The sample was allowed 20-30minutes in a vertical position to clot. The sample was then Centrifuged at 1500rpm for 3minutes to obtained serum.

3.8.2 Test Kits

Micropoint HBsAg Gold Rapid Screen Test manufactued by Trinity Biotech was used. This Rapid test strip is used for direct detection of the HBsAg from human sample such serum, saliva, or whole blood using chromatographic immunoassay. The membrane in the test strip is coated with specific antibody against Hepatitis B surface anti-gen in the region on the strip marked T. When performing the test, the sample is put on the strip to react with the colloidal Gold particles, that have been labelled with other particular antibodies. If HBsAg is present, a band with a pink colouration will appear on the membrane in proportion to the quantity of HBsAg available. The absence of the band with pink coloration in the test region suggest a negaive result. To serve as a procedural control, a pink colored band in the control region will always appear regardless of the presence of HBsAg.

3.8.3 Testing of Sample

The test kits were placed in a dry clean non-absorbent table surface, 2-3 drops of the serum was put on the sample pad and 2-3 drops of buffer was added. Results were read in 5-20 minutes.

3.8.4 Interpretation of Results

Negative: absence of a band in the test region indicated (T) on the test kit showed. A pink band appear in the control region indicated (C) on the test kit. This indicate that no HBsAg have been detected.

Positive: the appearance of the band in the control region (C) of the test kit, another pink band appeared on the test region (T) of the test kit. This shows that the sample have HBsAg.

Invalid: no band will appears in the region marked control (C) of the test kit, regardless of the presence or absence of line in the test region (T) of the test kit. It indicates an error which may occur during the test. In this situation the tests were repeated.

3.9 Data Analysis Strategies

The data collected was analysed using STATA version 15. Tables and charts were generated to present the main results. Descriptive statistics such as frequencies and percentages were used to analyze categorical data. Chi-square test of association was used to compare proportions as well independent sample T-test to test the relationship among dependent variables with continuous outcome and the groups (Healthcare workers and the comparison group). Logistic regression was also used to assess the relationship between independent and dependent variables while controlling for some confounding factors. In all statistical test, a p-value less than 0.05 was considered significant. Data was presented in tables and figures for easy understanding and interpretation.

3.10 Quality Control

The questionnaire for the data collection was pre-tested in Tamale at the Nursing Training College. The questionnaire was made brief and clear as possible for easy understanding.

3.10.1 Training

The research assistants, nurses and laboratory personnel were trained on the procedures and how to record responses clearly. It took a full day training session at the Tamale Teaching Hospital Training Unit. The training included; purpose and objective of the study, data collection techniques and tools and how to translate the questionnaires in to local language for some of the orderlis (cleaners).

3.10.2 Pilot Study

Data collection techniques were pre-tested using students from Tamale Nurses Training College as participants. Appropriate modification and correction were done before the actual data collection.

3.11 Ethical Consideration

Approval for this study was obtained from the Ethics Review Committee (ERC) of Ghana Health Service (GHS). Also, consent to conduct the research was acquired from the Tamale Teaching Hospital. Participants who were involved in the study did so on voluntary basis and confidentiality and privacy was assured. They were not required to indicate their names on the questionnaires to ensure anonymity.

3.12 Voluntary Participation and Informed Consent

Participants consent was sought after explaining to them the purpose of the study. They were made aware of the right to withdraw from the study at any point without consequences.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the information on the data collected from the respondents. The findings of this study were analyzed and presented based on the specific objectives of this study.

4.2 Demographic Characteristics of Respondents

The demographic characteristics of the respondents are shown in Table 4.1. The demographic profile of the respondents in terms of their age distributions revealed that most (40%) were aged between 31 – 40 years. Gender distribution had a slightly high proportion of males (62%) compared to females (38%) among HCWs whilst the distribution has females (53%) slightly higher than males (47%) among the comparison group. From the results, more than half (55%) of the respondents indicated they were married whilst the rest were either never married or divorced among HCWs whilst 65% of respondents indicated married in the comparison group.

The educational level of the respondents revealed that 2% had no formal education whilst 94% had tertiary education among HCWs as compared to 17% that has no formal education and 79% has tertiary education among the comparison group. Majority of the respondents among the HCWs (98%) reside in urban area and 2% reside in rural area as compared to 76% of the comparison group that reside in urban area and 24% being in rural area. All (100%) respondents among HCWs were civil servants whilst majority of the comparison group (48%) were self-employed. Regarding the religious denomination, the respondents who were Muslims were higher than the other denominations in both HCWs and the comparison group 53% and 56% respectively.

