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Prevalence of Hepatitis C Among Hospitalized Patients in Ha'il, Saudi Arabia: A Retrospective Study

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ABSTRACT

There is limited research on the prevalence of hepatitis C virus (HCV) infection in the general population or hospital settings in the Ha'il region of Saudi Arabia. This study aimed to determine the prevalence, associated factors, and distribution patterns of HCV antibodies among patients of King Khalid General Hospital. A retrospective study was conducted to assess HCV seropositivity among individuals who visited a tertiary healthcare facility in Ha'il between June 2020 and June 2021. Data from 3,861 patients, including demographic and clinical details, were collected and analyzed using Microsoft Excel and SPSS version 20 software. The association between categorical variables was examined using the chi-square (χ^2) test, and statistical significance was considered $P < 0.05$. The overall HCV antibody positivity rate was 1.4%, with females comprising 65% of the positive cases. Significant correlations were observed between HCV positivity and age group, clinical department, and specific months during the study period. The highest rates of seropositivity were observed in patients aged 31–40 years (0.44%), among those undergoing dialysis (0.6%), and in March 2021 (0.35%). The findings suggest that HCV infection remains a public health concern among hospital patients in Ha'il. Enhanced infection control practices, especially in hospitals and dialysis units, are essential to reduce the risk of transmission.

Keywords: Hepatitis C, Viral infection, Epidemiology, Surveillance, Saudi Arabia

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Introduction

Hepatitis C virus (HCV) is a major cause of chronic liver conditions, including hepatitis, cirrhosis, hepatocellular carcinoma, and the need for liver transplantation [1]. As such, HCV remains a critical global health and economic challenge. It is estimated that over 130 million individuals worldwide are living with HCV, and nearly half a million deaths occur annually due to HCV-associated liver complications, largely because effective treatment remains difficult [2–6].

Recent data from the Saudi Ministry of Health over the past five years reveal a concerning rise in hepatitis C incidence across the Kingdom (from 5.48 to 10.27 cases per 100,000 population) [7]. However, the prevalence and priority of infectious diseases vary across regions depending on geographic and demographic factors [8, 9]. In the Ha'il province, current estimates of HCV prevalence remain unclear, possibly due to cultural barriers that

hinder participation in public health research. Nonetheless, through routine clinical observations at King Khalid Hospital—Ha'il's largest medical facility—a consistent increase in HCV cases has been noted.
To address this gap, the present study aimed to conduct a retrospective analysis of HCV seropositivity among patients who visited a tertiary care center in Ha'il between June 2020 and June 2021.

Materials and Methods

This study is a retrospective review conducted at King Khalid General Hospital in Ha'il, Saudi Arabia. Patient data were collected for individuals who underwent hepatitis C antibody (HCVAb) testing between June 2020 and June 2021, totaling 3,681 patients. The dataset included patient age, test date, and HCVAb results.
All data were compiled and analyzed using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) version 20 software. The chi-squared (χ^2) test was applied to evaluate associations between categorical variables. A P-value < 0.05 was considered statistically significant. Age groups were categorized as follows: < 20, 21–30, 31–40, 41–50, and > 50 years. Additionally, HCVAb-positive cases were analyzed in relation to the month of testing.

Results and Discussion

A total of 3,681 hospital patient records were analyzed in this study. Among them, 1,708 (46.4%) were male, while 1,973 (53.6%) were female. Patient ages ranged from 3 months to 97 years, with a mean age of 40.01 ± 20.24 years. The largest age groups were those under 20 years (25.6%) and those between 21–30 years (25.2%). The majority of patients tested were either blood donors (32%) or patients admitted to the artificial kidney (dialysis) unit (10.87%). A total of 51 individuals tested positive for hepatitis C antibodies, resulting in an overall seropositivity rate of 1.4% **(Figure 1)**.

