Seroprevalence of hepatitis B virus among secondary schools in Tandlte - White Nile state central of Sudan 2015

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Abstract

Hepatitis B Virus (HBV) the major causes of morbidity and mortality worldwide, Sub-Sahara Africa bears the greatest burden for HBV.

HBV infections ranges from (3%-5%) in northern Africa to (10%-20%) in sub Sahara Africa.

A cross-sectional study was used to determine the prevalence, and associated factors for HBV and history of vaccination among students of secondary schools in Tndlte town in White Nile state. About 384 students were recruited consented. Then data was collected using questionnaires and SPSS 15.0 Evaluation Version Production Mode Facility was used for data analysis.

The study was carried out in July 2015. Students comprised 384 randomly selected from 5 secondary schools, from total 384 students 212 female and 172 male; 187 (49%) reacted positively for HBsAg from 384, 116 (62%) of whom were female, 71(38%) male. Only 5 students were married (2.7%).

Keywords: (HCC) hepatocellular carcinoma, (NGOs).governmental organizations

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Introduction

Worldwide approximately 2 billion individuals, a third of the world's population, have been infected with the hepatitis B virus (HBV)1 It is estimated that there are over 350 million chronic carriers infected with the virus across the globe2 The World Health Organization estimates that 1- 2 million deaths occur annually as a result of HBV infection 2 Approximately 25% of HBV chronic carriers develop chronic hepatitis, liver cirrhosis and hepatocellular carcinoma (HCC. HCC is the fourth most common cause of mortality from cancer and the eighth most common incident cancer worldwide 3 It is estimated that 54% - 80% of liver cancers can be attributed to HBV chronic infection 3.2 The HBV is described as the world's most common carcinogen, second only to tobacco 4. The course of infection depends on the age at exposure to HBV, with age at infection being the major determinant of whether a person becomes a chronic carrier. The risk of becoming a chronic carrier and consequently developing complications of HBV chronic infection is inversely proportional to age 5 The distribution of HBV chronic carriers is not uniform across the globe and the majority of HBV chronic carriers are found in developing countries. Liver cancer is also mainly a problem of developing countries, which contribute 81% of all deaths resulting from liver cancer 3 The global distribution of HCC follows a pattern similar to that of HBV chronic carriers and occurs predominantly in regions where HBV infection is highly endemic, particularly China and Sub-Saharan Africa. In 1982, a vaccine was licensed for active immunoprophylaxis against HBV infection. The first vaccines available were plasma derived but later recombinant vaccines were developed. Both types of vaccine have proven to be safe, highly effective, and, recently Cost-effective, available at a cost most countries can afford. As the success of treatment for HBV infection remains low and antiviral therapy expensive, prevention of infection by vaccinating with hepatitis B vaccine remains the best option for health ministries and policy makers. In 1991 the World Health Assembly (WHA), recommended the integration of hepatitis B vaccines to immunization campaigns of countries with an intermediate to high endemicity by 1995, and to all countries by 1997. Although many countries have adopted this recommendation whilst struggling to keep their health systems afloat the main challenge facing developing countries is reaching highly deprived populations through a primary health care infrastructure that is in many cases exhausted and short of funds 2.

Hepatitis B is a serious and common infectious disease of the liver, affecting millions of people throughout the world 6.

The severe pathological consequences of persistent HBV infections include the development of chronic hepatic insufficiency, cirrhosis, and hepatocellular carcinoma (HCC). In addition, HBV carriers can transmit the disease for many years 7.

More than 2 000 million people alive today have been infected with HBV at some time in their lives. Of these, about 350 million remain infected chronically and become carriers of the virus 6

Every year there are over 4 million acute clinical cases of HBV, and about 25% of carriers, 1 million people a year, die from chronic active hepatitis, cirrhosis or primary liver cancer8.

In Sudan across sectional study was done in Gazira state of central Sudan.