Table 4.1: Demographic Characteristics of Respondents. (N=225)

Variable	HCWs N (%)	Comparison group N (%)
Age (in years)		
20 – 30	81 (32.0)	95 (37.0)
31 – 40	103 (40.0)	115 (45.0)
41 and Above	71 (28.0)	45 (18.0)
Sex		
Male	159 (62.0)	120 (47.0)
Female	96 (38.0)	135 (53.0)
Educational status		
No formal education	5 (2.0)	44 (17.0)
Secondary	11 (4.0)	11 (4.0)
Tertiary	239 (94.0)	200 (79.0)
Marital status		
Never married	98 (38.0)	88 (35.0)
Married	139 (55.0)	167 (65.0)
Divorced	18 (7.0)	0 (0.0)
Religion		
Christianity	101 (40.0)	98 (38.0)
Islam	135 (53.0)	142 (56.0)
Traditionalist	19 (7.0)	15 (6.0)
Occupation		
Civil servants	255 (100.0)	73 (29.0)
Self employed	0 (0.0)	123 (48.0)
Jobless	0 (0.0)	40 (16.0)
Student	0 (0.0)	19 (7.0)
Area of residence		
Urban	249 (98.0)	193 (76.0)
Rural	6 (2.0)	62 (24.0)

4.3 Serological Test Status of Respondents

Under this portion, the study assessed the prevalence of HBV infection among two categories of respondents. The first category was the primary respondents, the healthcare workers which formed the study population and a comparison group from where the study institution is located. The essence of this was to compare the actual prevalence of HBV infection among the two categories of study participants. From Figure 4.1, the prevalence of HBV infection

based on the serology test among the healthcare workers was 26.3% as compared to the comparison group (14.5%). There was a statistically significant association (p = 0.001) between the prevalence of HBV among the two groups.

The results further showed that, 16.9% of the healthcare workers who were infected with the HBV were aged between 31 – 40 years as compared to 7.6% among the comparison group in the same age range. The prevalence was lowest among respondents who were above 40 years 2.1% and 0.9% among healthcare workers and comparison group respectively. Generally, there was no statistically significant difference (p = 0.453) between the ages of the two groups and HBV prevalence. Majority of the infected respondents among the healthcare workers were males (15.7%) as compared to females (10.6%). However, the prevalence of HBV was higher among females (9.4%) compared to males (5.2%) in the comparison group. Statistically, there was no significant difference (p = 0.225) between the sex of respondents in the both groups and the prevalence of HBV (Figure 4.1).

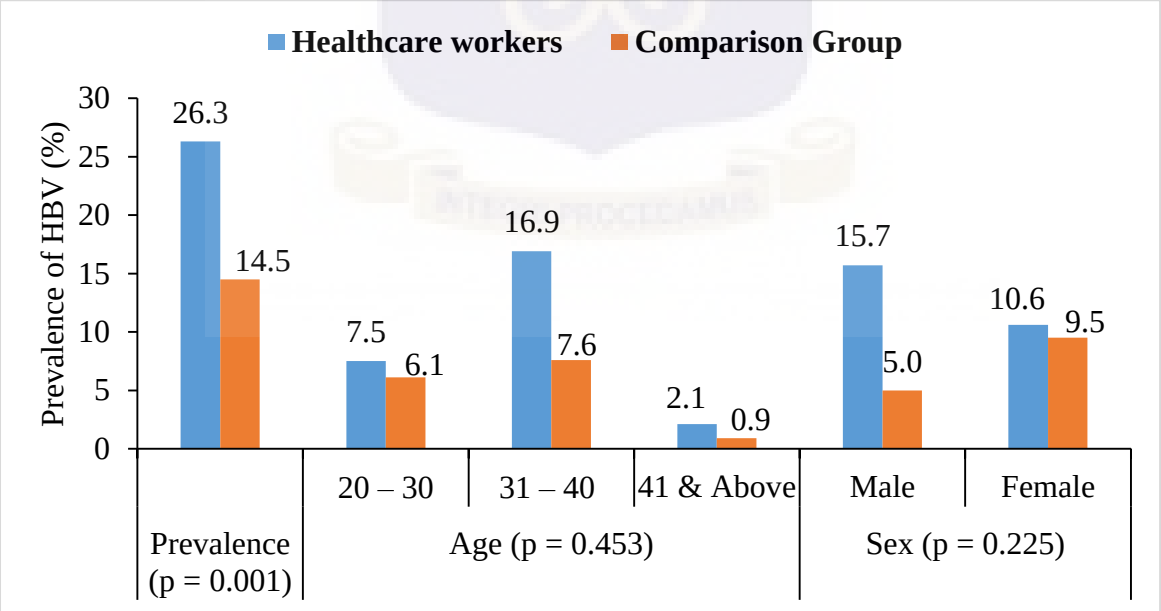

Figure 4.1:Prevalence of HBV Status in the Respondents

Table 4.2 presents some independent variables and their association with the dependent variable. The independent variables considered include; category, department, and

educational levels of staff. From the results, more Radiology staff (63.0%) tested positive for the serological test compared to the other work categories. A Chi square test of association indicated a statistically significant association ($\chi^2 = 13.81$; $p = 0.032$) between the category of healthcare workers and the outcome of HBV infection serological test.

The results showed that Obstetrics & Gynaecology and Surgery departments had the highest (45.0%) positive outcomes of HBV infection whilst Male Medical department recorded 10% positive outcomes of HBV infection. There was a statistically significant association ($\chi^2 = 21.22$; $p = 0.003$) between the department where the respondents work and the outcome of HBV infection as indicated in Table 4.2.