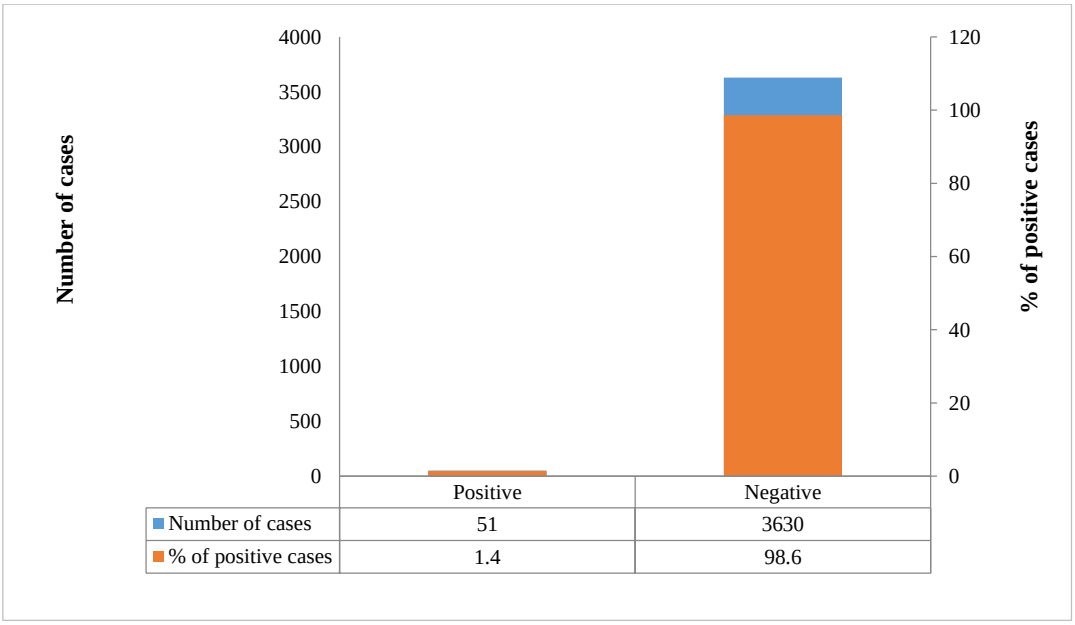
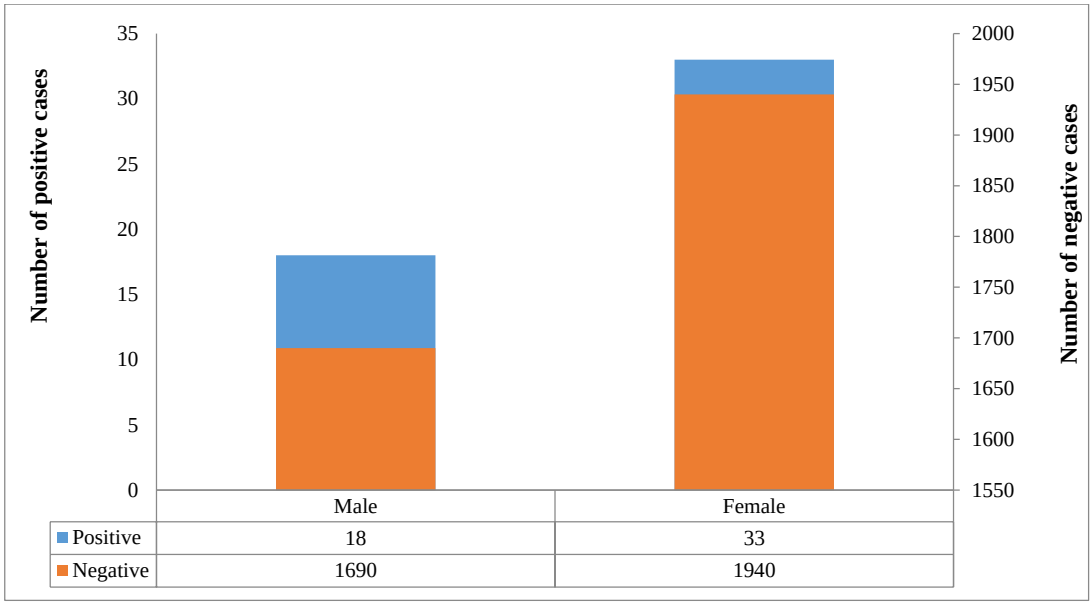
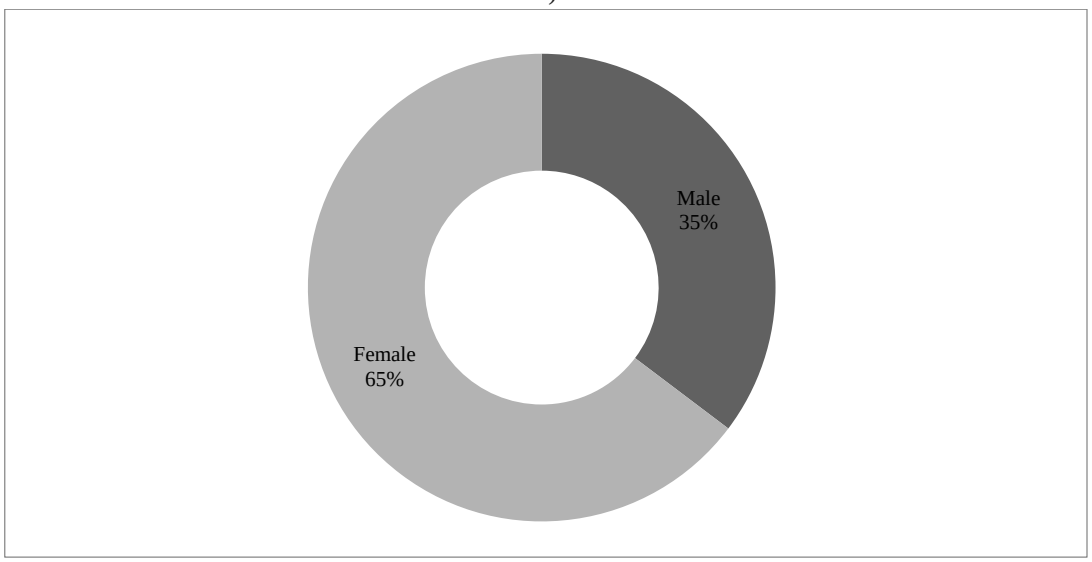


