

Prevalence and Risk Factors of Hepatitis B among the Population at Algamosi Locality, Gezira State, Sudan

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How to cite this paper: Mohamed, Y.A.G., Doutoum, A.A., Mahamat, A.B., Doungous, D.M., Gabbad, A.A. and Osmab, R.M. (2022) Prevalence and Risk Factors of Hepatitis B among the Population at Algamosi Locality, Gezira State, Sudan. *Health*, 14, 1191-1198.
<https://doi.org/10.4236/health.2022.1412084>

Received: July 11, 2022

Accepted: December 3, 2022

Published: December 6, 2022

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Abstract

Background: The local population in developing countries is at higher risk of contracting hepatitis B (HBV) due to some of the factors they practice which promote its establishment and distribution within their communities and may constitute a burden for them. **Objective:** This study aimed to determine the prevalence and risk factors associated with the hepatitis B virus in populations of the Algamosi region, Gezira State, central Sudan. **Method:** A cross-sectional study was conducted among 492 people, populations of the Algamosi region, Gezira state in central Sudan. A questionnaire was used to collect information on socio-demographic factors, transmission, and prevention of hepatitis B infections. As well, blood samples were taken from each participant, and serum was used for rapid tests for HBsAg. Positive samples were then tested by the ELISA method for confirmation. Data were obtained using SPSS version 21 and a P value of less than 0.05 was considered statistically significant. **Results:** The prevalence of hepatitis B was 16.10% and was higher in men than in women (05.7 - 1.00). People aged 31 to 45 had the highest prevalence of 27 (20,600%) for HBV infection. There was a significant association between HBV and age groups ($X^2 = 7.816$ and P value = 0.05). This study also found that there was a significant association between viral hepatitis and knowledge about transmission and prevention (P value < 0.005). This study showed a high prevalence of the hepatitis B virus in the local community of Algamosi in Sudan. So the prevalence of the hepatitis B virus was found to increase with age, Also, the previous infection with jaundice was identified among the risk factors contributing to the spread of hepatitis B, where the prevalence rate reached (2.7%) P value = 0.001. Social knowledge about hepatitis B was very high. **Conclusion:** Although most people who live

in developing countries are at high risk for transmission of hepatitis B, this indicates the need to implement the screening policy and integrate it with other health services and create awareness such as proper treatment and surveillance for hepatitis infection in all nations.

Keywords

Socio-Demographic, Transmission, Prevention HBV, Population Gezira State, Central Sudan

1. Introduction

HBV infection is a global public health problem. It estimated there are More than 780,000 people die every year due to complications of Hepatitis B including liver cirrhosis and liver cancer [1]. There are approximately 2 billion people infected by HBV and about 400 million carriers worldwide [2] [3]. Majority of these reside in Asia and West Pacific [4]. Although HBV is present all over the world, its prevalence is significantly different across different countries [5]. An estimated 57% of cases of liver cirrhosis result from HBV infection [6]. 8% - 20% of untreated adults with chronic hepatitis B go on to develop cirrhosis within 5 years; of these individuals, 20% annually develop hepatic decompensation and 2% - 5% develop HCC. In terms of endemicity, Sudan has been classified among the countries with high prevalence of HBV infection [7]. Based on the National prevalence of HBsAg reported, the prevalence rate of HBV among whole Population in Sudan is about 9.3% [7]. Moreover, there is only one study was conducted about the prevalence of Hepatitis B among the general Sudanese population. In Kassala, among healthy people and the seroprevalence was 8.2% [8]. Although there are many previous studies in Sudan regarding the viral hepatitis, but there is limited data about the exact figure of the prevalence rate of HBV in the community, moreover, most of those studies were carried in blood donors or antenatal mothers and they are hospital based and confined to specific group. The greater risk of Hepatitis B infections have transmitted through the parenteral route, blood transfusion product, sexual intercourse and vertically from infected mother to neonates [9]. The aim of this study is to provide information on the prevalence rate of HBV among general population at Algamosi Localty, in Gezira state central Sudan which could be used as Indicator for the determination of the magnitude of this problem in Sudan and it will provide the base line Data for further researches and studies.

2. Methods

2.1. Literature Search

A descriptive cross-sectional community-based study. The study protocol was approved by the institutional ethics committee. The study was conducted in the

general population of rural areas in Gezira State of Central Sudan, The study population was determined through the census records for 2016. All the subjects in the sample population were approached by a structured questionnaire pre-tested for reliability and validity and including demographic data as indicated in **Tables 1-3** and assessment of knowledge, attitude and practice towards Hepatitis was taking **Table 4**. Sample size calculation: it was calculated as 492 on the basis of the expected prevalence of HBsAg as 5%. The sample was distributed based on the number of villages (36) in the Algamosi locality. Among these villages, four villages were selected by lottery, and then the sample size was distributed as shown in the following **Table 5**. The villages were divided into neighborhoods and then into houses. The houses were given certain numbers. Then the sample was chosen by a simple random method. 3 milliliters of venous blood sample, from the subjects who gave consent, was obtained using universal sterile precautions. The samples were subjected to a card test (J Mitra) for HBsAg. All the positive card tests were confirmed by ELISA. The data was collected and compiled in SPSS analyses. Appropriate statistical tests (Chi-square test for qualitative analysis) were used for the analysis of data.

