



## The proportion of Hepatitis B among drugs abusers in Al-Huda prisoners in Sudan

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### General Note



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### ABSTRACT

**Aim:** This study was designed to determine the proportion of hepatitis B virus (HBV) among drug abuser in three prisons in Sudan, which include Al-Huda. **Methods:** A total of 300 candidates, mainly drugs abusers, were screened using questionnaires and included information from each respondent besides using immunochromatography (ICT) testing for detection of HBV from each respondent. The respondent were randomly chosen and enrolled in the study. Authorities approved this research in the Sudanese ministry of interior and the administration of Al-Huda prison. **Results:** The study revealed that the prevalence of infection with HBV among the drug abuser prisoners was 5% (16 prisoners). **Conclusions:** hepatitis B virus infection represents a considerable spread among drug abuser prisoners and accounts for around 5% of the prisoners.

**Keywords:** hepatitis B virus, drugs abusers, prison

## 1. INTRODUCTION

Hepatitis is a pathological disorder in which viruses or other mechanisms cause inflammation in the hepatic cells, resulting in injury or destruction. Hepatitis B virus (HBV) affects many countries of low health care level because of its wide-ranging spread and the difficulty and cost of prevention and treatment (Zampino et al., 2015; Velati et al., 2019). When we look to the virus (HBV) which is a hepadnavirus, its virion consist of a 42-nm Double-shelled spherical particle consisting of small spheres and rods with an average diameter of 22 nm (Abdallah et al., 2013; Wah et al., 2012). This is a highly resistant virus that can withstand high temperatures and humidity. HBV can live at  $-20^{\circ}\text{C}$  for 15 years, at  $-80^{\circ}\text{C}$  for 24 months, at room temperature for 6 months, and at  $44^{\circ}\text{C}$  for 7 days. Indeed, the roughly 400-year-old mummified remains of a child found on a Korean mountain top had sequenced HBV in the liver, and a viral genotype C was identified. HBeAg negative virus prevalence varies from region to region. Nearly half of patients with Hepatitis B virus chronic liver disease in Southern Europe, Middle East, Africa and Asia, as well as 10-30% of patients in the Europe and United States, were infected with this strain (Zampino et al., 2015; Velati et al., 2019; Prasant et al. 2020; Soni & Mugale, 2020). Also, the existence of hepatitis B surface antibodies (HBs) is substantially related to the increased risk of hepatocellular carcinoma in the case of hepatitis B surface antigen (HBsAg) and hepatitis B virus (HBV). However, surveillance for HCC is not recommended in the affected group unless cirrhosis is present. In the United States, the estimated annual incidence of HCC in a patient infected with hepatitis B is 818 cases per 100,000 persons. In Taiwan, this malignancy has an annual incidence of 2.8 % in patients with hepatitis B and cirrhosis. In Africa, the Far East, and Alaska where there is spread of hepatitis B infection, there are many cases of hepatocellular carcinoma (Mudawi et al., 2007).

Worldwide, the prevalence of the Hepatitis D virus (HDV) co-infection among patients infected with HBV is 0-30 per cent, with the highest incidence in South America, China, Southeast Turkey and the Orinoco River. The theory why hepatitis D virus is carcinogenic virus for HCC was studied with different results. For one research the prevalence of anti-delta for patients with and without HCC cirrhosis was not substantially different. In contrast, most other investigations show the delta virus to be more aggressive, with higher rates of cirrhosis and cancer. In areas with less prevalence, the life time risk of contracting hepatitis B virus is usually less than 2% (less than 2%; generally, 0.1-2%), and sexual transmission and percutaneous transmission during adulthood are the main modes through which it spreads. In United States, Canada, Western Europe, Australia, and New Zealand where the prevalence of hepatitis B virus is low, we found only 12% of infected people (Mohamed et al., 2013; Falla et al., 2018). The jail and jailed people is considered as high risk for contracting serious infections like human immunodeficiency virus, hepatitis C and B viruses (Zampino et al., 2015; Wah et al., 2012). Although, there is many studies about the prevalence and risk factors for blood-borne diseases among prison inmates in the world, such data are very scanty from Sudan (Mohamed et al., 2013). They are limited data regarding the prevalence of hepatitis B in Sudan, but there is no previous research about the prevalence of hepatitis B among the drugs abusers' prisoners in Sudan. Also, there is no previous research talk about drug dealers (Abdallah et al., 2013; Falla et al., 2018).

