



Research Article

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Frequency of Hepatitis C Infection in Hospital Patients in Ha'il, KSA: A Retrospective Analysis

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ABSTRACT

Few studies have assessed the prevalence of hepatitis C infection in the general population of Ha'il in KSA or among hospital patients. This study aimed to evaluate the prevalence, correlates, and patterns of HCV antibodies among individuals attending King Khalid general hospital. A retrospective analysis was applied to evaluate HCV seropositivity among individuals who attended a tertiary care system from June 2020 to June 2021 in the Ha'il region, KSA. Clinical and demographic data of 3861 patients for HCV seropositivity tests were collected and analyzed using Excel and the statistical package for social sciences (SPSS) programs. The association in categorical variables was tested using the chi-squared (χ^2) test. The level of statistical significance for the study was set at $p < 0.05$. The rate of HCVAb among hospital patients was 1.4%, with the majority 65% being females. A statistically significant association was; however, observed between HCV seropositivity and age, medical department as well as the epidemiological month. The rate of HCV seropositive was found significantly increased in the age group 31- 40 (0.44%), dialysis patients (0.6%), and during March 2021(0.35%). The rate of hepatitis C infection is still worrying among hospital patients in Ha'il. Strict universal precautions should be employed in hospitals and dialysis units to prevent HCV transmission.

Key words: Hepatitis C, Viral, Surveillance, Epidemiology, Saudi Arabia

INTRODUCTION

Hepatitis C virus (HCV) infection is the leading causative agent of chronic hepatitis, cirrhosis, hepatocellular carcinoma, and liver transplantation [1]. Therefore, HCV infection is still significant public health and economic concern in many parts of the world. HCV infection affects more than 130 million people worldwide, with nearly half a million people dying each year from HCV-related liver diseases as it is not easy to treat so far [2-6]. According to the last five years' data record collected by the ministry of health of the Kingdom of Saudi Arabia (KSA), there is a notable increase in the incidence rate of hepatitis C in the kingdom (Incidence rate/100000

population: 5.48 to 10.27) [7]. However, infectious diseases of high concern vary among the country according to geographic and demographic aspects [8, 9]. In Ha'il province, there are no exact estimates of the current hepatitis C burden. This is likely due to the culture of the local population who refuses to participate in such studies. However, we noted in our daily work at the King Khalid Hospital (the major hospital in Ha'il) a consistent growth in the number of people infected with HCV. To overcome this issue, we aimed in this study to perform a retrospective analysis to evaluate HCV seropositivity among individuals attended a tertiary care system from June 2020 to June 2021 in Ha'il region, KSA.

MATERIALS AND METHODS

This is retrospective data retrieved from King Khalid general hospital in Ha'il, KSA. The data of 3681 hospital patients tested for the presence of HCV antibodies within the period June 2020–June 2021) were collected from the hospital database. Data included age, date of the test, and the results of HCVAb. Data were organized and analyzed statistically using Excel and the Statistical Package for Social Sciences (SPSS) version 20 programs. The association in categorical variables was tested using the chi-squared (χ^2) test. The level of statistical significance for the study was set at $p < 0.05$. Age groups were distributed as <20 , 21–30, 31–40, 41–50, and >50 years old. Positive cases of both tests were also aligned in the context of the month.

RESULTS AND DISCUSSION

The reports of 3681 hospital patients were included in our study. Of all patients, 1708 (46.4%) were males and in 1973 (53.6%) were females. The ages of those patients varied between 3 months and 97 years old with a mean age of 40.01 ± 20.24 years old. The majority of the patients (25.6% and 25.2%) were within the age group of <20 and 21–30, respectively. Most of the tested patients were admitted as blood donors (32%) or to the artificial kidney unit (10.87%). Positive HCVAb cases were reported in 51 of these patients, giving an overall HCVAb rate of 1.4% (**Figure 1**).

