



SEROPREVALENCE OF HEPATITIS B VIRUS INFECTION AMONG PRECLINICAL STUDENTS OF KAMPALA INTERNATIONAL UNIVERSITY WESTERN CAMPUS UGANDA: A CROSS- SECTIONAL STUDY

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Abstract: The prevalence of hepatitis B virus infection among medical professionals is of great concern and this was due to increase in risky activities during clinical training such as needle stick injury, frequent contact with blood and other body fluids; and risky behaviours outside the clinical areas such as having unprotected sex, and injecting drugs. A descriptive cross-sectional study on preclinical students who are yet to be placed or begin practice in the clinical areas was conducted at Kampala International University Teaching Hospital (KIU-TH) in Ishaka sub-county, Bushenyi district in western Uganda between December, 2014 and January, 2015. The purpose of the study was to determine the sero-prevalence of Hepatitis B virus infection among preclinical students of Kampala International University western campus (KIU-WC) and also, to know medical students who were infected before their enrollment in medical school and those who will be found negative; to be vaccinated before going into the clinical areas. A total of one hundred and fifty (150) research participants were recruited for the study using a cluster and simple random sampling technique. Samples were collected from preclinical students of Medicine and surgery, Medical laboratory sciences, Nursing and Pharmacy department. All blood samples collected into a plain tube were allowed to clot and centrifuged to obtain serum; this is because, serum is the most preferred sample in serological testing for antigen and antibody dependent. Samples were tested for HBsAg with SD BIOLINE United States of America (USA) immune chromatographic rapid test strips with high sensitivity of 99.8% and specificity of 100%. Data on risk factors were collected using a structured closed ended questionnaire. The prevalence of hepatitis B virus (HBV) infection in this study was 4% which is lower among the preclinical students of Kampala International University (KIU). Fisher exact test was done to determine significance to risk factors in this study were needle stick injury, contact with blood and blood transfusion were significantly associated with HBV infection at p-value of 0.05. There is need for preclinical student to know their HBV status and those tested negative be vaccinated and this will give a clear source of HBV infection among medical students. This is important in order to avoid students' parents and guidance taking legal action against institutions of learning in the name of infecting their children in the clinical areas during training.

Index Terms - Sero-prevalence, Hepatitis B, Preclinical Students, Risk Factors, Virus Infection

I. INTRODUCTION

Hepatitis is an inflammation of the liver, most commonly caused by viral infection. Viral hepatitis is a serious public health problem affecting billion of people globally. Hepatitis B virus (HBV) is among the principal cause of severe liver disease, including hepatocellular carcinoma and cirrhosis related end-stage disease [1]. Hepatitis B virus (HBV) infection is mostly transmitted through mucosal exposure to an infected blood and other body fluids; it was observed to come from various human contacts: mother to child; nonsexual means such as contacts with infected surfaces; sexual means; needle-sharing; and occupational related especially, commonly seen amongst healthcare workers and medical students in general. Also, persons who tested positive with hepatitis B surface antigen (HBsAg) are potentially infectious to both household and sexual partners and the need to identify carriers in our society is paramount for effective control and prevention [2].

The world health organization has estimated that there are 360 million persistently HBV infected people and 5.7 million HBV cases worldwide. The highest rates of Hepatitis B surface antigen (HBsAg) carrier rate are found in developing countries with prehistoric limited medical facilities. Among the six types of hepatitis to be precise A, B, C, D, E and F, Hepatitis B virus causes the most serious form of hepatitis infections compared to the rest. It can exist in an individual with other viral and bacterial infections [3].

In areas like Africa and Asia, widespread infection may occur in infancy and childhood with prevalence of about 15%. The prevalence is lower in countries with the highest standard of living, such as Syria, Britain, Canada, United States, Scandinavia and other European nation [4]. A study in Ethiopia indicated greater knowledge of hepatitis B virus (HBV) infection, its modes of transmission and guidelines for its prevention and control; completion of three doses of HBV vaccination was very low despite the continuous exposure to needle stick injury and contact with blood reported by various health facilities [5].