This research will spot the light on specific population reflecting their health status. Increase incidence of hepatitis B among the drugs abusers prisoner lead to very severe complications and may become a very endemic disease in the prison. Hepatitis B is a major cause of chronic liver failure in Sudan (Wah et al., 2012). The aim of this study was to determine the prevalence for HBV, infections among prison inmates in Al-Huda Prison in Sudan.

## 2. MATERIALS AND METHODS

This descriptive cross-sectional institutional study was conducted in Al-Huda prison in Omdurman city, Sudan. The study was conducted during the period from april 2019 to july 2019. Study population composed of drugs abusers among current prisoners aged from 15 to 100 years. The respondent were randomly chosen and enrolled in the study. A total of 300 drugs abusers' prisoners in Al-Huda prison were enrolled in this study that was equal to 6% of the total number of the prisoners. The data was collected using a structured, pre-coded, pretested and interview administered. The ethical committee approved the study at the Sudanese ministry of interior and the administration of Al-Huda prison. Afterwards, informed verbal consent was taken from each respondent before data collection. Positive cases were further investigated and treated confidentially.

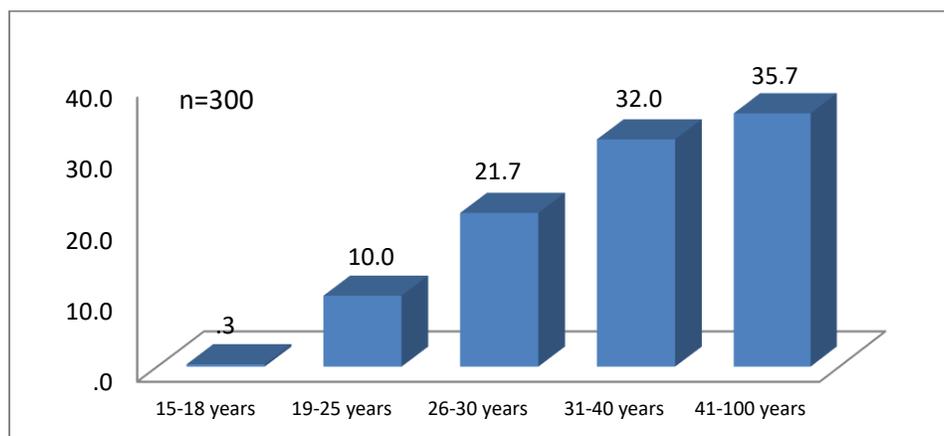
### ICT testing for HBV

One-step test for HBsAg utilizes the principle of ICT (immunochromatography), a unique two-site immunoassay on a membrane as the test sample flows to the other side of the membrane of the test device, the colored monoclonal anti-HBsAg-colloidal gold conjugate complexes with the HBsAg in the sample. This complex moves further on the membrane to the test region where it is fixed by another monoclonal antibody for Hepatitis B surface Antigen coated on the membrane leading to the formation of a pink-purple or red-coloured band which confirms a positive test result. Absence in the test area of this colored band suggests a none