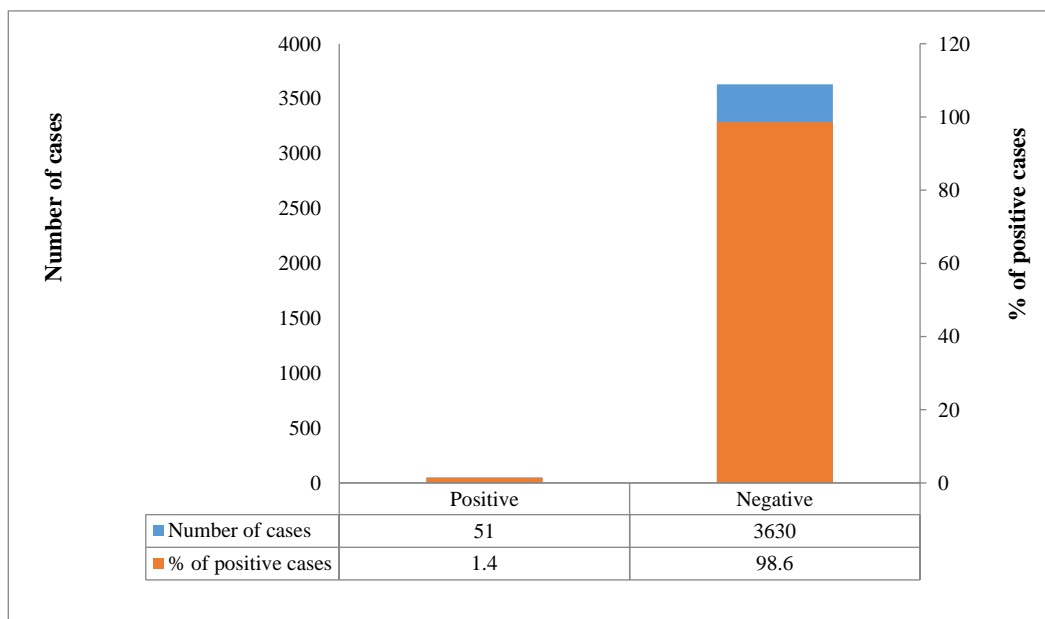
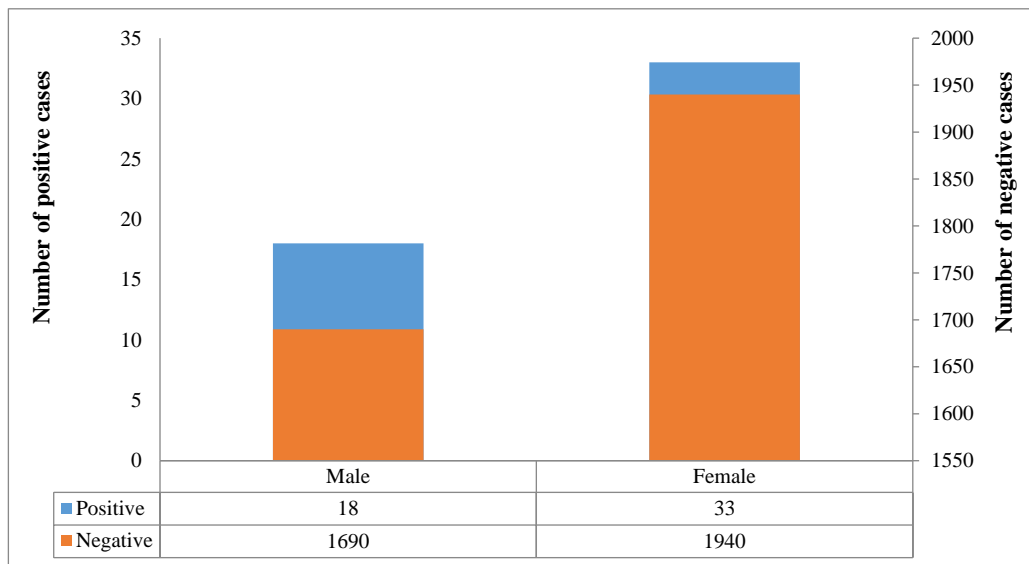
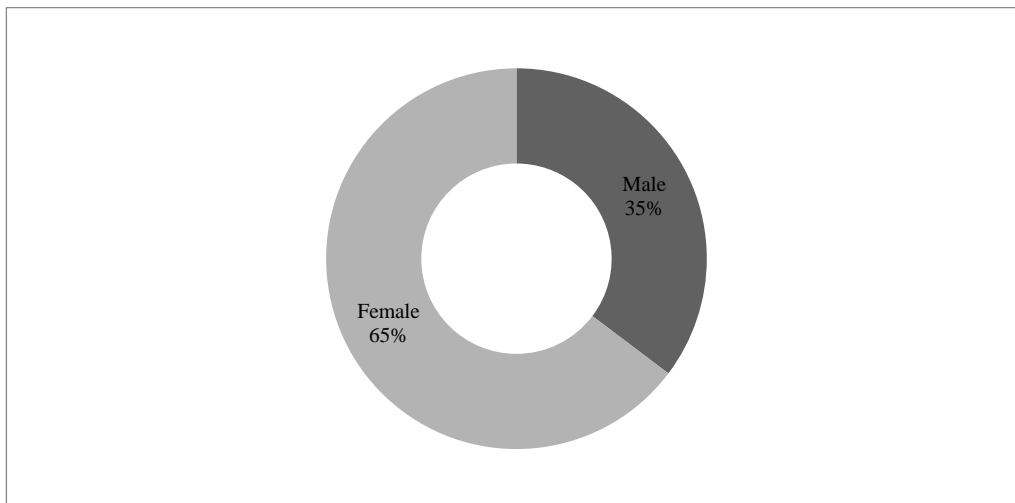