In Uganda according to the national sero-survey done in 2005, the prevalence of chronic HBV infection was found to be 10% with regional variations from 18-24% in Northern and west Nile regions to 4% in southern Uganda, [6] and 5% in central Uganda, [7]. The HBV risk factors include commercial sex, more than two sexual partners, marital status, religion, lack of male circumcision, ear or nose piercing, body tattooing, surgical procedures, sharing of needles, [8]. Though HBV infection is endemic in Uganda and transmission occurring in both childhood and adulthood; immunization against hepatitis B virus must be sustained since, is the only way to prevent spread of the infection [7]. Looking at the endemic nature of HBV infection in developing countries including Uganda, the only way to control its spread is to identify the carriers of the infection and vaccinate persons who tested negative against HBV [6].

II. RESEARCH METHODOLOGY

2.1 Study area

The study was conducted at Kampala International University Western Campus (KIU-WC) Ishaka-Bushenyi district western Uganda. KIU-WC is the leading private institution in Uganda and has the largest private own University Teaching Hospital in Uganda. It is located along Mbarara-Kasese highway and bordered by Rubirizi to the North-West, Buhweju district to the North-East, Sheema district to the East, Mitooma district to the South and Rukungiri district to the West. KIU-WC has students from across African nations such as Kenya, Nigeria, Rwanda, Cameroon, Tanzania, DR-Congo, Burundi, Somalia, and South-Sudan to mention but few. The people of the district are low income earners and are engage in agriculture crop farming, dairy farming, trading and cattle rearing.

2.2 Study design

This was a cross sectional descriptive study involving blood sample collection from pre-clinical students of Kampala international university teaching hospital (KIUTH) during the period of the study.

2.3 Study population

The study populations were all the pre-clinical students of Kampala international university studying (Medicine and surgery, Medical laboratory sciences, nursing and Pharmacy) that are yet to be placed into the clinical areas during the study period.

2.4.1 Inclusion criteria

All the pre-clinical students in second and third year of Kampala International University western campus who consented and are yet to be placed in the clinical areas were recruited for the study.

2.4.2 Exclusion criteria

All the pre-clinical students in second and third year of Kampala International University western campus who were already in clinical areas and were not willing to consent to participate in the study were excluded.

2.5.1 Sample size

This was determined according to the formula of Kish and Leislie (1963)

$$n = \frac{z^2 pq}{\sigma^2}$$

Where;

n = Number of Samples required

p = Estimated prevalence of HBV infection of 11% [9].

z = Confidence interval = 1.96

σ^2 = Allowable error of 5% (0.05)

q = 1-p (p = 11%)

Substituting the formula:

$$n = \frac{1.96^2 \times 11 \times 89}{5^2}$$

N = 150

Therefore, 150 participants were recruited for the study.

2.5.2 Sampling procedure

A clusters and simple random sampling technique was used to determine number of participants from each department. A convenient sampling technique was employed during blood collection and testing of samples from participants.

2.5.3 Sample collection

Using needles and syringes, 2mls of venous blood samples were taken from each participant using aseptic technique from the vein on the anterior aspect of the forearm and transferred into a vacutainer tube labelled with each participant's study number. The clotted blood was centrifuged and serum extracted for analysis of hepatitis B surface antigen (HBsAg). Data on demographic and risk factors was collected using a structured questionnaire.

2.5.4 Sample analysis

One step HBsAg dipstick (SD BIOLINE USA) immune chromatographic rapid test was used to screen for HBsAg in serum following standard protocols provided by the manufacturer. The result was recorded in a laboratory work sheet.

2.6 Data analysis

Collected data was summarized and entered into Excel spreadsheet and was exported to Statistical Package for Social Sciences (SPSS) where it was analysed. Fisher exact test was done to determine significantly associated risk factors to hepatitis B virus (HBV) infection using statistical package for social sciences (SPSS) analysis software. Results were presented in table, the prevalence was presented in pie-chart and the distribution of the research participants presented in bar graph.

2.7 Ethical considerations

Permission to carry out the study was obtained from research ethics Committee School of Allied Health Sciences of Kampala International University-Western Campus. Permission to conduct the laboratory analysis was obtained from the management of Kampala international university teaching hospital (KIUTH). Research participants were informed about the study in the language they best understood and those who consented; their blood was taken and tested for HBsAg. Confidentiality was maintained by the use of code numbers to de-identify the participants; Participants were informed that they are free to withdraw from the study at any time they feel they should without any consequences.

