

Research

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Prevalence of Hepatitis B Virus among Blood Donors and Assessment of Blood Donor's Knowledge about HBV in Sudan

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ABSTRACT

The prevalence of Hepatitis B varies between different regions of Sudan according to several published reports, but no data is available about the prevalence of HBV in all Sudan states, in a given time. The objective of this study was to determine the seroprevalence of hepatitis B virus among blood donors in all Sudan states in the years 2012-2014, its also assess the knowledge of blood donors about HBV modes of transmission, complications and preventive measures. A total of 200 blood donors presenting to the central blood bank were interviewed to assess their knowledge together with collection of retrospective data from monthly reports delivered to the central bank from regional blood banks to calculate the prevalence of HBV in the contributing States. The study revealed poor knowledge about HBV transmission and its consequences and the degree of knowledge was not related to the level of education. The majority of study population was not vaccinated, mainly due to lack of awareness about hepatitis B vaccine.

The study also included the prevalence of HBV in all Sudan states in 2012-2014. In 2012, the prevalence ranged between 0.1% in Northern State and Nahr Alnile to 15.7% in South Kordofan. In 2013, the prevalence ranged between 0% in Northern State to 12.3% in the White Nile State. In 2014, it was between 0.5% in Northern State to 8.8% in Al-Gadarif state. It concluded that despite the difference in prevalence between the states and the difference of prevalence in the same state over the years, the overall rates are lower than those previously reported. Poor knowledge about HBV risk factors, complications and preventive measures, was observed in all sectors, even in those with higher level of education. Lack of knowledge is a major obstacle in controlling HBV transmission.

KEYWORDS: Vaccine; Virus; Liver cirrhosis; Hepatitis; Blood bank.

INTRODUCTION

Hepatitis virus infections are the most common cause of liver disease worldwide. Sudan is classified among the countries with high hepatitis B virus seroprevalence Hepatitis B Virus (HBV) infection is a global public health problem. It is estimated that there are more than 350 million HBV carriers in the world, of whom one million die annually from HBV-related liver disease.¹ The implementation of effective vaccination programs in many countries has resulted in a significant decrease in the incidence of acute hepatitis B. Nevertheless, hepatitis B remains an important cause of morbidity and mortality.

Sudan is classified among the countries with high HBV endemicity. Earlier studies

carried out in the 80's and 90's estimated higher rates of HBsAg of 17.5% among asymptomatic blood donors.² The screening of blood donations for HBV was introduced throughout the country in 2002, before which time screening was performed in only a few centers in Khartoum. Vaccination for HBV was included as part of the extended programme of immunization in 2005. The introduction of vaccination and the screening of blood and blood products reduced the rate of HBV infection and the carrier pool.³ In more recent studies, the HBV seropositivity varies between different regions of Sudan, but ranges between 5 and 7% in the general population.³⁻⁶ More than a decade passed since the introduction of blood screening in blood banks, and this study is to monitor how much this together with other measures including vaccination were effective in reducing the infection rates of HBV. No recent data is available about the prevalence of HBV in all Sudan states, in a given time. The available data are scattered data of some states that included small numbers of patients.

One of the major factors attributing to increased transmission of HBV is the lack of awareness about the prevalence, mode of transmission and preventive measures. The study is designed to test the knowledge of blood donors about HBV. The study population were usually young and middle aged males, representing the most productive age group. Infection of this age group with HBV, HCV or HIV, has a major impact on the population as a whole. Knowledge and awareness about the mode of transmission is important for the planning and preventive health education programme. Disease control by preventive strategy is more effective than a curative one.

METHODOLOGY

200 males presenting to the national blood bank for blood donation are approached to participate in this study, after an informed verbal consent for acceptance, a structured questionnaire including age, marital status and level of education is filled. The questionnaire also tests the donor's knowledge about risk factors and mode of transmission and the consequences of HBV infection. Donors were asked if they were vaccinated and whether they are interested to know the results of their viral screening.

