

Factors Influencing Hepatitis C Viral Infections in the Population of Algamosi Locality, Gezira State, Central Sudan

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Abstract

Hepatitis C (HCV) remains a global health challenge and is transmitted via contact with contaminated blood and body fluids. This study aimed To find the factors influencing hepatitis c viral infections and to identify its prevalence among populations of the Algamosi area, Gezira state central Sudan. This cross-sectional community-based study was conducted. A total of 492 participants were randomly selected from among 4 villages and were interviewed to find out the factors that lead to transmission of infection and tested for markers of hepatitis C infection. ELISA confirmed all the positive card tests. The results showed that the individuals within the age groups > 45 and 31 - 45 years are more affected by HCV the percentage was 3.37% and 0.6% respectively, while the age groups of 15 - 30 and <15 years have zero prevalence 0%. There was a significant association between HCV with age groups ($p < 0.05$). Among the possible cause (1.4%) had a previous history of tattooing and were significantly reactive for anti-HCV ($X^2 = 14.588$ and p value = 0.001) The study concluded that the prevalence of hepatitis C viruses was only detected in three areas. This study explored many possible causes associated with viral hepatitis, tattooing is the common cause of hepatitis C virus. Based on the finding the study recommends, the crucial intervention program to screen most of the Algamosi population who have been not screened for HCV, proper treatment for HCV, and the health education program is strongly recommended to create awareness among the general population.

Keywords

Hepatitis C, Tattooing, The Population at Algamosi Locality

1. Introduction

Hepatitis C viral infection remains an important cause of morbidity and mortality [1]. According to the World Health Organization report 2016 [2], it is estimated that about 3% of the world's population is infected with hepatitis C [3]. There are also more than 170 million chronic infection carriers at risk of developing cirrhosis and/or hepatocellular carcinoma [4]. The prevalence of hepatitis C varies around the world [5] Egypt is one of the countries most affected by hepatitis C, with a prevalence rate of 11.9% in Egypt [6]. In America, the incidence of acute hepatitis C infection appears to be decreasing sharply, with an incidence of about 2.7 million [7] and the prevalence of HCV infection has been estimated to be less than 2% [8]. 0.3% was reported in Bahrain, 0.4% in Oman, 1.1% in Qatar, 1.4% in Kuwait, and 1.6% in Saudi Arabia, and the United Arab Emirates [9]. In Sudan, in 2016 the prevalence of hepatitis C in the population was 4.5% [10]. In 2018, a study conducted by Mudawi *et al.* found that the prevalence of hepatitis C was 3.9% [11]. There are also previous studies indicating that the prevalence rate was 3.4% and 3.6%, respectively [12] and [13]. The greater risk of Hepatitis C infection includes people who have blood transfusions, health workers, injection drug users, infants born to HCV-infected mothers, non-sterile needles, tattooing, sharing razors and acupuncture, multiple partners, and sexually transmitted disease [14]. Hepatitis C is more common among black in association with lower economic status and education levels [15]. The purpose of this study is to provide information on the rate of hepatitis C and its relationship with economic status variables that include geographic areas, age, gender, and possible risk factors of Algamosi locality in Gezira state, central Sudan.

2. Materials and Methods

A cross-sectional, descriptive, community-based study was conducted from January to February 2019. Study protocol was approved by the institutional ethics committee. The study was conducted on the general population of four villages located in a rural area in Gezira state in central Sudan, and the sample size was calculated according to Raosoft: google, based on the 2016 national population census that determined that the buffalo has a total population of 140,000. The study sample included 634 individuals, taking into account the expected attrition. Those who expressed their agreement were 492 individuals. The sample was distributed in a cluster manner, where the sample units are selected in several stages. In the first phase, the Jamousi area was selected, which was divided into 36 villages. In the second stage, 4 villages are randomly selected, and each village has several neighborhoods. In the third stage, the sample was selected. Random selection of a group of neighborhoods within each village, and in the last stage a group of houses within each neighborhood were randomly selected, then the questionnaire was distributed to families. Blood sample, from the subjects who gave consent was obtained using universal sterile precautions. All positive card tests were confirmed by ELISA. The blood was allowed to clot and

then centrifuged at 3000 rpm for 10 minutes. The serum was separated, the test device was removed from the sealed fuel bag and used shortly, 3 drops of serum were transferred to the sample wheel of the test device, for anti HCV antibodies. then the time started to appear colored. A positive hepatitis C antibody test result indicates a colored line in the test area, while a negative result does not. Due to technical difficulties in filling out the questionnaire, children under the age of fifteen were excluded from the study. All solid and liquid waste generated was disposed of according to standard guidelines. Data were collected and classified in SPSS analyses. Appropriate statistical tests (Chi-Square qualitative analysis test) were used to analyze the data.