With educational levels of the respondents, those with tertiary education recorded higher (27%) positive outcomes of HBV infections compared to those with no formal education (20%) and secondary education (9%). However, there was statistically no significant association ($\chi^2 = 1.88$; $p = 0.390$) between the respondent's level of education and the outcome of HBV infection (Table 4.2).

Table 4.2:Category of Staff and Serological Test Outcomes among Healthcare Workers

Variables	HBV results (N = 255)			X^2, p – value
	Positive	Negative	Total	
Category of Staff				**13.81, 0.032***
Nurse	45 (27.0)	122 (73.0)	167 (100.0)	
Doctor	10 (21.0)	37 (79.0)	47 (100.0)	
Lab Technician	5 (50.00)	5 (50.00)	10 (100.0)	
Radiology Staff	5 (63.0)	3 (37.0)	8 (100.0)	
Pharmacy Staff	0 (0.00)	6 (100.00)	6 (100.0)	
Cleaners	2 (20.0)	8 (80.0)	10 (100.0)	
Anaesthetist	0 (0.00)	7 (100.00)	7 (100.0)	
Department				**21.22, 0.003***
Accident & Emergency	13 (22.0)	45 (78.0)	58 (100.0)	
Out Patient Department	13 (30.0)	30 (70.0)	43 (100.0)	
Male medical ward	4 (10.0)	36 (90.0)	40 (100.0)	
Female medical ward	0 (0.0)	13 (100.0)	13 (100.0)	
Obstetrics & Gynaecology	13 (45.0)	16 (55.0)	29 (100.0)	
Surgery	13 (45.0)	16 (55.0)	29 (100.0)	
Neurology	4 (25.0)	12 (75.0)	16 (100.0)	
Ante-natal	7 (26.0)	20 (74.0)	27 (100.0)	
Educational level				**1.88, 0.390**
No formal education	1 (20.0)	4 (80.0)	5 (100.0)	
Senior Secondary School	1 (9.0)	10 (91.0)	11 (100.0)	
Tertiary	65 (27.0)	174 (73.0)	239 (100.0)	

*Numbers in parentheses are percentages while those without parentheses are the respondent counts; X^2 is the Pearson Chi Square coefficient; * indicates significant difference at $p < 0.05$. Percentages calculated as row percentages.*

4.4 Level of Awareness of HBV Infection among Respondents

The level of awareness of respondents on HBV infection was assessed. The HCWs workers and the Comparison group were analyzed to get a better picture of the study. All the HCWs (100%) said they are aware of HBV as compared to (82%) in the Comparison group. There was a statistically significant difference ($p < 0.001$) between the two groups and the awareness of HBV infection. The results also showed that 23.5% of HCWs heard of HBV from friends as compared to 32% of the Comparison group. It was also revealed that, most of the respondents 44% among the Comparison group identified Hospital as their major source of information on HBV. Regarding the major source of information, there was no statistically significant difference ($p = 0.449$) between the two groups (Figure 4.2).