Retrospective data regarding the prevalence of HBV in the years 2012, 2013 and 2014 was collected from monthly reports delivered to the central bank of blood services from the Sudan States major blood banks. The number of states included in the study was 15 states in 2012, 17 states in 2013 and 18 states in 2014. Methods for screening for HBsAg differ between states; some states use ICT for testing, others use ELISA, and some states use both methods.

The data was analyzed with statistical package for social sciences (SPSS 11.5). The results were presented in tables, discussed and compared with local and international studies.

RESULTS

200 blood donors were included in this study, to test their knowledge regarding HBV out of which 30% were under the age of 25 years, 49% were between 25-35 years, 19% were between 36-45 years and 2% were above the age of 46 years. Sixty two percent of the donors were single and 38% were married. (Tables 1-3)

State	Total no. of donors tested	No of HBV +ve Donors	Percentage
Khartoum	19450	710	3.65%
Al-Gezira	109588	4851	4.4%
Sinar	7873	159	2%
Kassala	6099	225	3.67%
Red Sea	4602	74	1.6%
A-Gadarif	1850	56	3%
Blue Nile	3125	68	2.17%
White Nile	5162	301	5.83%
Nahr El Nile	4956	8	0.1%
Northern state	2561	5	0.1%
North Kordofan	5409	179	3.3%
South Kordofan	4248	670	15.7%
North Darfor	5331	230	4.3%
South Darfor	4834	124	2.5%
West Darfor	1984	127	6.4%
Total	187072	7787	4.1%

Table 1: Prevalence of HBV among blood donors in fifteen states in 2012.

State	Total no. of donors	No of HBV +ve Donors	Percentage
Khartoum	120850	5680	5.49%
Al-Gezira	13583	746	4.7%
Sinar	12784	407	3.1%
Kassala	7780	447	5.74%
Red Sea	4524	103	2.2%
A-Gadarif	66655	3140	4.71%
Blue Nile	3601	166	4.61%
White Nile	3331	410	12.3%
Nahr El Nile	2232	38	1.7%
Northern state	263	0	0%
North Kordofan	4651	282	6%
South Kordofan	1976	94	4.75%
North Darfor	3157	249	7.88%
South Darfor	8364	502	6%
West Darfor	1741	118	6.77%
East Darfor	1280	65	5%
Middle Darfor	413	24	5.8%
Total	257185	12471	4.8%

Table 2: Prevalence of HBV among blood donors in seventeen States in 2013.

State	Total no. of donors	No of HBV +ve Donors	Percentage
Khartoum	90905	2505	2.7%
Al-Gezira	27990	1470	5.25%
Sinar	20171	863	4.2%
Kassala	10910	499	4.5%
Red Sea	4214	187	4.4%
A-Gadarif	12042	1063	8.8%
Blue Nile	6178	254	4.1%
White Nile	10970	894	8.14%
Nahr El Nile	5557	53	0.9%
Northern state	4118	22	0.5%
North Kordofan	14222	805	5.6%
South Kordofan	6514	183	2.8%
North Darfor	10417	420	4%
South Darfor	2183	99	4.5%
West Darfor	2019	92	4.5%
East Darfor	2608	95	3.6%
Middle Darfor	3438	208	6%
West Kordofan	27484	1401	5%
Total	261940	11113	4.2%

Table 3: Prevalence of HBV among blood donors in eighteen States in 2014.

Regarding the educational level of the donors 1% were illiterate, 11.5% had a primary school level of education, 4% had an intermediate school education, 29% had a high school education and 54.5% had university level or postgraduate education.

Forty one donors (20.5%) had been in contact with a HBV positive patient, either a relative, neighbour or a friend.

When asked about HBV modes of transmission, 23% knew that HBV can be transmitted through blood, 0.5% mentioned sexual transmission, 8.5% knew that it can be transmitted both sexually and through blood transmission. Only 3% had a good knowledge and mentioned the three major modes of transmission, and the majority (59%) did not know any of HBV modes of transmission. Of those 0.8% were illiterate, 16.9% had a primary school level, 3.4% had an intermediate school level, 29.7% had a high school level, and 49.2% had a university or postgraduate level of education.