3. Results

Out of 634 people, 492 agreed to participate, with response rate of 77.6%. The individuals who showed positive for hepatitis C antibody test as shown in **Figure 1**. most of them are males and represent 65.9% of the study population, Of these, the prevalence of hepatitis C was found to be higher in males 4 (0.8%) than the females 1 (0.2%). The difference in the distribution of HCV infection by gender was no significant ($p > 0.05$) (**Table 1**). Among the age groups of the population, individuals within the age groups 31 - 45 and >45 years old were most affected by HCV, the percentage was 4 (0.4%) and 4 (0.6%) respectively, while no one was affected for the age groups between 15 and 30. There was a significant association between HCV and age groups ($P < 0.05$) (**Table 2**). This study showed that the sero-prevalence of hepatitis C was low but similar rate in the community local of Algamosi (**Table 3**). Tattoo was significantly associated with anti-HCV antibody positive results. H/O jaundice and h/o surgery were not associated with anti-HCV antibody positive results. Dental procedure, sharing razor, history of blood or blood product transfusion and multiple sexual partners was not given by any of the participants the small simple size could be the reasons (**Table 4**).

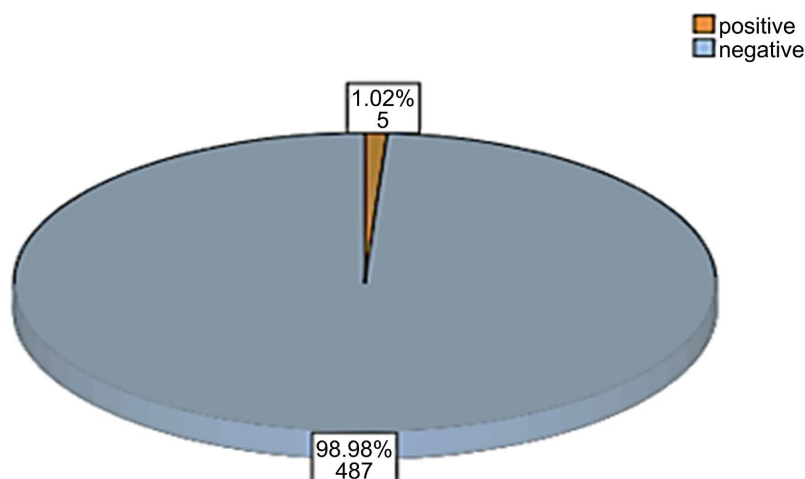


Figure 1. The prevalence of hepatitis C infection among the study population of Algamosi Locality, in Gazira State, 2019.

Table 1. Gender among the study population in relation to hepatitis C at Algamasi, Gazira State, Sudan, 2019.

| Gender/HCV | Positive No % | Negative No % |
|------------|---------------|---------------|
| Male | 4 (0.8%) | 320 (65.9%) |
| Female | 1 (0.2%) | 167 (34.1%) |
| Total | 5 (001%) | 492 (100%) |

$X^2 = 0.450$, p value = 0.503 (no significant).

Table 2. The age group among the study population in relation to hepatitis C at Algamasi, Gazira State, Sudan, 2019.

| Age/HCV | Positive No % | Negative No % |
|---------|---------------|---------------|
| <15 | 0 (0.0%) | 105 (21.3%) |
| 15 - 30 | 0 (0.0%) | 167 (34%) |
| 31 - 45 | 2 (0.4%) | 129 (26.3%) |
| >45 | 3 (0.6%) | 86 (17.5%) |
| Total | 5 (001%) | 492 (100%) |

$X^2 = 8.037$, p value = 0.045 (significant).

Table 3. Residence among the study population in relation to hepatitis C at Algamasi, Gazira State, Sudan, 2019.

| Location/HCV | Positive No % | Negative No % |
|--------------|---------------|---------------|
| Brebira | 0 (0.0%) | 74 (15%) |
| Abroished | 1 (0.2%) | 179 (36.4%) |
| Cadose | 2 (0.4%) | 74 (15%) |
| Firdose | 2 (0.4%) | 160 (32.6%) |
| Total | 5 (001%) | 487 (100%) |

$X^2 = 3.188$, p value = 0.364 (no significant).