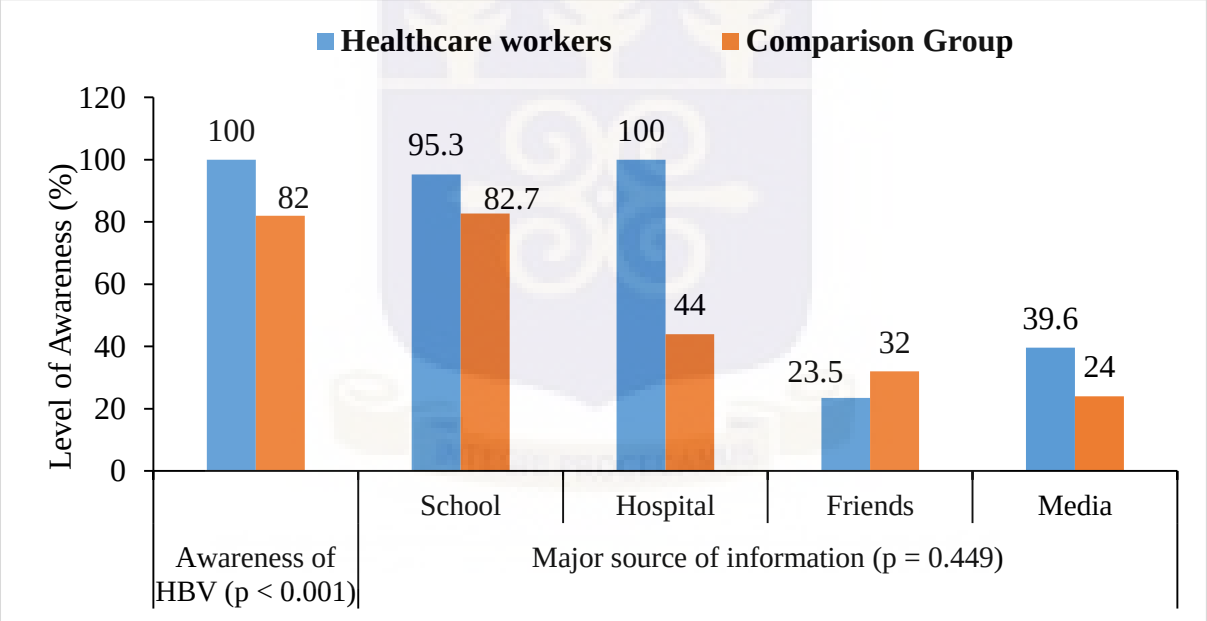

Figure 4.2: Respondent's Level of Awareness of HBV Infection

The respondent's clinical knowledge concerning HBV infection is shown in Table 4.3 below. Majority of the respondents (45%) identified jaundice as a sign of HBV infection whilst 35% also indicated swollen stomach as a sign of HBV infection. Only 10% of the respondents identified muscle as well as joint pain as signs of HBV infection.

Also, most of the respondents (55%) who were healthcare workers indicated horizontal transmission as the mode of HBV spread. Thirty percent (30%) and 15% of the respondents indicated vertical transmission and unsafe needles as the mode of HBV spread respectively. The results further showed that, 35% of the respondents identified liver failure as a complication of HBV infection. Thirty percent (30%) and 20% of the respondents reported Chronic Hepatitis and Cirrhosis as a complication of HBV infection respectively. Only 15% of the respondents attributed death as a complication of HBV infection (Table 4.3).

Table 4. 3: Respondents (HCWs) Clinical Knowledge on Hepatitis B Infection

Variables	Frequency (N = 225)	Percentage (%)
Signs and symptoms		
Jaundice	115	45.0
Swollen abdomen	90	35.0
Fatigue	25	10.0
Muscle and joint pains	25	10.0
Mode of HBV spread		
Horizontal transmission	141	55.0
Vertical transmission	76	30.0
Unsafe needles	38	15.0
Complications of HBV infection		
Liver failure	89	35
Death	38	15
Cirrhosis	51	20
Chronic Hepatitis	77	30

Analysis of predictors of category of staff and awareness of HBV infection was done after controlling for confounding factors such as age, educational level, and marital status by matching and randomization. Logistic regression analysis was used to test for significant relationships. The independent variables were simultaneously introduced into the model in order to control for the effects of the other variables.

From Table 4.4, medical doctors were 2 times more likely to be aware of HBV infection as compared to anaesthetists (OR; 2.53, 95% CI:0.3 – 18.66, p = 0.36). The results also showed that, nurses were 0.98 times more likely to be aware of HBV infection as compared to anaesthetists (OR; 0.98, 95% CI: 0.18 – 5.40, p = 0.99).

Table 4. 4: Level of Awareness of Hepatitis B among Category of Staff

Category of Staff	Unadjusted		Adjusted*	
	OR (95% CI)	p – value	OR (95% CI)	p – value
Anaesthetists	1		1	
Nurses	2.13 (0.52 – 8.73)	0.30	0.98 (0.18 – 5.40)	0.99
Doctors	6.14 (1.02 – 36.74)	0.05*	2.53 (0.3 – 18.66)	0.36
Radiology staff	3 (0.25 – 36.32)	0.39	1.72 (0.1 – 24.40)	0.69
Cleaners	0.13 (0.03 – 1.24)	0.08*	0.07 (0.01 – 0.66)	0.02*

*OR means Odds Ration; 95% CI means 95% Confidence Interval; * means significant difference at p < 0.05*

4.5 Control Measures of HBV Infection among Respondents

This section mainly focused on the HCWs meaures employed in the hospital to control HBV infection. From Table 4.5, Majority of the respondents representing 94% indicated that they were using personal protective euipment (PPEs) and 6% indicated they don't use PPE. The results also revealed that 91% of the respondents said there were containers available for bioharzardous waste. There was low (40%) usage of retractable syringes and needles. Regarding vaccination, 65% said they were vaccinted. However, 13% completed firt dose, 28% of the respondents completed second dose of the vaccination and 59% completed third

dose of the vaccination. Among the respondents who completed the third dose, it was only 41% that vaccinated the booster dose.

Table 4. 5: Control Measures of Hepatitis B Virus Infection

Variable	Frequency (N)	Percentage (%)
Usage of personal protective equipment		
Yes	239	94.0
No	16	6.0
Total	**255**	**100.0**
Availability of sharp boxes in the units		
Yes	239	94.0
No	16	6.0
Total	**255**	**100.0**
Availability of containers for biohazardous waste		
Yes	232	91.0
No	23	9.0
Total	**255**	**100.0**
Use of retractable syringe and needle		
Yes	102	40.0
No	153	60.0
Total	**255**	**100.0**
Hepatitis B vaccination		
Yes	167	65.0
No	88	35.0
Total	**255**	**100.0**
Stages of Hepatitis B vaccination		
First	33	13.0
Second	72	28.0
Third	150	59.0
Total	**255**	**100.0**
Booster dose		
Yes	62	41.0
No	51	34.0
Don’t remember	37	25.0
Total	**150**	**100.0**

CHAPTER FIVE

DISCUSSIONS

5.1 Introduction

This chapter closely discusses the main findings of the study and compares them to available literature. Key among the issues are the extent to which findings agree with or at variance with the reviewed literature. The discussion of the results is presented based on the specific objectives of the study.