A total of 404 subjects were included in the study, the mean age being 35 years with an age range of 8-90 years. 54.9% of the subjects were female, 51.2% had a history of jaundice, 30.7% had dental treatment, 18.8% received parenteral antischistosomal therapy, 11.2% had a previous history of surgery, 5.1% received a blood transfusion and 2.7% had a tattoo / scarification on examination. HBsAg was reactive in 6.9% of subjects; there was no statistically significant difference regarding infection rate in different age groups .HBcAb was reactive in 47.5%. Exposure to HBV infection was highest in those over the age of 50 years (68%) and lowest in those under the age of 10 years (12.5%) . The only significant risk factors for HBV exposure were a previous history of parenteral antischistosomal therapy and increasing age 9.

Rationale

Hepatitis B is infectious diseases that threaten life and cause serious complication such as liver cancer. This research was conducted among student of secondary schools in White Nile state in Tndlte town, to determine the proportion of disease through them and the risk factors that spread the disease.

To the best of our knowledge, this is the first study in Sudan investigating the Prevalence of hepatitis B virus and their related risk factors among secondary school students.

Study of prevalence of HBV is necessary for ongoing preventive strategies regarding prevention of diseases.

Objective

General objective:

To study seroprevelance of hepatitis B virus among secondary schools students in Tandlte in white Nile state.

Specific objective:

To identify the risk factor of hepatitis B infection among schools students in Tndlte.

To asses scociodemogrophic characteristic of the participants.

To determine the seroprevelance of hepatitis B infection among participant.

Materials and Methods

Study Design : Cross sectional descriptive study.

Study Population : This study was conducted on student in Tandlte secondary schools aged between (14-20) in the White Nile state.

55 students from Al-Gdema school for females, 63students from Al-Anwar secondary school for females and males,13 students from Ebn-Albytar secondary school for males and females ,and 125 students from Al-Gdema secondary school for males, 128 students from AL-Hga Madena secondary school for female were included in the study.

Study area: This study was conducted in five secondary schools in Tndlte Town in the White Nile State.

Sample size: 384 blood samples.

Sample collection and transport of blood: After ethical approval, with extreme precaution and under strict sterile condition, a five ml of whole venous blood samples were collected from each individual by trained technician.

The blood samples were collected in sterile plain containers (without any anticoagulant) serum was aseptically separated after clot retraction by leavedthe container blood in a standing position for about 20-30 minutes. Serum was then stored at -20°C until tested.

An ELISA technique was applied to detect HBsAg in the serum.

Data collection: Laboratory tests and questionnaire containing the information like age, sex and possible risk factors.

ELISA by Murex HBsAg version 3 kit:HBsAg was tested using the appropriate Enzyme–linked Immunosorbent Assay (ELISA) technique using micro–ELISA kit supplied by Murex HBsAg version3 kit.

The preparation of materials provided in the ELISA: All the reagents and samples were brought to 15- 25c before the beginning of the test (without removing the test plate from the container). Stock wash buffer was diluted 1to 19 with distilled or demonised water.

Substrate solution was prepared by added volume of colorless substrate diluent to an equal volume of pink substrate concentrate.

Test procedure: The ELISA test was done according to the manufacturer's instructions. Briefly, 25µl of sample diluents was added to each well. 75 µl of samples, positive control, and negative control was added to the numbered wells (one sample/well). The plate was incubated at 37 ^{o}C for one hour. After one hour, 50 µl of HRP conjugate anti-HBsAg antibodies was added to each well. The plate was incubated at 37 ^{o}C for 30 min. After removal of the solution, wells were washed 5 times with washing buffer. Then, 100µl of substrate solution was added into each well and the plate was incubated at 37 ^{o}C for 30 minutes. Then, 50ul of stop solution was added into each well. The plate was read at wavelength 450 nm - 630nm.

Interpretation of ELISA results: The results were calculated by relating each samples optical density (OD) value to the cut off value (C.O).

Calculation of cut-off (C.O) value was according to the following formula:

C.O. =NC*+ 0.05

NC*=the mean absorbance value for tow negative control.

Test results are interpreted as ratio of the sample's OD and thecut-off value as the following:

Non reactive result: samples giving an absorbance less than cut-off.

Reactive result: samples giving an absorbance equal or greater than cut-off.

Statistical analysis: Statistical analysis was conducted using SPSS (version 15.0) software. Descriptive analyses of percentages of categorical variables were reported using chi square X^2. An alpha value of < 0.05 denoted a statistically significant difference in statistical comprises.