Figure 1. Frequency and prevalence of HCVAb among the hospital attendees.

The majority of positive HBVAb cases were reported in females (33 cases, 65% of the positive cases) while only 18 positive cases in males (35% of the positive cases). However, this was statistically insignificant as tested by Pearson Chi-Square (**Figure 2**).



a)



b)

Figure 2. Frequency of HCVAb positive and negative cases between genders.

a) The number of HCVAb positive v.s. negative cases. b) The percentage distribution of HCVAb positive cases between males and females.

The age group 31 – 40 years old had the highest positive cases ($n=16$, 31.37% of the positive cases) among other age groups, while it was the lowest ($n=3$, 5.88% of the positive cases and 0.44% of the total number of patients) among the age group of >50 years old (**Figure 3**). Chi-Square analysis indicated a statistically significant association between age and HCVAb seropositivity, $P < 0.05$. These results suggest that age and HCVAb positive cases are associated with each other.

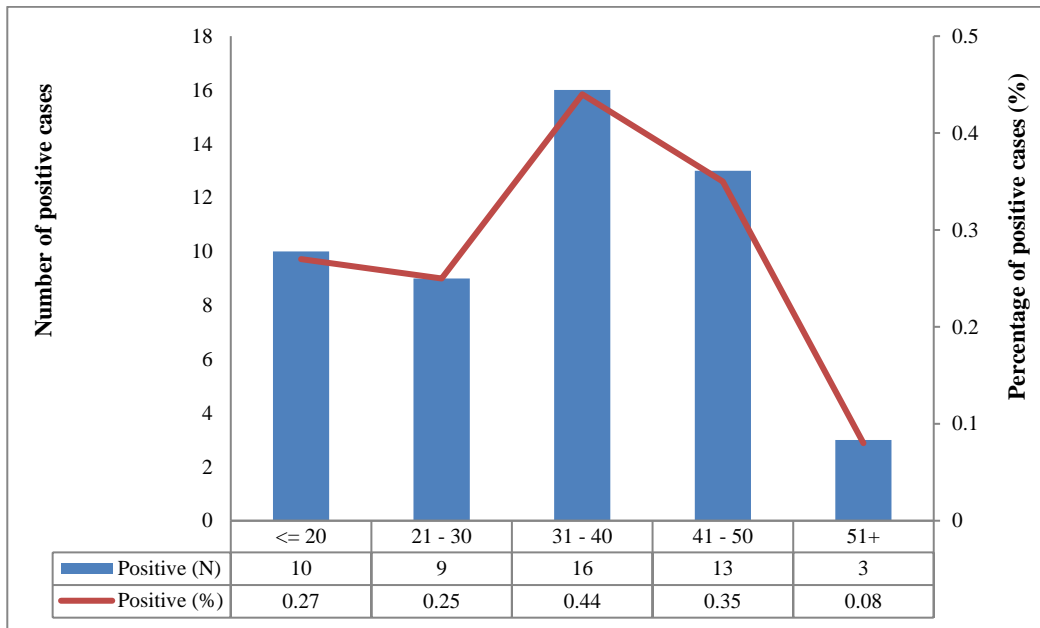


Figure 3. Frequency and seroprevalence of HCV among the different age groups.

As shown in **Figure 4**, most of the positive cases were reported from patients in the artificial kidney unit (n=22, 31.4% of the positive cases and 0.6% of the total number of patients) followed by blood donors (n=11, 21.6% of the positive cases and 0.3% of the total number of patients). Interestingly, the Pearson Chi-Square test revealed a significant association between positive HCVAb cases and the number of patients in different medical departments, *P*-value <0.001.

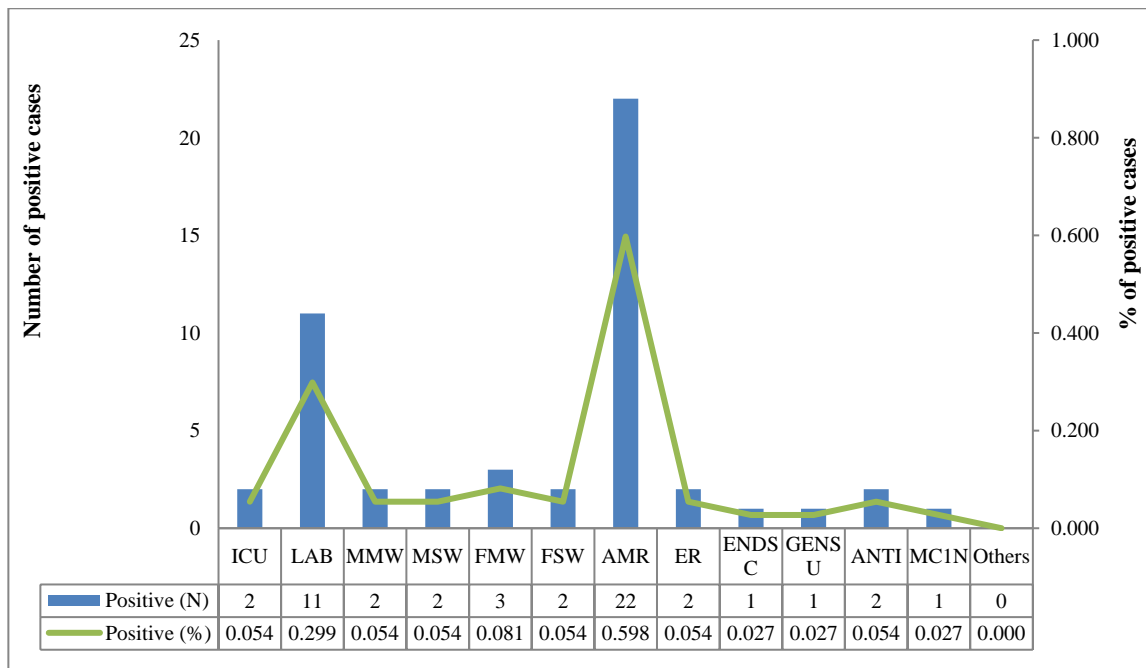


Figure 4. Frequency and seroprevalence of HCV according to the medical department.