5.2 Serological Test Status of Respondents

Health care personnel are at an increased risk of contracting blood borne pathogens due to their occupational exposure to blood and body fluids of infected patients at the clinical environment. Nursing category in the healthcare setting is mostly involved in accidental piecing and cutting by sharp objects as compared to other category of staff. This is because the nursing professionals are those that handle these sharps during procedures. Thus the risk of accidental exposure to Hepatitis B virus being high. This assertion was manifested in the study results.

From the results, 27% of the healthcare workers reactive to HBV infection were nurses. This finding from the study disagrees with the study done by Wijayadi et al. (2017) where HBsAg carrier rate was highest (18%) among medical doctors in Bahir Dar City Administration, Northwest Ethiopia. The differences in the observed results between the study findings and the reference population in Ethiopia could be due to the working environment couple with the knowledge and working experiences of the health staff. Since the reference population was medical doctors their knowledge of HBV infection could have been informed by their training and exposure to infected patients at the clinical environment. Also, their knowledge

might have guided them on the way they handle infected persons and blood samples so as to avoid accidental exposures.

Hepatitis B virus infection often has no symptoms and may not even be noticed. It is common among adults who are infected with acute Hepatitis B virus to recover fully. Infected adults can develop complications such as hepatocellular carcinoma, liver cirrhosis and chronic infection. With the knowledge of the mode of transmission, healthcare workers were more likely to be careful when treating a patient infected with HBV infection.

It is also importance to add that, despite the respondents being healthcare workers aside the population that was sampled for the comparison, the knowledge and awareness of the comparison group did not inform them to go for testing and vaccination. Work pressure added to no need for them to go for testing and vaccination could be a reason that demotivated people to go for the HBV infection testing. This finding from Tamale Teaching Hospital agrees with the study done by Yasobant et al. (2017) in a teaching Hospital in India where vaccination coverage concerning HBV infection among health care workers was low. The similarity in terms of the results could be due largely to the nature of the study and the sampled population. Since the two population was taken from teaching hospitals, it is possible they might have similar characteristics.

Healthcare workers are considered as a high-risk group for HBV infection due to occupational exposure to blood-borne pathogens in the clinical environment. The prevalence of HBV infection was found to be high among the healthcare workers. From the results, the prevalence of HBV infection among the healthcare workers was 26.3%. This finding of the study is at variance with the study conducted by Jha et al. (2012) were the prevalence of HBV infection among microbiology laboratory workers was found to be 12.2%. This high number of healthcare workers found to be reactive to the HBV infection at the study place is of

concern considering the fact that, only a sample of the respondent's category was taken. The situation might even appear to be higher considering the huge number of healthcare workers now working at the hospital. This should be a public health concern.

The HBV status of healthcare workers could be a danger to the patients seeking treatment for their various health conditions or the family members of the healthcare workers. Health care workers who might be reactive to occult HBV infection could not have been detected unless molecular techniques to show the presence of HBV genome. The study did not assess occult HBV magnitude. Despite the fact that, HBV infection was found to be high among the nurses at the hospital, other healthcare providers were also infected with the condition. This is consistent with the findings of Tatsilong et al. (2016) where they reported statistically significant association between healthcare workers and HBV status in Yaoundé, Cameroon. However, the results showed that, 63% of the Radiology Staff category were reactive to the HBV infection. This finding from the study disagrees with the study done by Ziraba et al. (2017) where in Uganda, the prevalence of HBV infection among Radiology staff and laboratory staff were very minimal.

The results further showed that, there was a statistically no significant association between educational level of respondents and their HBV status. This finding of the study agrees to the findings of Kashyap et al. (2016). In their work, they reported that educational level of healthcare workers was not associated with HBV status. This implies that irrespective of one's level of education, one can still get HBV infection.

5.3 Level of Awareness of HBV Infection among HCWs

Hepatitis B virus infection is a major threat to public health globally especially among healthcare workers. It has been shown that healthcare workers have up to four-fold increase in incidence of this infection in the general population. The main risk factor to acquire HBV infection for healthcare workers is direct contact with infectious material, especially HBV

infected blood or body fluid. Some studies have also reported that awareness of HBV and proper precautions against blood-borne infections are lacking in healthcare workers. Therefore, raising awareness of healthcare workers concerning HBV infection is ideal in protecting themselves against the disease.

From the results, all the respondents who were healthcare workers indicated that they had heard of HBV infection. This agrees with a study conducted by Bakry et al. (2015) where knowledge of healthcare workers on HBV infection was found to be high. Their sources of knowledge were perhaps informed by the hospital, and at their various training institutions. Also, all the healthcare workers recruited for the study indicated the hospital and schools (their training institutions) as the major source of acquiring knowledge on HBV infection. A study conducted by Hussain et al. (2016) supports this finding. In their study, healthcare workers in Tanzania identified hospitals and schools as their major sources of knowledge concerning HBV infection (Hussain et al., 2016).