2.8 Quality control

Professional ethics was sought and highly maintained at all levels of Sample collection, processing and analysis and this was done with the aid of standard operating procedures (SOPs). Positive and negative controls were used along with the test sample to ascertain the functionality of each batch of HBsAg test strips.

III. RESULTS AND DISCUSSION

3.1 Results of Descriptive Statics of Study Variables

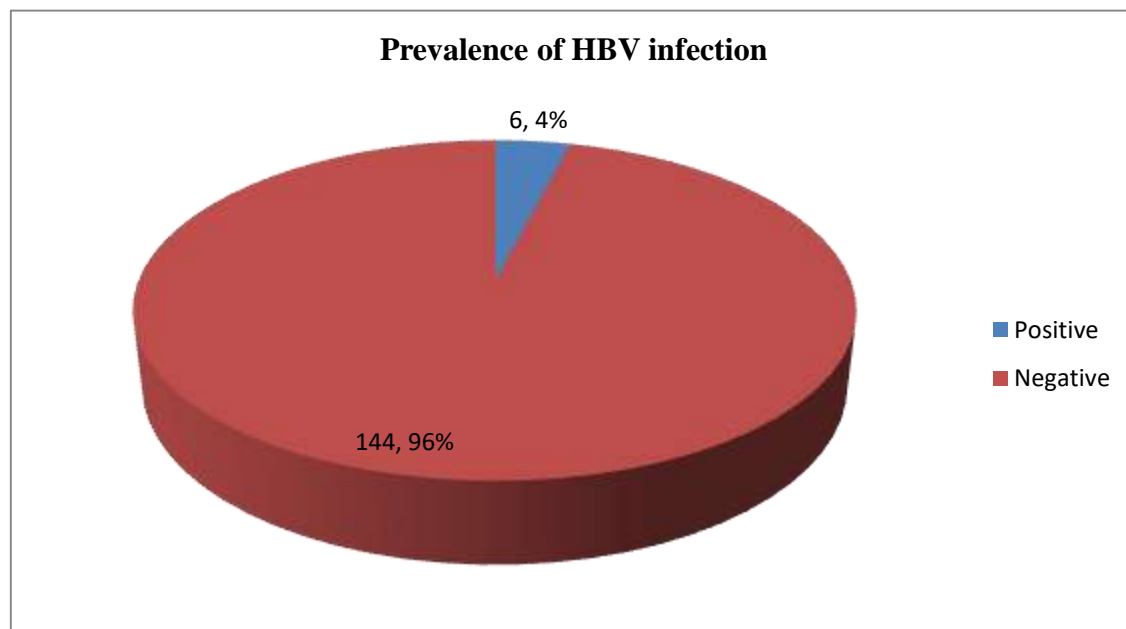


Figure 1: Prevalence of HBV infection: The above figure showed the prevalence of 4% out of 6 positive among the total participants of 150.

A total of 150 participants were involved in the study where their blood samples were collected and tested for HBsAg. The overall prevalence of HBV infection in this study was found to be low [Fig. 1] and similar with the findings by other researchers; [10], [11], [12]. [13] and [14] who all reported HBV infection prevalence to be low in their studies. A higher prevalence was reported in Makerere University by [9]. Among the study participants, all who tested positive are students of Medicine and surgery while their counterparts (Medical Laboratory, nursing and Pharmacy none tested positive [Fig. 2]. This could be because, the medicine and surgery students were mostly always engaged in practical areas right from basic biomedical courses compared to students from the other departments and thereby, exposing them to high risk of infection.

Table 1: Risk factors to HBV

The Chi-square test with Fisher exact on needle stick injury, contact with blood, and blood transfusion are significantly associated with HBV infection as indicated on the table below

Risk Factor	Chi-Square	P-Value (0.05) Fisher Exact
Gender	0.69	0.344
Needle stick injury	24.16	0.04*
Drinking of Alcohol	0.00	1.0
Contact With Blood	18.24	0.00934*
Male Circumcision	0.12	1.00
Blood transfusion	17.46	0.013*
Tattooing on The Body	6.86	0.116
Number of Lifetime Sex Partner	6.99	0.142
Number of Medical Injection	10.98	0.147

Key: *Indicated significant

On risk factors, the finding of this study shows that all the participants have knowledge on HBV infection and this can be compared with findings by [15] on the risk factors, needle stick injury, contact with blood and ever transfused with blood were significantly associated with HBV infection [Table 1]. The finding in this study can be compared with a study by the following researchers [10], [13] and contrary to a study by [7] which in their study reported age, poverty, ethnicity, uneducated, occupation among associated factors to HBV infection. Though, this study recorded positive cases of HBV infection, it is difficult to link the prevalence in this study to the exposure within the teaching hospital as most of the participants had not yet been placed in the clinical areas and this limited the sources of infection to other factors other than those mentioned in this study.