Figure 1. Frequency and prevalence of HCVAb among the hospital attenders

The majority of HCVAb-positive cases were identified in female patients, accounting for 33 cases (65% of all positives), while 18 cases (35%) were detected in males. However, this gender-based difference was not statistically significant, as determined by the Pearson chi-square test **(Figure 2)**.



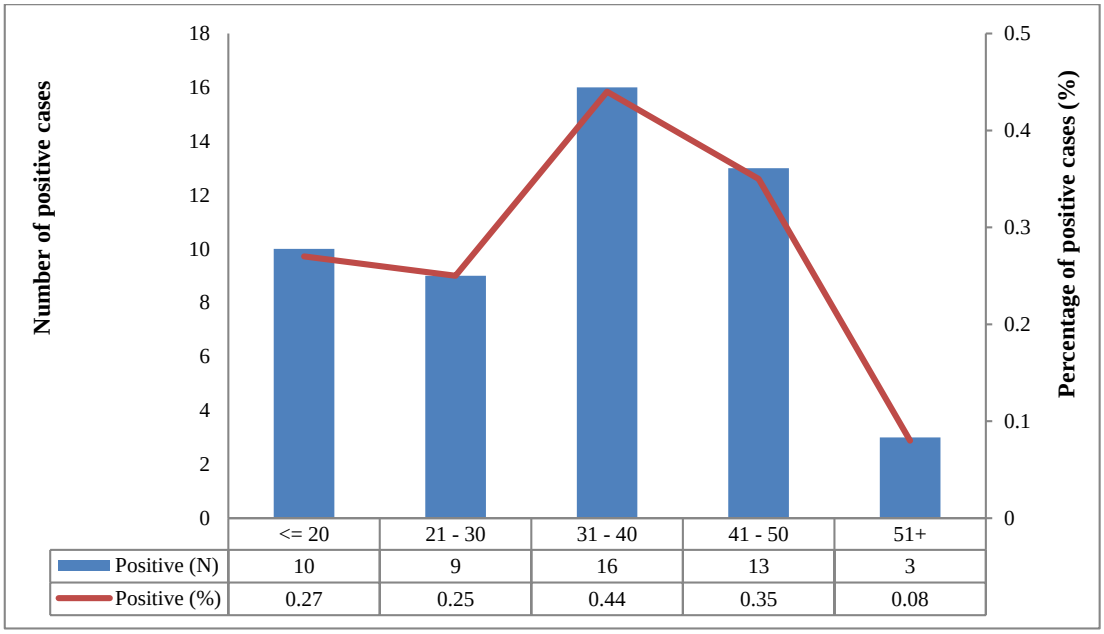
a)