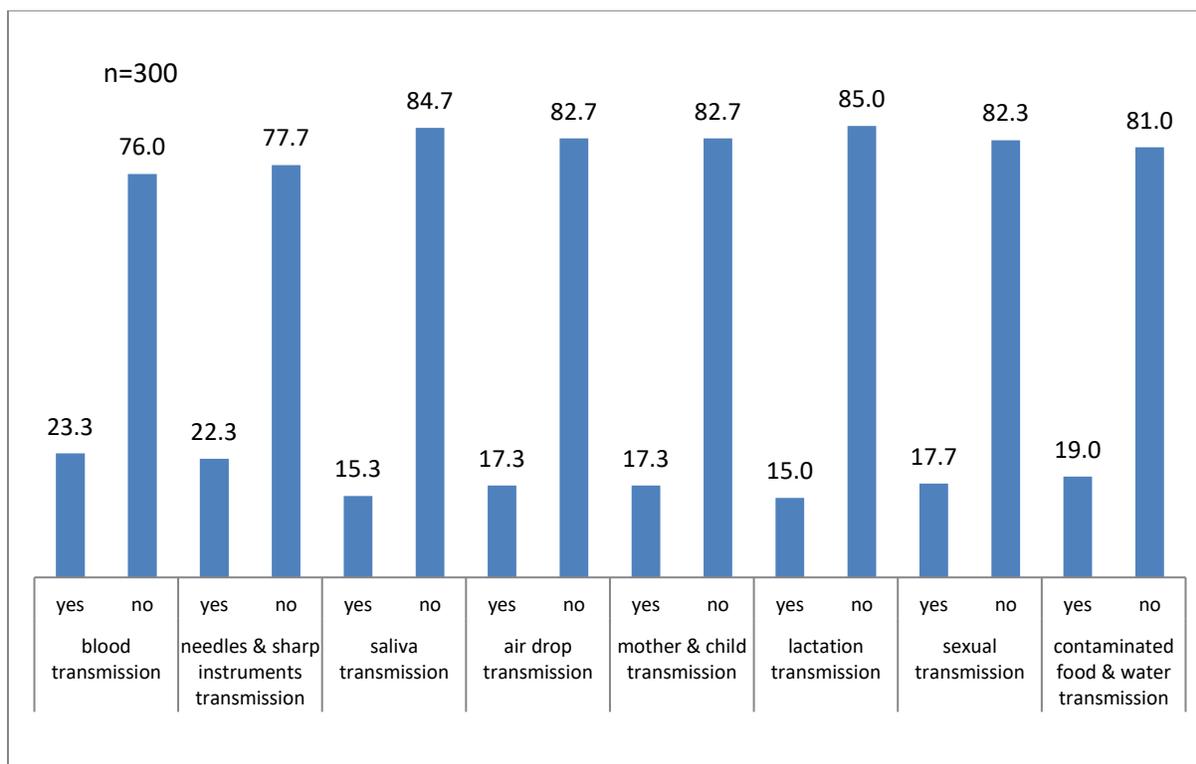
positive test result. The unreacted conjugate and unbound complex if any more pushes on the membrane and eventually becomes immobilized by the antiserum coated on the membrane of the anti-rabbit at the control region, it create a pink-purple or red band. This band is used to check the results of the test. We analyzed the data by using Statistical Package for the Social Sciences (SPSS) software.

### 3. RESULTS

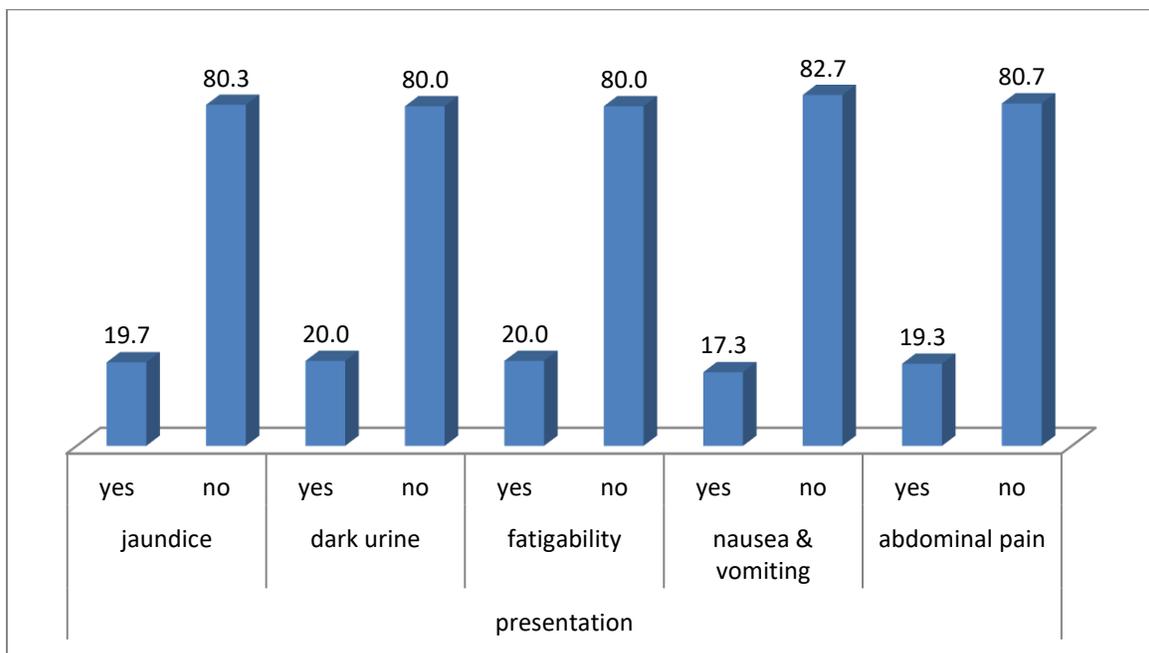
The majority of the respondents are below 40 years of age (64.3%), (Figure 1). Fifty-six percent of the samples know nothing about HBV. Figure 2 demonstrates the percentage of those who know about the mood of transmission of hepatitis B among respondents. Only 24% and 22% of the sample believes that hepatitis B virus can be transmitted through the blood and infected needles, respectively. Eight percent of respondents received a blood transfusion in their life, and 3% took drugs through the intravenous injection. Only 2% of the respondents were vaccinated against HBV. Furthermore, 18% of the prisoners believe that HBV transmitted through sexual intercourse (Figure 3) which demonstrates knowledge of prisoners on HBV causes and symptoms. The result of this study revealed that only 1% (4 respondents) was infected with HBV, and only one respondent received medical treatment.