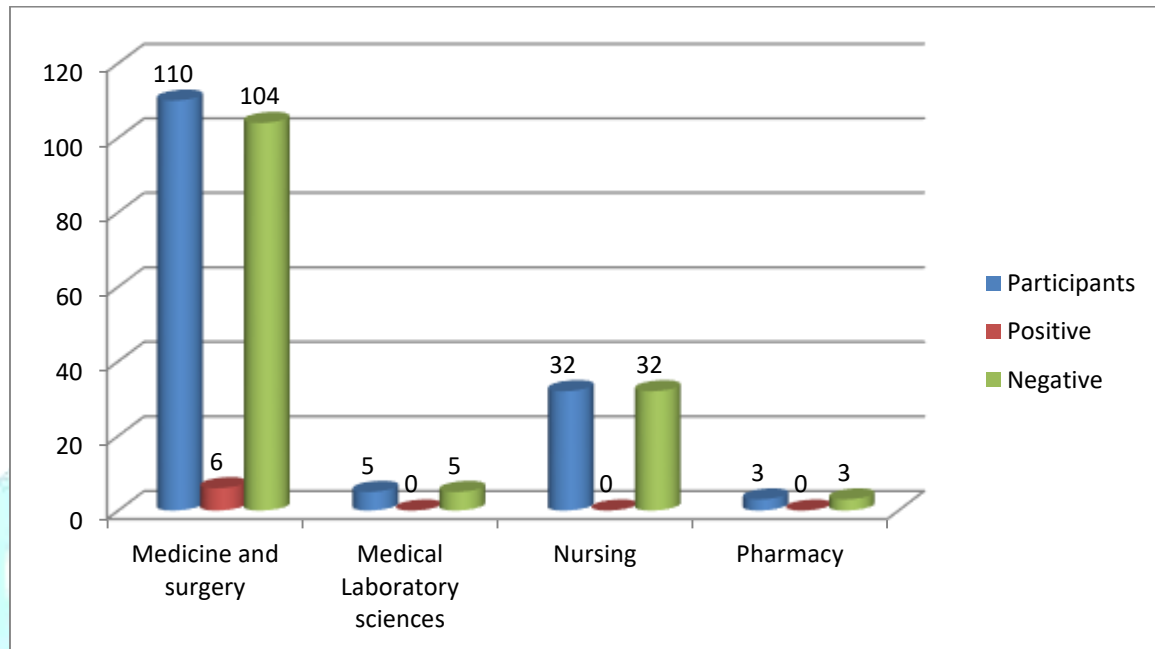


Figure 2: Distribution of HBV infection by departments

The figure above indicated the distribution of HBV infection according to department with Medicine and surgery having 6 sero-positives out of 110, Medical laboratory; Nursing and Pharmacy have no sero-positive among the participants. The reason for HBsAg positives among Medicine and surgery students was because of their early exposure to basic clinical areas than their counterparts and this was due to high expectations required of them in the field of medicine.

Conclusion

The prevalence of hepatitis B virus (HBV) infection among preclinical students in this study is found to be low however; preclinical students need to be aware on the following risk factors of HBV infection which are contacts with blood, needle prick, transfusion of infected blood and unprotected sexual intercourse. This study recommends the sensitizations of pre-clinical students' especially, those in second and third years who are at the point of going into clinical areas about the modes of transmission, and the need to know their status by blood test before going into the clinical areas and those who are found negative be vaccinated against HBV and this will help to prevent its spread among medical students in clinical areas. Further research should focus on health workers and clinical students who still practice in the clinical areas and did not complete their vaccination against hepatitis B virus.

III. ACKNOWLEDGMENT

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Conflict of Interest

The authors declare no conflict of interest in regards to this research.

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