b)

Figure 2. Frequency of HCVAb positive and negative cases between genders: a) The number of HCVAb positive vs. negative cases, and b) The percentage distribution of HCVAb positive cases between males and females

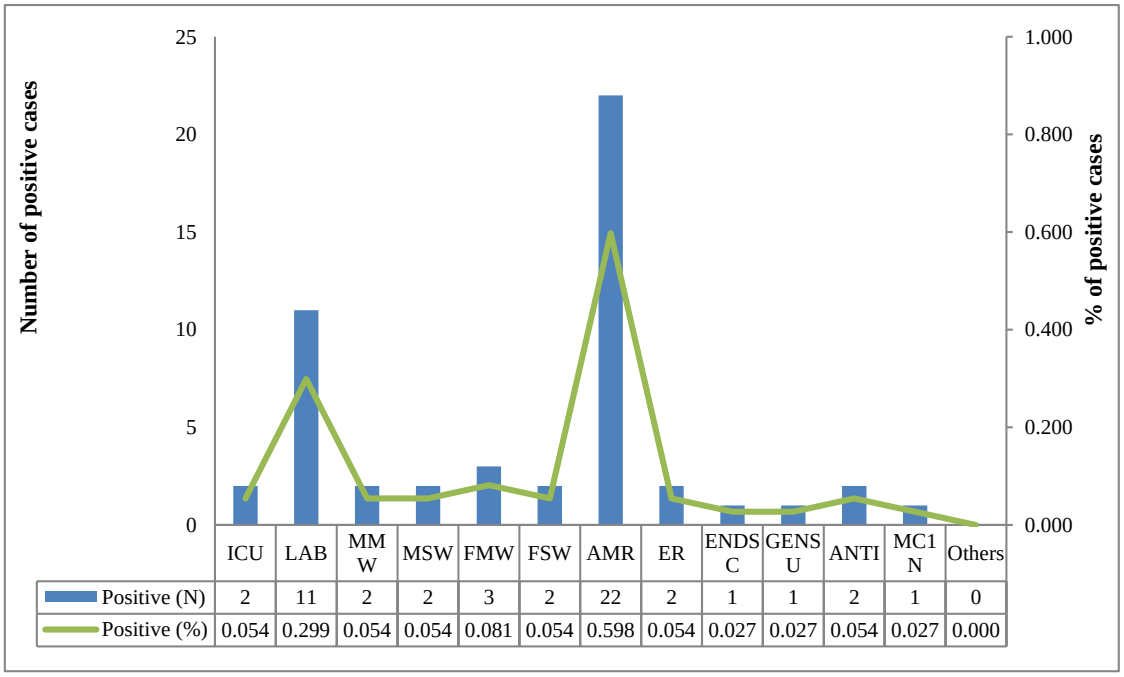
The age group of 31–40 years had the highest number of HCVAb-positive cases, with 16 individuals (31.37% of all positives). In contrast, the > 50 years age group had the lowest number of positive cases, with only 3 (5.88% of the positives and 0.44% of the total patient population) **(Figure 3)**. Chi-Square analysis revealed a statistically significant relationship between age and HCVAb seropositivity ($P < 0.05$). These findings indicate that age is closely associated with the likelihood of testing positive for HCV antibodies.