**Figure 1** Distribution of age



**Figure 2** Demonstrates the percentage of those who know about the mood of transmission of hepatitis B among male prisoners at Al-Huda prison



**Figure 3** Symptoms of HBV

#### 4. DISCUSSION

Prisons in Sudan do not have currently screen for blood-borne viruses as a routine, and there are no statistics concerning the prevalence of hepatitis B virus among prisoners generally and drug abuser prisoner. This study was conducted to determine the prevalence of hepatitis B surface antigen among drug abuser prisoners in Al-Huda prison. From the results obtained in this research out of 300 drug abuser prisoners in A-Huda prison screened for HBV infection, five percent (16 subjects) showed positive ICT testing for HBsAg, this study correlates and supported with number of previous reports which showed that the prevalence of the HBV among drug abuser prisoners in nearby countries (Reekie et al., 2014; Ataie et al., 2013) comparing with the study done for Hepatitis C, hepatitis B and HIV infection among Egyptian prisoners: sero-prevalence, risk factors and related chronic liver diseases five hundred resident prisoners were screened. The prevalence of antibodies to hepatitis B core antigen was 9.8% (49/500). Comparing with a study done for hepatitis A, B, C and HIV prevalence and risk factor study in ever injecting and non-injecting drug users in Luxembourg associated with HAV and HBV immunizations the prevalence was 4.8% for HBV (Sofian et al., 2012).

Most of the respondents were poorly educated about hepatitis B only 44% heard about it, about 18% had little knowledge about the mood of transmission in comparison with a study done about Awareness and understanding of hepatitis B infection and prevention and the use of hepatitis B vaccination in Hong Kong among adult Chinese population, 14% were considered to have good knowledge about HBV infection. The most efficient method for prevention against HBV is vaccination. Vaccination has a 95% success rate in prevention mother to child HBV transmission (Yu, 2019). Thus, prompt vaccination after birth is necessary to reduce viral transmission to its minimal rate. In African countries, the vaccination coverage was reported to be  $\leq 90\%$  of the projected coverage level of HBV, which may lead to an increase in early childhood transmission (Breakwell et al., 2017). Thus, education is recommended to prevent transmission between adults due to avoidable reasons.

#### 5. CONCLUSION

Based on the findings of this study, which showed that the prevalence of the infection in Al-Huda prison is (5%) and the infection depends on knowledge about the disease, and depend on vaccination status, cultures and education level. Implementation of educational and vaccination programs are recommended for both prisoners and police-officers against HBV. The study revealed that there is a need for extensive screening of prisoner for HBV in to develop an effective plan for treatment and prevention (vaccination and education). However, there is a strong need for HBV care like screening, investigation and management in the penal institutions

#### Recommendations

The authorities should increase the efforts towards making awareness of HBV infection in the community and prisoners specifically and make vaccination campaigns against HBV infection. Positive cases should be further investigated and treated confidentially.

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### Author contributions

The research was conducted by the author alone.

### Funding

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### Conflict of interest

The author declare that they have no conflict of interest.

### Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

### Ethical approval for human

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (ethical approval number: REC-HSD-004-2019).

### Data and materials availability

All data associated with this study are present in the paper.

### Peer-review

External peer-review was done through double-blind method.

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