Results

Out of 384 students aged (13-20) years screened for HBsAg status, 187 subjects positive given a prevalence of 49 %.(pv 0.14)

The distribution of HB infection according to gender ,higher prevalence was found among female (55%,212/384),than male (45%,172/384).Was statistically significant .(pv 0.00)

They was statistical difference between HB infection and marital status, all students married were positive for HB infection (100%,5/5.),while the prevalence among who were single (48%,182/379).(pv 0.02)

Percentage distribution of HBsAg infection among students in relation to some risk factors that might be associated with virus, There was a statistically significant association between the blood transfused (p<0.02), family history (p=0.05), history of vaccination (p<0.02) and hepatitis virus infection (Table3. 3)

No statistically significant relationship between surgical operation and HBV (p=0.86)
(Table3.3)

Students Age: Student's age ranged between 13 to 20 years.

Students sex: From the 384 students tested, there are 172 male and 212 female (table 1.).

For male students the percent is55%, while female students are 45%.

Table 3.1. Distribution of student according to the gender

Gender	Frequency	Percent
Female	212	55
Male	172	45
Total	384	100

Table 3.2. Description of hepatitis B seropositive among the gender of study group

Gender	Result		Total
	Negative	Positive	
Female	96 41%	116 59%	212 100%
Male	101 59%	71 59%	172 100%
Total	197 51%	187 49%	384 100%

Table 3.3: Epidemiological and risk factors among surveyed subjects for HBV infection

Possible risk factors		HBV +ve N=187	HBV –ve N=197	P value
History of vaccination	Yes	0	0	0.02
	No	187	197	
Surgical operation	Yes	20	20	0.86
	No	167	177	
Family history	Yes	39	53	0.05
	No	148	144	
Blood transfusion	Yes	8	0	0.02
	No	179	197	

Discussion

In this study, 187(49%) of the participants were positive for HBsAg. This figure is alarming considering the future role of these youths in the economy of a developing country like Sudan. The danger is that these carriers, though asymptomatic might serve as reservoir of the virus and a medium for spreading infection among other children.

The risk of subsequent chronic HBV infection is about 90% for infants, 25% to 50% for children aged one to five years, 5% to 10% for adolescents and 1% to 5% for adults. This correlates with the result obtained in this study with subjects aged (13-20) years. In the United Nations majority of acute HBV infection occur in teenagers and young adults. Half.

of these youths never develop symptoms. In a similar study conducted by.15 Ndako et al, 2011 it was found that subjects aged 15-19 a recorded Prevalence of 18.1% a within the age group where the highest number of positivity occurred Similarly,when gender was considered,males recorded 13.5% seropositivity compared to females with 16% which is at variance with the result obtained by 10 in a study conducted among students where males had a prevalence of 25.5% compared to

females with 10.9%. An observation in this study (Table 3.1) was that more females (55%) were infected with HBV than males (45%) was no obvious explanation for the difference in gender as a risk factor for these viral infections, similarly.11

In comparing risk behaviors based on clinical history among males and females, no significant difference, among the two groups was recorded. This correlates with a similar work carried out among students in Jagindi Tasha Jema'a Local government Area Kaduna State by.10. The high prevalence observed may be due to contact through other risk factors. This study generally has given an over view of HBV activity in my location of study. However, acute HBV infection occur in individuals with no identifiable risk factors (Nature and Science 2012) in which the mode of transmission is unknown among one third of new cases reported 6.

Conclusion

In this study, it was discovered that most of the subjects screened had no knowledge of hepatitis B virus (HBV). Since the subjects in this area live a communal life of sharing things in common, the prevalence recorded is alarming considering the mode of lifestyle and predisposing risks outlined which calls for enlightenement on the various risk factors that can predispose these youths to HBV infections also of equal importance is the need for routine screening and management of infected individuals which would l help reduce the cycle of transmission.

Finally, mass immunization of children and adolescents against HBV should be embarked upon by the Sudan Government and Non - governmental organizations (NGOs).

Recommendations

There are needs to develop information, Education, and Communication, mainly utilising radio to educate the population about the importance and benefits of antenatal care during pregnancy, vaccination in general, and hepatitis B vaccination specifically.

- Adoption of the PCR method to test for HBV because of its increased sensitivity compared to ELISA and because it reflects the current situation of positive patients.

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