	<= 20	21 - 30	31 - 40	41 - 50	51+
Positive (N)	10	9	16	13	3
Positive (%)	0.27	0.25	0.44	0.35	0.08

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

Figure 4 shows that the majority of positive cases were found among patients in the artificial kidney unit, accounting for 22 cases (31.4% of the positives and 0.6% of all patients). Blood donors followed with 11 positive cases (21.6% of the positives and 0.3% of all patients). The Pearson chi-square test revealed a significant correlation between HCVAb positivity and the medical department of the patients, with a P-value < 0.001.



	ICU	LAB	MMW	MSW	FMW	FSW	AMR	ER	ENDSC	GENSU	ANTI	MC1N	Others
Positive (N)	2	11	2	2	3	2	22	2	1	1	2	1	0
Positive (%)	0.054	0.299	0.054	0.054	0.081	0.054	0.598	0.054	0.027	0.027	0.054	0.027	0.000

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

We also examined the distribution of positive cases over time **(Figure 5)**. The data revealed an irregular pattern, with two notable peaks in HCVAb positivity: one in August 2020, with 5 cases (9.8% of positive cases and 0.14% of all patients), and another in March 2021, with 13 cases (25.5% of positive cases and 0.35% of total patients). A significant correlation between the timing of the tests and the occurrence of positive HCVAb cases was found, as indicated by the Pearson chi-square test (P < 0.001). These findings suggest that the incidence of HCVAb positivity may follow a seasonal variation.

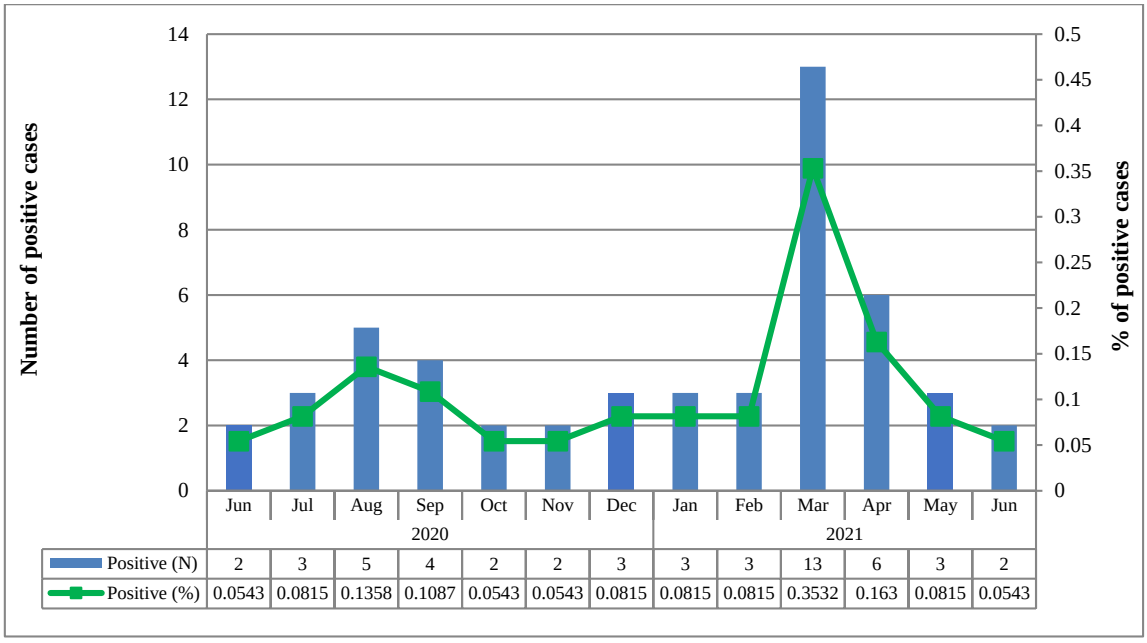


Figure 5. Frequency and seroprevalence of HCVAb according to the epidemiological month