Respondent's awareness concerning the mode of spread of HBV infection was also assessed in the study. Blood and its products were seen to be the common source of transmission in hospital settings. There is an increasing risk of HBV infection due to invasive diagnostic and therapeutic procedures. It is necessary for healthcare workers to always practice appropriate protective methods because of their constant handling of biomedical wastes. Hence the need for them to be aware of HBV infection and its prevention.

The major route of HBV transmission in sub-Saharan Africa is horizontal (that is transmission unrelated to recognize-sexual, perinatal, parenteral exposure) in children under 5 years of age; however, percutaneous/parenteral transmission is also an important mode of spread (Malewezi, Omer, Mwagomba, & Araru, 2017). The results further showed that, majority of the respondents working at the hospital identified horizontal transmission as a mode of spread of HBV infection. This finding from the study disagrees with the study done

by Kabir et al. (2010) where healthcare workers cited accidental exposure to infected blood samples as a mode of HBV infection route. HBV could be transmitted through many other routes, and inadequate knowledge of HBV among health workers may reflect their behavioural pattern to vaccination and safety measures.

Similarly, from the results, some of the respondents identified abdominal distension as a sign of HBV infection. This is in agreement with the findings Muljono et al. (2018) where health care workers in Indonesia identified similar condition as a sign of HBV infection. The symptom identified as abdominal distension could be as a result of respondents coming into contact with patients in the clinical environment with those symptoms. The results also showed that, majority of the respondents cited liver failure as a complication of HBV infection. This finding from the study is at variance with the study done by Karaivazoglou et al. (2014) where healthcare workers in a study did not have much knowledge on complications of HBV infection as liver failure.

One of the elements that could contributes to the prevention of vertical transmission of Hepatitis B among patients is the knowledge and compliance with the established actions for prevention, which depended mainly on the attitudes and practices of health care workers. Identifying and educating healthcare workers infected with Hepatitis B virus regarding vertical transmission and the need for pre-natal care is an important way of reducing mother to child transmission during childbirth. Enhancing the awareness of these professionals on HBV infection would serve as means of creating the awareness of the general population, since healthcare workers is the main source of information regarding health and the implementation of control and preventive measures to Hepatitis B virus infection.

5.4 Control Measures of HBV Infection among Respondents

Healthcare workers have higher risk of being infected with blood-borne diseases because of the constant contact with blood, body fluids and contaminated objects. In this study, it was found that, the level awareness among both HCWs and the comparison group was adequate.

The results of the study showed that majority of the respondents indicated were using personal protective equipment as a way of preventing HBV infection. This disagrees with the study done by Afihene et al. (2017) where most healthcare workers were not using hand gloves and complained of unavailability of those items.

Majority of the respondents in this study had containers for biohazardous waste. This agrees with the study done by Muljono et al. (2018) were healthcare workers indicated that they had waste containers. In preventing HBV infection, hospital waste management is very important aspect which should not be underestimated. Trained healthcare workers should be involved in monitoring for effective disposal of hospital generated waste. Health training programs and education should be organized regularly for healthcare workers on control of hospital infections. There should be comprehensive effort in dealing with staff safety which has many challenges.

Healthcare worker's knowledge and practices play a key role in preventing the spread infection. Preventive measures are necessary to control the spread Hepatitis B virus. This virus can spread without knowing because not all infections are symptomatic. From the results, majority of the healthcare workers indicated that they had taken the third dose of the HBV vaccination. This is a requirement to fully prevent one from contracting the virus. This is contrary to the findings of Bakry et al. (2015) where most of the healthcare workers in Uganda Hospital indicated that they had taken only a first dose of HBV vaccination.

The number of healthcare workers who had taken only first and second doses of HBV vaccines is of great concern. Interactions with some of these healthcare workers indicated that

they did not complete the vaccination requirement while others at the time of conducting the study had just begun the vaccination. This shows alarming evidence that very few health-care workers in sub-Saharan Africa report receiving vaccination against HBV (Kao & Chen, 2002). This is of critical importance since accidental injuries, both percutaneous and mucosal types, are common at the hospital. Moreover, some reports have indicated that sub-Saharan Africa has the highest incidence of occupational exposures in the world (Karaivazoglou et al., 2014).

The high prevalence of chronic HBV infection and risk factors for their transmission make prevention and control of these infections very critical for correctional health programs. In addition, because a substantial proportion of members of the community continue to acquire or transmit these infections at a high rate, correctional efforts should become part of prevention and control efforts in the broader community (Ozsoy et al., 2003).

Safe and highly effective vaccines to prevent HBV infection are available if tested non-reactive. Infection status and risk factors identification, combined with harm and risk-reduction counseling, and substance-abuse treatment, have the potential to prevent HBV infections and can also significantly lower the risk of acquiring diseases. Chronic HBV infection identification provides opportunities for medical evaluation and treatment of chronic liver disease, and measures to prevent further transmission.