2.2. Criteria for Inclusion and Exclusion

The general population (People living in Algamosi area, all ages, and gender) present during the period of the study in Algamosi village is targeted.

All known cases of viral hepatitis b and c infection and persons who vaccinated previously.

2.3. Ethical Consideration

Ethical clearance was obtained from the ethical review committee in Sudan Federal Ministry of Health (FMOH), also there is a consent letter to inform the participant about the required data and procedures.

3. Results and Discussions

Figure 1 shows that (16.1%) of populations were positive for the test of hepatitis B viral infection. This may be due to poor health care settings, and difficulty to

Table 1. Residence among the study population in relation to hepatitis B at Algamasi-Gazira state-Sudan 2019 ($n = 492$).

Location	HBV		Total No %
	Positive No %	Negative No %	
Brebira	13 [2.65%]	61 [13%]	74 [15.6%]
Abroished	29 [5.9%]	151 [30.6%]	180 [36.5%]
Kadose	13 [2.65%]	63 [12.8%]	76 [15.5%]
Firdose	24 [4.9%]	138 [28%]	162 [33%]
Total	79 [16.1%]	413 [83.9%]	492 [100%]

$X^2 = 0.373$; $P = 0.946$.

Table 2. The age group among the study population in relation to hepatitis B at Algamosi-Gazira state-Sudan 2019 ($n = 492$).

Age	HBV	Positive N %	Negative N %	Total N %
<15		8 [1.6]	97 [19.7%]	105 [21.3%]
15 - 30		29 [5.9]	138 [28%]	167 [33.9%]
31 - 45		27 [5.5]	104 [21.1%]	131 [26.7%]
>45		15 [3.1]	74 [15.1%]	89 [18.1%]
Total		79 [16.1]	413 [84.4%]	492 [100%]

$X^2 = 7.816$; $P = 0.05$.

Table 3. Gender among the study population in relation to hepatitis B at Algamosi-Gazira state, Sudan 2019 ($n = 492$).

Gender	HBV	Positive N %	Negative N %	Total N %
Male		67 [13.6%]	257 [52.4%]	324 [66%]
Female		12 [2.5%]	156 [31.7%]	168 [33%]
Total		79 [16.1%]	413 [84%]	492 [100%]

$X^2 = 15.039$; $P = 0.001$.

Table 4. Hepatitis B knowledge. Participants were asked to indicate whether the following statements about hepatitis B are Yes or No.

Statement about hepatitis B	present in HBsAg Positive n (%)	present in HBsAg positive n (%) No	P value
Do you know the cause of hepatitis B	53 [10.8%]	26 [5.3%]	0.004
Does hepatitis b transmitted through blood and blood products	37 [7.5%]	42 [8.5%]	0.004
Does hepatitis b transmitted through mother to child during pregnancy	21 [3.5%]	58 [11.8%]	0.05
Does hepatitis b can be prevented by vaccination	17 [8.1%]	62 [12.6%]	0.001
Is there treatment and prophylaxis for HBV	40 [8.1%]	39 [7.9%]	0.902
Is hepatitis B sexually transmitted	37 [7.5%]	42 [8.5%]	0.902

53 [10.8%] individuals responded positively to the question do you know the cause of hepatitis B, while 26 [5.3%] answered no and appeared to be positive for the test. 37 [7.5%] of the participants responded positively to the question does hepatitis B transmitted through blood and blood products, while 42 [8.5%] individuals answered no and appeared to be positive for the test.

Table 5. The distribution of the individual's sample.