We also analyzed the frequency of positive cases across the periods of the reported cases (**Figure 5**). Remarkably, the frequency of positive cases showed a heterogeneous distribution of positive cases across the assigned period. However, 2 prominent peaks of HCVAb positive cases/rate were noticed during August 2020 (n=5, 9.8% of the positive cases and 0.14% of the total number of patients) and March 2021 (n=13, 25.5% of the positive cases and 0.35% of the total number of patients). Pearson Chi-Square test revealed a significant association between positive HCVAb positive cases and the reported dates of the test, *P*-value <0.001. Thus, it is likely that HCVAb cases followed a seasonal pattern.

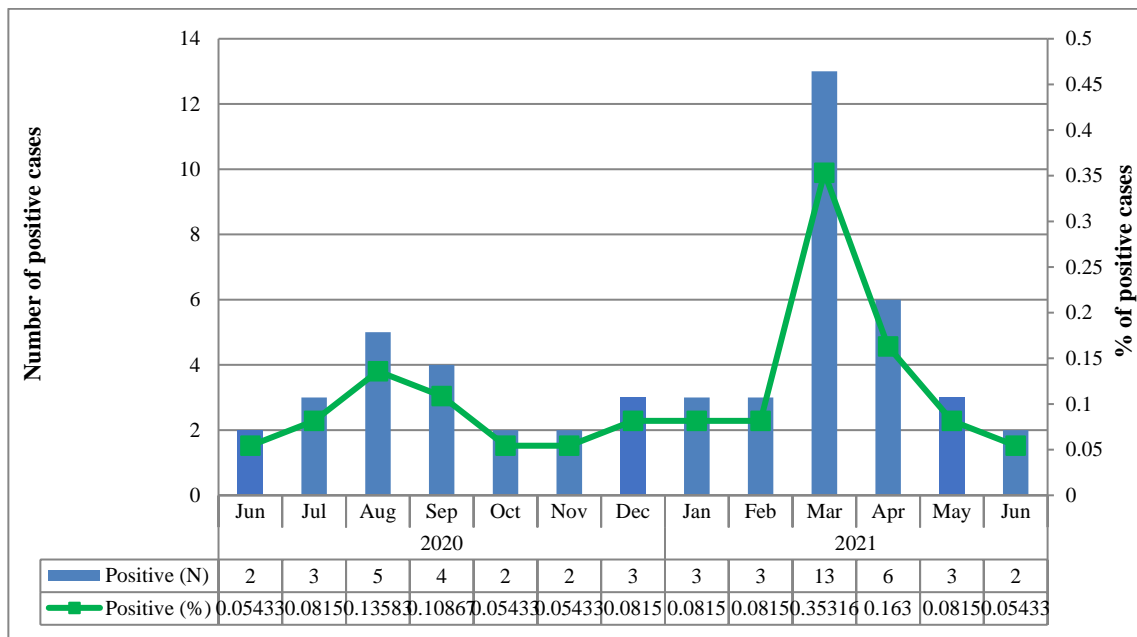


Figure 5. Frequency and seroprevalence of HCVAb according to the epidemiological month.

The WHO's 2016 resolution sought to eradicate viral hepatitis as a public health threat by 2030 [10]. In KSA, the country is increasingly reporting primary hepatic carcinoma in the last decade with marked regional variations. The major etiological factor of this is chronic infection with HBV and/or HCV [11]. Our study sought to investigate HCV seroprevalence among patients attending King Khalid Hospital in Hail, KSA. We collected and analyzed the report of HCVAb tests from 3380 patients. Our results revealed that 51 out of 3681 patients were seropositive for HCVAb (1.4%), which is 3-4 folds lower in compassion to previously reported for this hospital 2 decades ago [12]. In KSA, the rate of HCV infection is not well established; however, evidence from blood donor screening suggests prevalence rates of 0.4%–1.1% [13]. Thus, it is likely that despite the decline in the prevalence of HCVAb in Ha'il in the last 2 decades, HCV prevalence is still higher than in many other regions in the country. This suggests that the variations in the prevalence of HCV infection in Ha'il compared to other regions in KSA might be attributed to geographical and socioeconomic differences among different regions.