The 2016 resolution by the World Health Organization (WHO) aimed to eliminate viral hepatitis as a public health threat by 2030 [10]. In the Kingdom of Saudi Arabia (KSA), the incidence of primary hepatic carcinoma has been rising over the past decade, particularly with marked regional differences. Chronic infections with HBV and/or HCV are considered the primary causes of this increase [11]. This study aimed to investigate the prevalence of HCV antibodies (HCVAb) among patients at King Khalid Hospital in Ha'il, KSA. We collected and analyzed HCVAb test reports from 3,380 patients. Our results showed that 51 out of 3,681 patients tested positive for HCVAb, yielding a seropositivity rate of 1.4%. This is significantly lower by 3-4 times compared to figures reported at this hospital two decades ago [12]. While the rate of HCV infection in KSA is not definitively established, blood donor screenings suggest a prevalence range of 0.4%–1.1% [13]. Despite the decline in HCVAb prevalence in Ha'il over the past two decades, the infection rate remains higher than in other regions of KSA, which may be due to geographic and socioeconomic disparities between regions.

Studies have shown varying trends in HCV prevalence between genders, with some reporting higher rates in females and others in males [12, 14-16]. In our study, females showed a slightly higher rate of HCVAb positivity than males, but this difference was not statistically significant. These findings align with other studies that found no clear gender-based trend in HCV positivity [16]. However, the higher rate of HCVAb in females warrants attention, as it could signal a potential increase in vertical transmission from mother to child [17]. Therefore, routine HCV testing for women, especially pregnant women, should continue to be a priority.

Older populations have generally been shown to have higher rates of HCV infection [18]. Our study found a significant association between age and HCVAb positivity, with the highest prevalence observed in the 31–40 years age group. Interestingly, the prevalence decreased after age 50. However, this finding may not accurately reflect the true prevalence of HCV in the population, as more than 20% of the tested patients were blood donors, most of whom were younger than 50 years. Additionally, only 4.3% of the tested individuals were older than 50 years, despite this age group comprising about 11% of Ha'il's population. Targeted screening of older individuals may provide a clearer picture of HCV prevalence in this demographic. Moreover, the lower prevalence of HCVAb in those over 50 may be partly due to mortality from HCV-related cirrhosis and hepatocellular carcinoma in this age group [19].

Dialysis patients are at an increased risk of acquiring HCV, with prevalence rates ranging from 5-60% in developed countries and up to 50% in developing countries [20, 21]. In our study, the majority of HCVAb positive cases were found among dialysis patients (22 cases, 5.5% of dialysis patients and 43.3% of all positives). This figure is slightly lower than the previously reported rate of 6.9% in the same department at this hospital [12], likely due to a breakdown in universal preventive protocols that increases the risk of HCV transmission in dialysis units. Stricter measures should be implemented to prevent the spread of HCV in these settings. Blood donors also had a relatively higher prevalence of HCVAb (11 cases, 21.6% of all positives), though the positivity rate within

the blood donor population was only 0.93%, much lower than the previously reported 4.3% at this hospital [12]. Still, this rate is higher than the rates reported in Riyadh (0.4%), the Eastern Province of KSA (0.59%), and neighboring countries (0.16%) [22-24].

Viral hepatitis C shows seasonality in many countries, with peaks typically occurring in spring and summer months [25]. Our study also identified significant peaks in HCVAb positivity in March 2021 and August 2020. While the exact reasons behind these seasonal peaks are not fully understood, studies have suggested that meteorological and behavioral factors may play a significant role in disease seasonality. Interestingly, we observed that March 2020 and August 2021 had fewer cloudy days, with August also experiencing the highest temperatures. These findings suggest the need for further investigation into the relationship between climate and the incidence of HCV.

Conclusion

The prevalence of hepatitis C infection remains concerning among hospital patients, particularly in dialysis patients in Ha'il, especially within the middle-aged group and during the spring season. To help limit the spread of HCV, health education programs for patients and the enforcement of strict universal precautions in hospitals and dialysis units are essential.

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Conflict of Interest: None

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Ethics Statement: None

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