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## Frequency of Viral Hepatitis (B & C) among Homeless Populations in Omdurman Region- Sudan

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<p><b>Abstract:</b> <i>Background:</i> 170 million people have chronic viral hepatitis B (HBV) or C (HCV), which increases their risk of acquiring liver disease, cirrhosis, or cancer. As there is currently no vaccine against HCV, it is crucial to be aware of how to prevent getting sick again. Homeless people were at a greater risk because they were unhygienic, inadequate nutrition, and low levels of education. <i>Objective:</i> This study aimed to assess the risk factors and frequencies of both HBV and HCV among the homeless population. <i>Materials and Methods:</i> 5 ml of blood from 97 people was drawn under sterile conditions while taking labeling into consideration. The blood was then allowed to clot, and serum separated. The ELISA approach was used to measure the HBV and HCV immunoglobulins using a semi-automated analyzer. Using a sandwich-based enzyme-immunoassay to detect. <i>Results:</i> 39.2% of people had HBV infection, and 60.8% of tests came back negative. While 96.9% had negative results and 3.1% had positive results for HCV. <i>Conclusions:</i> The findings support the notion that there is a HBV infection is substantially more common among the homeless population, which is consistent with the increased occurrence of these diseases in recent years not only in Omdurman, Sudan but also globally. But there was no noticeable difference in the HCV cases.</p>	<b>Research Paper</b>
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### INTRODUCTION

Hepatitis is described as liver inflammation and consequent hepatocellular damage brought on by toxins, medications, infectious germs, or viral infections [1]. Acute viral hepatitis is a widespread infection that predominately affects the liver. One of the following five viruses—Hepatitis A virus (HAV), Hepatitis B virus (HBV), Hepatitis C virus (HCV), Hepatitis D virus, and Hepatitis E virus—causes nearly all cases of acute viral hepatitis (HEV). Hepatitis can manifest with few or no symptoms, but it frequently results in anorexia, anemia, and general malaise. Hepatitis is clinically divided into two types: acute and chronic. Acute hepatitis lasts less than six months, whereas chronic hepatitis lasts longer. The hepatitis a virus transmitted by fecal-oral route and HEV through the consumption of contaminated food and water (excreted in patients' stools). Blood and blood products can spread HBV and HCV, and sexual contact can potentially spread them. Hepatitis A and B vaccines

are accessible, but hepatitis C and E vaccines are not. However, several researchers have hypothesized that climatic and behavioral factors, such as summer travel to endemic areas, population swimming habits in hot months, an increase in sexual contact, tattoos, poor hygiene and environmental sanitation, and dietary habits (fecal-oral transmission of viral hepatitis), may have a significant impact on the seasonal occurrence of diseases [2]. Yellow fever viruses affect the liver but also spread to other parts of the body, thus they are not the only cause of hepatitis. [3]. other viruses that cause hepatitis include Epstein-Barr virus (the cause of infectious mononucleosis) and cytomegalovirus. More than 500 million people worldwide are estimated by the World Health Organization to have chronic HBV or HCV infections, and 1 million people die each year (or 2.7% of all deaths) due to conditions associated with viral hepatitis and liver disease [4]. Worldwide, there are reportedly 100 million homeless individuals [5]. These estimates help to put a number on how many people are

homeless, despite the methodological difficulties and the wide variety of definitions of homelessness [2]. There have been earlier reports of health issues in homeless people [6]. In comparison to the general population, mortality rates are four times greater [7]. Homeless populations experience much higher rates of morbidity and higher prevalences of mental disorders [8]. And infectious diseases than general populations [9], which, because they are controllable, could be the focus of health measures to lessen the incidence of detrimental consequences. Infections in the homeless are linked to malnutrition [10], prolonged homelessness [11], and high medical care utilization [12], and can spread to the general population. In some nations, the absolute number of homeless individuals is substantial, therefore changes in care could have a significant impact on public health. Many estimates of the prevalence of infectious diseases among homeless persons have been reported, especially for HIV, hepatitis B, and tuberculosis [13].

## MATERIALS AND METHODS

**Study design:** Descriptive cross-sectional study.

**Study area:** Khartoum state-homeless areas.

**Study population:** Homeless individuals and families in Khartoum state-Omdurman region.

**Inclusion criteria:** A homeless individual with no permanent residency was enrolled in this study.

**Sample Size:** They are 97 homeless they are 48 male and 49 Female.

### Sample Collection:

Under hygienic conditions and considering labeling 5 ml of blood and then letting the blood allow clotting formation, the serum is separated using centrifugation and kept frozen till the time of laboratory analysis.

Measurement step: Laboratory measurement was conducted in Aljaily Khalid Musa medical laboratory- Omdurman. Both HBV and HCV were assessed using enzyme-linked immunosorbent assay (ELISA) with a semi-automatic analyzer BTS350-Germany and viral ELISA kit trademark Fortress-UK.

### Data Analysis:

Data were analyzed using SPSS 25.0, descriptive statistics in terms of frequency, percentages, means and standard deviations, and Chi-square test were calculated. A *p value*  $\leq 0.05$  is considered statistically significant.