When asked about the consequences of HBV infection, 74 donors (37%) knew that HBV can cause liver cirrhosis, seven donors (3.5%) knew that HBV can cause liver cirrhosis, and it can be complicated with portal hypertension and Hepatocellular Carcinoma. But 119 donors (59.5%) were not aware of the consequences of HBV, of those 0.8% were illiterate, 16% had a primary school level, 3.4% had an intermediate school level, 33.6% had a high school level, and 46.2% of donors with a university level of education did not know any of HBV modes of transmission.

Only seventeen donors (8.5%) were vaccinated against

HBV, 183(91.5%) were not vaccinated, of them 10(5%) did not think vaccination was important and 173(86.5%) did not know about the vaccine.

One hundred eighty seven (93.5) wanted to know the result of their screening, 13(6.5%) did not want to know, mainly because of the fear of positivity and the impact of a positive result in their lives, jobs and families.

The overall prevalence of HBV in Sudan in 2012 was 4%. The prevalence varies between the 15 states included in the surveillance, ranging between 0.1 in Nahr Alnile and the Northern state to 15.7% in South Kordofan. In 2013, 17 states were included in the survey and the overall prevalence of HBV was found to be 5%. The prevalence of HBV ranged between 0% the Northern state to 12.3% in White Nile state. In 2014 HBV prevalence was found to be 4.2%. The survey included eighteen states and HBV prevalence ranged between 0.5% in the Northern state and 0.9% in Nahr Alnile to 8.8% in Gadarif.

DISCUSSION

Despite the implementation of effective vaccination programs, hepatitis B remains an important cause of morbidity and mortality worldwide. Understanding the epidemiology of the disease is essential in developing programs to prevent and treat this global infection.¹ The lack of knowledge about HBV modes of transmission, its consequences, and its preventive measures is a major cause of increasing prevalence of HBV. Other causes include the influx of immigrants from endemic areas and the improvement in diagnosis and documentation of HBV infection.

All blood donors included in the study are males. Females do not usually donate blood in Sudan. Men of young or middle age are those who willingly donate blood.

Although 20% had a relative, neighbour or a friend diagnosed with HBV or HBV related disease, their knowledge of HBV was generally poor. When asked about HBV modes of transmission; 23% knew that HBV can be transmitted through blood, 8.5% knew that it can be transmitted both sexually and through blood transmission, but only 3% mentioned all three major modes of transmission, including vertical transmission. The majority (59%) did not know any of HBV modes of transmission; of those 49.2% had a university level of education or higher.

Only 3% knew that HBV can cause liver cirrhosis and can be complicated by portal hypertension and Hepatocellular Carcinoma. The majority (59.5%) of the study population of whom 46.2% were university graduates did not know any consequences of HBV infection. The lack of knowledge is observed in all groups irrespective of their education level. A study was carried out among non medical students of the University of Kassala, to assess their knowledge and awareness towards HIV and HBV infection. It revealed that the students had poor knowl-

edge about HBV mode of transmission, symptoms and preventive measures, in comparison they had better knowledge about HIV infection.⁷

Most of those vaccinated (8.5%) were offered the vaccine by their employers (e.g. Central Sudan bank, Al Gaili petrol refinery). The study population included two doctors who were not vaccinated. The majority (93.5%) wanted to know the result of their viral screening.

In 2012, the Northern and Nahr Alnile states had the lowest prevalence of HBV (0.1%). In 2013 no cases were detected in the Northern Province, probably because of the small size of the population tested, i.e. only 263 donors. The incidence in Nahr Alnile, in the same year, was 1.7%. In 2014, HBV prevalence in the Northern state was 0.5%, and was 0.9% in Nahr Alnile. Our data showed a lower percent when compared to a previous study in 2007, conducted among blood donors in Shendi, Nahr Alnile, and was found to be 5.1%.⁸

The highest prevalence of HBV in 2012 was in South Kordofan, which was 15.7%. In 2013, the White Nile state had the highest percent of 12.3. And in 2014, Al-Gadarif showed the highest prevalence of 8.8%. No published data about the prevalence in these states were found.