Table 4. Risk factors for transmission.

| Risk factors | present in HBsAg positive | present in HBsAg negative | P value |
|-------------------------|---------------------------|---------------------------|-----------|
| Tattoo | 4 | 78 | 0.001 |
| Dental procedure | 0 | 75 | 0.341 |
| Sharing razor | 0 | 42 | 0.92 |
| H\O Blood transfusion | 0 | 49 | 0.455 |
| Multiple sexul partners | 0 | 47 | 0465 |
| H\O jaundice | 1 | 74 | 0.766 |
| H\O Surgical Procedure | 1 | 43 | 0.383 |

4. Discussion

This descriptive study was conducted at Algamosi Locality, the objective of the

study was to find the factors influencing hepatitis c viral infections, to identify its prevalence, to identify the most affected age and gender group. In this work, out of 492 people screened, 79 individuals (1% of the sample population) were found to have HCV positive. These results are in agreement with the results aforementioned by Chaabna *et al.* [10]. This may be due to poor health care settings, and difficulty to detect and investigate viral hepatitis infections [16]. Previous studies from other parts of the country showed that the prevalence rate of HCV was higher at 3.4%, 3.5%, and 6.78%, which had been reported by Bazie *et al.* [12], Hamed *et al.* [13] and Mudawi *et al.* [11] respectively. In this study, we found only five individuals of all participants (1.0%) were reacting to the anti-HCV antibody. These findings are deferred In comparison to studies from other parts of the country, and the reason for this may be due to the sample size, selection of the Target population, study area, and add to that reason from the nine studies regarding HCV antibody prevalence most of them in Khartoum and mostly hospital-based study among blood donors, or immunocompromised patients, Also, there is no study has been found providing prevalence information of HCV in an apparently healthy population [11]. Moreover, this prevalence rate is relatively more than or comparable, to the findings of Mahmoud *et al.* [9] who reported the prevalence rate of HCV in Iran was (0.3%). Mahmoud *et al.* [9] were reported the prevalence of 0.3% in Bahrain, 0.4% in Oman, 1.1% in Qatar, 1.4% in Kuwait, 1.6% in Saudi Arabia and the United Arab Emirates. However, less than 11.9% was recently recorded in Egypt [6]. On the other hand, in developed countries like the US, the prevalence of HCV infection has been estimated to be less than 2% [8]. Individuals Aged 31 and over 45 years had the highest prevalence of HCV infection the percentage was 3 (3.37%) and 2 (0.6%) respectively. The prevalence rate of HCV infection was higher among males at 1.2% than the females at 0.6%. This finding is different from the findings who reported a prevalence of 16.6% among females and 3.4% among males in Keffi [17] [18]. Furthermore, this work determined the relevant factors for HCV infection among the study population, previously, reported by Abou *et al.* [19]. It was a significant association between some risk factors. Unprotected sexual activities (20%) were the most apparent predisposing risk factor for both HBV and HCV seropositive, followed by razor sharing 13.3%, parenteral drug injections (10%) for each, tattooing and surgical procedures 3.3%, As well as in this study, there is a significant association between HCV infection among the population and history of tattoo, the percentage was (4.78%). This represents the most predisposing risk factor for HCV seropositive, this could be due to the ignorance of the danger of it, or the instrument used is not sterilized. this is different from the finding of Mahmoud *et al.*, which reported 17.3% in seroprevalence of hepatitis D virus and its risk factors in the west of Iran [9], 16.2% of the HCV-positive cases gave a history of sharing razors with others, this finding is in concordance with the finding that had been reported above by Abou *et al.* [19].

2.3% of the participant had a history of surgical, this finding is considered the lowest in comparison to 5.9% and 16.7% reported by Abdallah *et al.* [20] and

Eboumbou *et al.* [21]. 8.1% of the HCV positive cases gave a history of blood transfusion, this result is different from the result of Eboumbou *et al.* [21] in their study. HIV, HBV, HCV and T. pallidum infections among blood donors and Transfusion-related complications among recipients at the Laquintinie hospital in Douala, Cameroon, also this finding is more than what had to been reported at 2.1% by Dawet *et al.* [22].

5. Conclusion

Seroprevalence of anti-HCV antibody was 1%. The individuals having past history of tattoos were significantly associated with anti-HCV antibody positivity. Educating familiar people regarding the mode of transmission of Hepatitis B and C will help to reduce their transmission.

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Conflicts of Interest

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

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