### Ethical Considerations:

Ethical approval for the study was obtained from the Board of the Faculty of medical laboratories sciences, at Shendi University. The written informed

consent form was obtained from each guardian of the participant as well as from the subject himself before recruitment into the study. All protocols in this study were done according to the Declaration of Helsinki (1964).

## RESULTS

This cross-sectional study was conducted in Omdurman among the homeless community, where people were surviving on campuses and shelters and dealing with drugs, alcohol, and prostitution in an open-minded community. The participants in this study voluntarily agreed to undergo several laboratory tests, including those for viral hepatitis B and C. They were 48 (49%) men and 49 (51%) women. 38 (39.2%) people tested positive for HBV, and 59 (60.8%) people had HBV infection. While three (3.1%) people tested positive for HCV. They were divided into 3 categories based on their educational status, with the non-educational group including 23% of them, the primary school group including 35% of them, and the high school group including 42% of them. They were separated into two groups based on age: those over 40 (31%) and those under 40 (69). When it came to the length of homelessness, they were divided into two groups: fewer than 10 years at homelessness (29%) and more than 10 years at homelessness (71%). Hepatitis B testing yielded results subdivided by age categories, with the group under 40 years old having 23 participants infected with HBV according to test results (34.3%) and 44 subjects with negative results (65.7%). There was no significant difference found based on the positive outcomes among age groups for the group over 40 years, which had results that were positive in 15 of the groups (50%) and negative in 15 of the other groups (50%) (Table 1). Among males, 19 (39.6%) had positive HBV test results and 29 (60.4%) had negative ones, whereas among females, 19 (38.8%) had positive HBV test results and 30 (61.2%) had negative ones. However, there was no statistically significant difference between the genders for the gender-positive result in the HBV test (Table 2). Education level and the effects of HBV infection were positively correlated among the uneducated group of 10 (45.5%), the primary school population of 15 (44.1%), and the high school population of 13 (32.5%), with no discernible difference in the results (Table 3). People were divided into groups based on how long they had been homeless and exposed to drug use. Those with HBV-positive results for less than 10 years made up 42.9% of the group, while those with results for more than 10 years made up 37.7% of the group (Table 4). Sub-groups of the homeless did not differ significantly in terms of HCV infection, as three (3.1%) of them tested positive for the virus; they were all under 40 years old, one did not have a high school degree while the others did, and one had been homeless and using drugs for less than ten years while the others had been doing so for more than ten years (Table 5-8).

**Table 1: Association between HBV and age**

Age	Result		Total	P. value
	Positive	Negative		
<40 Years	23 (34.3%)	44 (65.7%)	67 (100.0%)	<b>0.109</b>
>40 years	15 (50.0%)	15 (50.0%)	30 (100.0%)	

**Table 2: Association between HBV and gender**

Gender	Result		Total	P. value
	Positive	Negative		
Male	19 (39.6%)	29 (60.4%)	48 (100.0%)	<b>0.550</b>
Female	19 (38.8%)	30 (61.2%)	49 (100.0%)	

**Table 3: Association between HBV and education**

Education	Result		Total	P. value
	Positive	Negative		
Non-educated	10 (45.5%)	12 (54.5%)	22 (100.0%)	<b>0.453</b>
Primary school	15 (44.1%)	19 (55.9%)	34 (100.0%)	
High school	13 (32%)	27 (68%)	41 (100.0%)	

**Table 4: Association between HBV and duration of being homeless**

Duration	Result		Total	P. value
	Positive	Negative		
<10 Years	12 (42.9%)	16 (57.1%)	28 (100.0%)	<b>0.034</b>
>10 Years	26 (37.7%)	43 (62.3%)	69 (100.0%)	

**Table 5: Association between HCV and age**

Age	Result		Total	P. value
	Positive	Negative		
<40 Years	3 (4.5%)	64 (95.5%)	67 (100.0%)	<b>0.352</b>
>40 years	0 (0.0%)	30(100.0%)	30 (100.0%)	

**Table 6: Association between HCV and education**

Education	Result		Total	P. value
	Positive	Negative		
Non-educated	1 (4.5%)	21 (95.5%)	22 (100.0%)	<b>0.426</b>
Primary school	0 (0.0%)	34 (100.0%)	34 (100.0%)	
High school	2	39	41	

**Table 7: Association between HCV and gender**

Gender	Result		Total	P. value
	Positive	Negative		
Male	1 (2.1%)	47 (97.9%)	48 (100.0%)	<b>0.508</b>
Female	2 (4.1%)	47 (95.9%)	49 (100.0%)	

**Table 8: Association between HCV duration of being homeless**

Duration	Result		Total	P. value
	Positive	Negative		
<10 Years	1 (3.6%)	27 (96.4%)	28 (100.0%)	<b>0.645</b>
>10 Years	2 (2.9%)	67 (97.1%)	69 (100.0%)	