The feasibility of including viral Hepatitis prevention activities in existing prevention programs has been demonstrated (Robotin et al., 2014). However, the integration of a comprehensive viral Hepatitis prevention and control programs faces a lot of challenges in correctional health settings. These involves staffing and budgetary constraints, lack of communication among correctional health and priorities that compete with preventive health care, public health, and private health-care systems. Preventive vaccination against Hepatitis B for hospital staff is standard in many countries but it is still not implemented in many rural

settings. From the results, most of the respondents working at the hospital indicated that they had not taken HBV vaccination. This is at variance with the study conducted by Afihene et al. (2017) where majority of the health workers in Bantama, Ghana indicated that they had taken HBV infection. Accidental exposure to blood and body fluids is common among healthcare workers and has been associated with occupational Hepatitis B infections which makes it worrisome as a result of low vaccination rate.

Hepatitis B vaccination coverage among healthcare workers is very low for various reasons in developing countries, including awareness, risk assessment, and low priority given by the health managements of both government and private hospitals (Nkonge et al., 2012). Post-exposure management strategies including the coordination among various departments for reporting, testing, and vaccination are not adequate in most hospitals.

There are many factors that increases the risks toward Hepatitis B infections, these include unprotected sexual intercourse, blood transfusion, needle stick injuries, splash, intravenous and/or intramuscular injections, and unvaccinated population (Lee, 2009). Knowledge regarding HBV infection can influence individual decisions on preventive measures.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The research identified that Hepatitis B prevalence was high among HCWs in Tamale Teaching Hospital. These factors were seen as the reason for the prevalence; low level of education among some cadre of staff, fomites were not sterilized as soon as possible but had a specified period and pressure on some staff of certain departments.

Generally, there was high level of awareness of Hepatitis B Virus diseases, though some category of healthcare workers were not well informed about the mode of infection of the disease. This was basically due to the level of education and the willingness of staff to learn. Some categories were not also informed about the reporting channel they need to do when they are injured in the course of duty.

Control measures to mitigate the rate of infection was also low. Lack of retractable syringes which is a key measure to avoid needle prick injury during recapping was a major issue. Though there was high usage of personal protective equipment, some of these equipment was reported to have expired. Lack of vaccination policy in the hospital is also a major factor. Low figures were reported to have vaccinated and that contributed to the high prevalence of the disease.

6.2 Recommendations

The following actions were recommended based on the findings of the study:

- Universal vaccination policy should be implemented for all Healthcare Workers to ensure that every staff is vaccinated to prevent infection.
- Since most of the Hepatitis B cases had history of needle stick injuries, healthcare administrator or managers should provide retractable syringes to healthcare workers to void such injuries during recapping.
- Health Care Workers should be educated on the prevalence of this infectious diseases, so as to take the necessary preventive measures.
- Hospital sterile equipment should be sterilized when necessary and not on specified bases such as daily or twice daily.
- Cleaners working at the hospital should be informed of reporting channels within the departments in cases of injury and skin contacts with patient's body fluids.

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APPENDICES

Appendix I: Questionnaires

QUESTIONNAIRE ON INVESTIGATION OF PREVALENCE OF HEPATITIS B AMONG HEALTHCARE WORKERS IN TAMALE TEACHING HOSPITAL

Instructions

You have been in a research study. Please note that by completing this questionnaire you are voluntarily agreeing to participate in this research study. You will remain anonymous and your data will be treated confidentially at all times. You may withdraw from this study at any time during the completion of the questionnaire. The questionnaire consists of four sections; Section A – Hepatitis B status; Section B – Practices; and Section C – Management.

Please complete the questionnaire in full. Mark the appropriate answer with a cross or write un the space provided.

SECTION A

1. What is your sex? (a) Male [ ] (b) Female [ ]
2. What is your age?

   ……
3. What is your marital status?

(a) Single [ ] (b) Married [ ] (c) Divorced [ ] (d) Widow [ ]

4. What is your religion? ……
5. what is your occupation?

(a) civil servant [ ] (b) self-employed [ ] (c) jobless [ ] (d) student [ ]

6. Area of residence? (a) Urban [ ] (b) Rural [ ]
7. Which department are you working? ……
8. Which category of staff are you?

(a) Nurse [ ] (b) Doctor [ ] (c) Lab technician [ ]

(d) Radiology [ ] (e) Pharmacy Staff [ ] (d) Cleaner [ ]

9. How long have you been working in the hospital?

.....