Some studies reported a higher prevalence of HCV in females than males, while others found it is more prevalent in males [14-17]. Our results showed an insignificant increase of HCVAb seropositivity in female than male patients. This is consistent with other studies which have reported no trend in HCV seropositivity among gender [17]. However, the higher prevalence of HCVAb in women is an alarm for the potential increase of vertical transmission from mother to infant of HCV [18]. Therefore, more attention and routine test for HCV infection among women, in particular pregnant, should be continued.

Most of the studies showed an increased prevalence of HCV in the elderly [19]. Our data showed a significant association between HCVAb seropositivity and age. However, the highest age-related prevalence of HCVAb was in the age group 31-40 years old, while a progressively decreased after 50 years old. Because of the study's design, these results may not reflect the real prevalence of HCV infection. For example, the low number of older people in the reported cases could be attributed to the fact that more than 20% of the tested individuals were from blood donors, in which most of the tested individuals are younger than >50 years old, while only 4.3% were >50 years old. This age group (>50 years old) comprises about 11% of the Ha'il population and therefore, targeting them through intended screening may reveal the actual prevalence of HCVAb in Ha'il. Additionally, the decreased HCVAb prevalence in those >50 years old is likely owing to deaths caused by HCV-related cirrhosis and hepatocellular carcinoma in this age group [20].

Dialysis patients are more likely to acquire HCV than the general population, ranging from 5-60% to 50% in developed countries and developing countries, respectively [21, 22]. Considering the prevalence of HCVAb according to the individuals of the different medical departments in this study, the majority of HCVAb positive cases were from dialysis patients (n = 22, 5.5% of dialysis patients, 43.3% of all HCVAb positive cases) which are a bit lower than previously reported (6.9%) from the same department in this hospital [16]. This is likely due to a breakdown in universal preventive protocols, which easily enhances the spread of HCV in hemodialysis

facilities [22]. Thus, further measures should be taken to reduce the spread of HCV in this category. Blood donors had also a relatively higher prevalence of HCVAb (n = 11, 21.6% of all HCVAb positive cases). However, when expressed per the population reported in this category (blood donors), only 0.93% of the HCVAb positive cases were found in blood donors, which is much lower than previously reported (4.3%) from the same department in this hospital [16]. Even though, this prevalence of HCVAb is still higher than that reported in the capital Riyadh (0.4%) and the Eastern province of Saudi Arabia (0.59%) and in neighbouring countries (0.16%) [23-25].

In most countries, the seasonal distribution of viral hepatitis C exhibited a varied peak throughout the year, with the most apparent peak in the spring and summer [26]. In this regard, our findings also revealed an increased rate of HCVAb positive cases, with significant peaks in March 2021 and August 2020. To date, there it is still not understood why some hepatitis infections appear during specific months/seasons. However, many studies have suggested that meteorological and behavioral factors could have a considerable influence on disease seasonality. Indeed, when we revised the history of several parameters of the climate in Ha'il for the period studied. Interestingly, March 2020 and Aug 2021 were found to be less cloudy during the period studied, and August prominently showed the hottest temperature. These findings shed the light on the further and deep investigation of the correlation between climate and HCV occurrence.

CONCLUSION

The rate of hepatitis C infection is still worrying among hospital patients in particular the dialysis patients in Ha'il, especially among mid-age people, dialysis patients, and during spring. Health education programs among patients and strict universal precautions should be employed in hospitals and dialysis units are the main interventions that might help limit the spread of HCV infection.

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CONFLICT OF INTEREST : None

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ETHICS STATEMENT : The study was approved by the Biomedical Ethics Committee of the Ministry of Health-Ha'il branch (IRB log number: 2020-22).

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