## DISCUSSION

This study was conducted from May to August 2018 in Khartoum State's Jabrona West Omdurman. People who were homeless were specifically targeted for medical screenings for a variety of conditions, including viral hepatitis B and C. These individuals were exposed to many hepatitis subtypes as well as other diseases while

living in shelters, using drugs, engaging in sex work in an environment free from moral constraints, and having both family and individual living situations. When 97 people were tested for HBV and HCV, 38 (41.8%) of them tested positive for HBV Ag, 19 (50%) of them were male and 19 (50%) were female, and 3 (3.3%) tested positive for HCV Ag, with one (33.3%) female and two (66.7%) male. This largely supports research from Iran

that focused primarily on homeless guys who used drugs and had lower rates of HBV than HCV (0.98% vs. 31.3%, respectively) [14]. Moreover, there is some agreement with an American study that found that 43% and 72%, respectively, of homeless people, had HBV and HCV [15]. We had populations that were divided into sub-groups based on age, gender, education, length of homelessness, and drug use. Thirty-one people made up the group of those under the age of forty (40) in terms of age. Thirty percent (50%) of those aged 40 and older had HBV infection, while the other fifty percent were negative. This is consistent with a Brazilian study that looked at homeless people and found that they were a marginalized group at high risk for STIs like hepatitis B. A total of 353 people underwent interviews and tests for signs of HBV infection. The overall prevalence of HBV was 21.8%. Regarding the age groups, 10.8% of those between the ages of 18 and 30 had positive results, whereas 49 people over the age of 50, people of color, and homosexuals or bisexuals had higher exposure to HBV [16]. Gender distribution: Of the 48 males, 19 (39.6%) tested positive for HBV, while 29 (60.3%) tested negative. Of the 49 females, 19 (38.8%) tested positive for HBV, while 30 (61.2%) tested negative. This is in contrast to a study that found that males were more likely than females to be infected with HBV, with rates of 25% and 14.8%, respectively [17]. This is in agreement with a Chinese study concerned with knowledge and risk of HBV infection, but it didn't include homeless, rural residents as they had low education levels. Of the 22 non-educated individuals, 10 (45.5%) were HBV positive, and 12 (55.5%) were HBV negative. Of the primary educated group of 34, 15 (44.1%) were +ve for HBV, and 19 (55.9%) were -ve for HBV. Thirteen (32.5%) of the 40 high school students had positive HBV, while 27 (67.5%) had negative HBV [18]. In this study, only 3% of the participants had hepatitis C virus infection; one of them was a female under 40 years old who had no education, and the other two were male and female over 40 years old who had completed high school. According to a survey of homeless people, adults were more likely to get infected than younger people. Those who do not regularly or ordinarily have access to a traditional home are considered to be homeless [19]. Depending on the region and type of investigation, the homeless populations have seen significant variation. Studies have been conducted in emergency rooms, shelters, and on the streets by social workers or welfare agencies [20]. In many countries, including the USA, children and adolescents are regularly described as homeless (60–95%), but this is only rarely the case in other countries. Others, such as refugees and undocumented immigrants, are more likely to become homeless [21]. Homelessness is a significant issue in both developed and developing nations. At least 500,000 Americans are homeless right now [22, 23]. In 1988, it was estimated that a similar number of people were homeless in England [22] and in 1996 in France [23, 24]. Sharing injecting equipment significantly increases the burden of disease. Injection-

related morbidity and death are significantly influenced by the transmission of blood-borne viruses, such as HIV, hepatitis C virus (HCV), and hepatitis B virus (HBV), through contaminated injection equipment [26]. Effective health policy planning requires accurate quantification of the number of people who inject drugs, their demographics, and the degree to which they are exposed to risk behaviors and settings [27, 28] Even treating homeless persons presents therapeutic challenges because their adherence to therapy is frequently poor and they frequently cannot afford it. Moreover, mental illness, transportation issues, self-neglect, and a phobia of institutions may restrict access to healthcare [29]. Globally, hepatitis C is prevalent. With prevalence rates of 2.3% and 1.5 percent, respectively, the WHO Eastern Mediterranean and European Regions are the most afflicted. The prevalence of HCV infection varies between 0.5% and 1.0% in various WHO areas. Hepatitis C virus infection can affect both certain populations (such as drug users) and/or the broader population, depending on the nation. The HCV virus has numerous strains (or genotypes), and their geographic distribution varies [30]. Having intercourse with several partners and having blood exchanged during traumatic sex appear to carry the highest 51 sexual hazards for HCV infection [31]. Research on the transmission of HCV with other risky behaviors, such as the use of non-injectable drugs (such as inhaled cocaine and methamphetamine) [32], is progressing. In certain studies where there were no other risk factors, alcohol abusers were also found to be at elevated risk [33]. However, other research discovered that alcohol users were only more at risk when injecting drugs was also being used [34]. Homeless people are more likely to contract HBV infection when involved in high-risk behavior [35].

## CONCLUSION

HBsAg prevalence is high (38%) whereas HCV prevalence is low (3%). The HBsAg-infected groups were divided into two groups based on the length of infection: more than 10 years and less than 10 years. When the two groups were compared to one another, a significant difference was seen (the group with more than 10 years of infection had a higher frequency of the HBsAg) at a *P value* of 0.034.

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**Conflict of Interest:** The author has affirmed that there are no conflicting interests.

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