The prevalence in Khartoum, in 2012-2014 was 3.6%, 4.7%, and 2.7%. A study conducted, in 2008-2011 on patients undergoing surgery at Alshab Hospital, one of the major hospitals in Khartoum, revealed a higher percentage of 4.9%.⁹ In a more recent study in 2012 conducted among 843 health care workers in public teaching hospitals in Khartoum showed that Anti-HB core was found to be 57%, HBsAg was 6%, HBeAg was 9%, and Anti-HBsAg was 37%.¹⁰

The HBV prevalence in Al-Gezira state (Central Sudan) in 2012-2014, was 4.4%, 5.49%, and 5.2% respectively. These percentages are lower than those observed in a study conducted in 2000, in Um Zukra village in Al-Gezira state, the percent of HBV was found to be 6.9%.³ An earlier study in 1992, revealed much higher percents, it studied the prevalence of hepatitis B surface antigen in blood donors and laboratory technical staff in Al-Gezira state, and was found to be 17.3%, and 12.1% respectively.¹¹ A study of the epidemiology of HBV in Al-Gezira State in 1989 reported a high HBsAg rate of 18.7% and anti-HBc of 63.9%.¹²

The prevalence of HBV in South Darfor (West Sudan) in 2012-2014 was 2.5%, 6% and 4.5% respectively. An earlier study in 2007 conducted in blood donors in Nyala (West Sudan) revealed a percent of 6.25%.⁵

The prevalence of HBV in Kassala (East Sudan) in 2012-2014 was 3.6%, 5.7% and 4.2 % respectively. A much higher percentage of 8.2% was found in a study conducted in 2011 on

healthy visitors at Kassala Hospital.¹³

The prevalence in the Red Sea state in 2012-2014 was 1.6%, 2.2%, and 4.4% respectively. In a study in 1987, HBsAg was detected in 14% of sexually active heterosexuals in Port Sudan and Suakin, and 27% were positive for Anti-HBc.¹¹

Poor knowledge about HBV risk factors, complication and preventive measures, was observed in all sectors, even in those with higher level of education. It is attributed to the absence of formal school based health education. Lack of knowledge is a major obstacle in controlling HBV transmission.

With the exception of the Northern and Nahr Alnile States that sustained low levels of HBV infection throughout the years, there is a large variation in the prevalence of HBV among different states, together with differences in prevalence in the same state throughout the years. This is due to the influx of immigrants from the borders of Sudan, and the internal population movements between states. But generally the rates are lower than those previously reported,³⁻⁶ as the overall prevalence in Sudan in 2012-2014 was 4.1%, 5% and 4%, respectively.

CONCLUSION

Although there is a large variation in the prevalence of HBV among the states, together with differences of prevalence in the same state throughout the years, the rates are generally lower than those previously reported. The overall prevalence in Sudan in 2012-2014 was 4.1%, 5% and 4% respectively.

The highest prevalence of HBV in 2012-2014 was in South Kordofan, the White Nile, and Al-Gadarif respectively. From 2012-2014, the Northern and Nahr Alnile states had the lowest prevalence of HBV. More measures should be taken by health authorities, especially in the states with a high prevalence of HBV, including mass screening and vaccination programmes. Despite the availability of HBV vaccine, almost all the donors were not vaccinated, poor knowledge about HBV mode of transmission, symptoms and preventive measures was demonstrated in all sectors irrespective of their level of education. HBV transmission, and thus prevalence can be controlled by improving the population knowledge.

As a conclusion, more efforts are needed to increase awareness about HBV infection, and ways of preventing transmission. Knowledge can be delivered through media, poster and brochures targeting all sectors, but focusing mainly on the young population as they in turn can act as a source of knowledge to their families. Blood donors found to be seronegative for HBV, should be advised to receive HBV vaccine and mass vaccination through large companies should be encouraged. And finally further wide population prospective studies are needed including both males and female of all age groups, to assess the prevalence of HBV and the risk factors implemented.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONSENT

We obtained a written consent from all the 200 blood donors included in the study, it includes information and agreement that the data will be published.

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