10. Have you ever heard of Hepatitis B viral infection? (a) Yes [ ] (b) No [ ]

11. What is your source of information about Hepatitis B? (a) School [ ] (b) Hospital[ ]
(c) Friends [ ] (d) Media [ ]

12. Have you ever had invasive procedure done on you? (a) Yes [ ] (b) No [ ]

13. Have you ever been transfused? (a) Yes [ ] (b) No [ ]

14. Have you ever had signs of jaundice (yellowish eyes)? (a) Yes [ ] (b) No [ ]

15. Have you ever had skin contact with patient's body fluid? (a) Yes [ ] (b) No [ ]

16. If Yes in (Question 10) what kind of fluid (you can mention more than one)?

……

……

17. Have you ever been injured in the course of performing a procedure?

(a) Yes [ ] (b) No [ ]

18. If Yes in (Question 12), what kind of instrument or sharps injured you?

……

……

19. What kind of procedure were you performing in (Question 12), when you became injured?

……

……

20. Do you know your Hepatitis B test status? (a) Yes [ ] (b) No [ ]

21. If No in (Question 15), why?

……

……

22. If Yes in (Question 15), what is your serologic test status?

(a) Positive (HBsAg) [ ] (b) Negative (HBsAg) [ ]

SECTION B

23. Do you have PPEs? (a) Yes [ ] (b) No [ ]

24. Do you wear gloves anytime you are handling patient's sample?

(a) Yes [ ] (b) No [ ]

25. State your reason for Question 19.

……

……

26. Have you ever had a torn glove during a procedure? (a) Yes [ ] (b) No [ ]

27. If Yes in (Question 21), what do you think was the cause?

……

……

28. Do you have containers for sharps? (a) Yes [ ] (b) No [ ]

29. If Yes in (Question 23), are they placed in places convenient for you?

(a) Yes [ ] (b) No [ ]

30. Do you have containers for other used items? (a) Yes [ ] (b) No [ ]

31. Do you use retractable syringe and needle? (a) Yes [ ] (b) No [ ]

32. If No in (Question 26), why?

……

……

SECTION C

33. Is there Hepatitis B vaccination policy in the hospital? (a) Yes [ ] (b) No [ ]

34. If Yes in (24), have you vaccinated? (a) Yes [ ] (b) No [ ]

35. What state of the vaccination series are you?

(a) First [ ] (b) Second [ ] (c) Third [ ]

36. Did you take the booster dose? (a) Yes [ ] (b) No [ ]

37. Is there a reporting channel for those injured in the course of performing a procedure?

(a) Yes [ ] (b) No [ ]

38. Is there an incidence book in your unit? (a) Yes [ ] (b) No [ ]

39. How often do you sterilize your instrument?

(a) Two times daily [ ] (b) Daily [ ] (c) When necessary [ ]

40. What are the signs and symptoms of Hepatitis B viral infection?

(a) Jaundice [ ] (b) Swollen abdomen [ ] (c) Fatigue [ ] (d) Muscles and joint pains [ ]

41. What is the mode of spread of Hepatitis B virus?

(a) Horizontal [ ] (b) Vertical [ ] (c) Unsafe needles [ ]

THANK YOU!!

Appendix II: Consent Form for Health Care Workers

CONSENT FORM FOR HEALTH WORKERS

Form number [ ]

Project Title

Prevalence of Hepatitis B Virus infection among healthcare workers in Tamale Teaching Hospital.

Name and Address of Principal Investigator

I Chimsi Ibrahim, Department of Biological, Environmental and Occupational Health Science, School of Public Health, University of Ghana, Legon. Or School of Hygiene, P. O. Box 753, Accra

Institution affiliated

School of Public Health, University of Ghana, Legon, Accra

Introduction

I am a student from the school of public health, University of Ghana, conducting a research on prevalence of Hepatitis B virus infection among healthcare workers in Tamale Teaching Hospital. Please, spend some few minutes to fill the questionnaire designed to collect data for the research. All information collected will be treated as confidential and no one will be able to trace any information back to you.

Procedure

The study is targeted at healthcare workers who work in the various departments of the Tamale Teaching Hospital and are exposed to various kinds of infections. Selection of participants is by simple random sampling for all other staff. Participation is voluntary. Participants will be made to complete a questionnaire and return to the principal investigator.

Risks and Benefits

Participants may feel uncomfortable with some of the questions, however, they will be helpful for the purpose of the research and may contribute to evidence based policy guidelines for HBV control in healthcare workers in the Tamale Teaching Hospital.

Right to refuse

Your consent to participate in this study is voluntary, you are not under any obligation to participate, and you are at liberty to withdraw from this study at any point in time. I will however appreciate it, if you could stay on till the completion of the study.

Anonymity and confidentiality

I assure you that any information given will be used purely for the purpose of this academic research. All information given will not be disclosed to anyone. Your name will not be used in any report, but your ideas and suggestions will help us to design programs and policies that will improve upon the health of healthcare workers in Tamale Teaching Hospital.

Participant's right

This research has been reviewed and approved by the Ethical Review committee of the Ghana Health Service. If you have any questions about your rights as a research participant, you can contact the Ethical Review Co-ordinator on 0507041223 (Ms. Hannah Frimpong)

Do you have any question(s) to ask me? If yes, please note the question(s) below.

Voluntary agreement form for healthcare workers

The above document describing the benefits, risks and procedures for the research topic: "prevalence of Hepatitis B virus among healthcare workers in Tamale Teaching Hospital"

I have read and understood the content of this consent form. I have been given an opportunity to ask question(s) about the research. I agree to participate as a participant.

Name:……..……..

Signature: …… Date:……

Interviewer's statement

I ……., the undersigned, have explained to the subject in the language he/she understand and the participant has agreed to take part in the study.

Signature: …… **Date:…….**