Name of villages	No. of individuals	$n = n \cdot w / N$	$n = n1, n2 \dots n31$
Abroaished	17,000	$492 \times 17,000 / 46,378$	180
Alfirdose	15,300	$492 \times 15,300 / 46,378$	162
Kadose	7157	$492 \times 7157 / 46,378$	76
Berbira	6921	$492 \times 6921 / 46,378$	74
Total	46,378		492

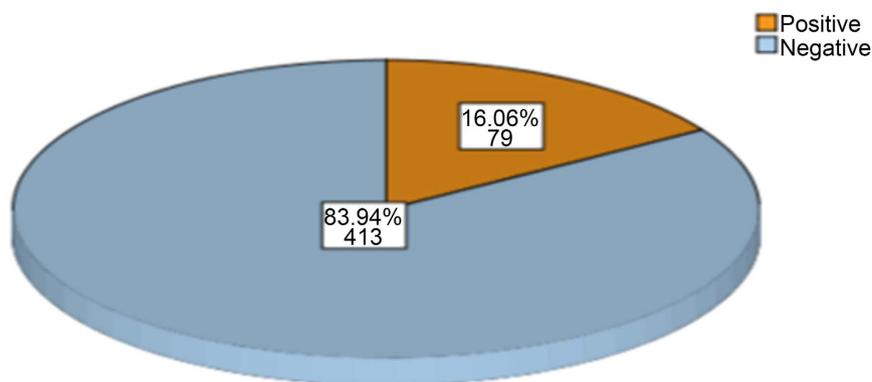


Figure 1. The prevalence of hepatitis B infection among the population of Algamosi locality in Gezira State 2019 ($n = 492$).

detect and investigate viral hepatitis infections [10]. It is obvious that Algamosi made significant progress in viral hepatitis B, in comparison to studies from the other parts of the country, the prevalence reported in this study was higher than 12.69% and 9.3% [7] [8]. On the other hand, the seroprevalence rate of HBV in our study also was considered very high when compared to the endemic country in Europe (Italy) which is reported to have a prevalence rate of 5.9% [11]. As well as this prevalence rate even exceeds the global prevalence (5%) of HBV [12]. These differences may be due to most of the participants in our study not having access to health services, and a lack of awareness of the transmission, prevention, and exposure to risk factors. Our study showed the prevalence rate of HBsAg was lower than 26.5% and 19.8% [13] [14]. These differences may be due to differences in study populations, sampling size, and study areas. Regarding the demographic characteristics, in 2015, Bazie and colleagues in their study determined a significant relationship between seropositive HBsAg and participants between 20 and 40 years old [15]. Additionally, the highest HBsAg prevalence was more likely to be in the female gender (61.39% versus 41.31%) [7].

As indicated in **Table 1**, the seroprevalence of hepatitis B was high but a similar rate in the community local of Algamosi 2.65%, for each of Brebira and Kadose, while Abroished 5.9% and Firdose 4.9%.

In our study, we noticed that, among the age groups of the population, individuals within ages 15 - 45 years had the highest prevalence of [$>5\%$] for HBV infection (**Table 2**). This is similar to what had been reported in the study of the frequency and determinants of Hepatitis B and C virus in general population of Farah Town, Islamabad, they revealed that (the most affected age group with HBV is 21 - 40 years old) with 58% [16]. These may be due to low hepatitis B vaccination coverage among adults; also, this age group contains active youths in the society so it may be attributed to some negative social behavior associated with the lifestyle of the youth today like sexual activity with multiple partners, intravenous drug use and tattooing. On top of this, they may not have access to HBV immunization during their childhood period. There was a significant association between HBV with age groups [$P < 0.05$].

As appear in **Table 3**, among the gender groups of the population, the prevalence rate for HBV infection was higher among the males 67 [13.6%] than the females 12 [2.5%]. And there is a significant relationship between the distribution of HBV and gender group [$P < 0.05$], probably due to lifestyle variance between both gender groups, This result is similar to the findings that reported a higher prevalence of HBV infection among males [17.5%] than the females [9.5%] in Ibadan [17] [18].

21 [3.5%] answered yes to the question. Hepatitis B is transmitted from mother to child during pregnancy and both appeared to test positive, while 58 [11.8%] of individuals who answered “no” and appeared to be positive for the test.

17 [8.1%] answered yes to the question: Is it possible to prevent hepatitis B through vaccination and appear positive to the test, while 62 [12.6%] answered no and turned out positive for the test.

40 (8.1%) answered yes to the question. Is there treatment and prophylaxis against hepatitis B and it appears that the test was positive, while 39 [7.9%] of individuals answered no and the test appeared positive

37 [7.5%] of the participants answered yes to the question, Is hepatitis B sexually transmitted and appeared positive for the test, while 42 [8.5%] of individuals answered no and appeared to be positive for the test.

This may be due to a lack of education about the mode of transmission that may have helped spread the infection. Previously, it has been shown that knowledge of any disease, especially infection, may help reduce the spread of this disease [19]. These are similar to those reported in the United States, and several studies have investigated the knowledge of Asian minorities about the hepatitis B virus. Knowledge of a particular subject is low about the means of transmission of hepatitis B virus [5%].

4. Conclusion

Although most people who live in developing countries are at high risk for transmission of hepatitis B, this indicates the need to implement the screening policy and integrate it with other health services and create awareness such as proper treatment and surveillance for hepatitis infection in all nations.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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