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Research Article

Seroprevalence of Hepatitis C Virus Antibodies among University Students at Cihan University–Erbil, Kurdistan Region, Iraq

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ABSTRACT

Hepatitis C virus (HCV) is a clinically significant pathogen due to the serious complications that infection with this virus can cause. The chronicity rate following initial infection ranges between 50% and 70%, potentially progressing to liver cirrhosis or hepatocellular carcinoma, both of which are fatal. As a blood-borne virus, there is a risk of transmission to medical students during clinical training or laboratory work. Therefore, this study aimed to assess the prevalence rate of anti-HCV among medical department undergraduate students at Cihan University in Erbil, Iraq's Kurdistan region. Out of the 700 tested students, 2 showed positive results for HCV antibodies, indicating a total prevalence of 0.28%. Positive tested students for HCV antibodies were male, which indicates 0.55% (2/361), while 0 (0.00%) of the 339 female students tested positive. This study showed a relatively low prevalence of HCV antibodies among students at Cihan University-Erbil. However, even this low prevalence indicates the incidence of HCV infection among university students, who represent a broad part of society. The presence of HCV-antibodies in students of medical colleges and departments may indicate that these students acquired hepatitis C infection during practical training in hospitals or medical laboratories.

Keywords: Hepatitis C virus, prevalence, chronic infection, cirrhosis

INTRODUCTION

Hepatitis C virus (HCV) is one of the important viruses that infects humans and causes serious complications in a high percentage of patients. HCV is an RNA enveloped virus of the family *Flaviviridae*. HCV infects the liver and leads to acute liver infection, followed by chronic infection in a high percentage of cases that may reach 70%.[1,2] An estimated 1.5 million new cases of HCV infection are reported each year, making it one of the most prevalent infections in the world.[3,4]

HCV infection is significant because a substantial percentage of infected people progress from acute to chronic infection, and, according to various international studies, the percentage ranges between 40% and 70%.[5,6] Because of the ongoing viral activity and immune response over a number of years, chronic HCV infection is one of the serious illnesses with a poor prognosis, which may lead to cirrhosis of the liver and thus life-threatening liver failure. Furthermore, about 2–4% of people with chronic HCV may develop primary hepatocellular carcinoma.[5,7]

As a blood-borne virus, HCV is primarily spread by contact with contaminated blood during blood or blood product transfusions, or parenterally through needlestick injuries or other risky invasive procedures. The virus may sometimes be transmitted sexually.[7,8]

Young adults, as well as medical students in medical colleges or paramedical departments, represent a susceptible group for blood-borne infections due to their possible exposure to various risk factors that could lead to HCV transmission and other blood-borne microorganisms.[9,10]

Studies investigating the prevalence of HCV antibodies in university students are limited. However, existing literature

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exposes varying prevalence rates globally, and this is often connected to specific high-risk behaviors within certain demographics.[11] In some studies, low incidence rates of HCV antibodies have been detected among university students, with rates extending from 0.04% to 1%, which is usually lower than the overall population. Even so, local epidemiological factors can show an important role in these rates. For example, countries with high rates of blood-borne infections may reflect this risk even in younger, generally low-risk populations, such as university students.[11-13]

Some behavioral and environmental factors can raise the risk of HCV spread among young adults. Studies show that the main risk factors for HCV infection include exposure to unsterile needles or syringes (through practices like intravenous drug use or unsafe tattooing), unprotected sexual encounters, body piercings performed without proper sterilization, and contact with contaminated blood products.[6] In a university setting, additional risk factors may include medical training programs where students are exposed to blood-borne pathogens and healthcare-related procedures. Research on HCV prevalence among medical students has shown a significant association with high-risk behaviors, including substance use and insufficient knowledge about transmission prevention.[6,7]

The Middle East has a unique HCV epidemiology, with some of the highest HCV rates globally, particularly in Egypt and other neighboring countries. Various studies have shown that due to limited awareness and healthcare access in specific areas, certain populations are at an increased risk for HCV.[13] Research highlights that many HCV cases in this region go undiagnosed, particularly among younger, seemingly low-risk populations. Regional research among young adults and students shows that awareness programs and preventive education are critical in reducing the spread of HCV. University-based studies provide valuable insights into the specific risk factors among younger populations, especially in high-prevalence areas like Iraq.[4,14,15]

This study aimed to determine the prevalence of anti-HCV antibodies among Cihan University-Erbil undergraduate students in the basic medical department, Kurdistan region, Iraq. A localized understanding of the state of HCV within an educational institution can be obtained by investigating the prevalence of HCV antibodies among Cihan University-Erbil basic medical department students. Given the limited research on HCV prevalence among university students in Iraq, this study is likely to contribute important data that may inform local health policies and university-based interventions.

MATERIALS AND METHODS

Study Population

Subjects involved in this study are the students of basic medical departments of the University of Cihan-Erbil, Kurdistan region, Iraq, during 2024–2025, meaning young adults, both males and females. Seven hundred students in all had their HCV antibodies tested.

Sample Processing

Colloidal gold-enhanced quick immunochromatographic assays are used in rapid anti-HCV test kits to qualitatively identify HCV antibodies in human blood or plasma, and were used for all tests (Health-Chem diagnostics, USA). The kit's sensitivity is 100%, and its specificity ranges from 97% to 99%. The process was carried out according to the producer's guidelines.

Statistical Analysis

Statistical Package for the Social Sciences (SPSS) 16 was used to analyze the data (SPSS Inc., Chicago, Illinois, USA). Using contingency tables, the Chi-square test was used to assess proportional differences. If the $P < 0.05$, and statistical significance was set at $P < 0.05$, it was deemed statistically significant.

RESULTS

The study involved testing 700 students for HCV antibodies. The age range was 17–28 years old, with a mean age of 19.8 (± 2.75). Table 1 indicates that 361 (51.6%) of the subjects were males and 339 (44.4%) were females.

Of the 700 tested students, 2 showed positive results regarding HCV antibodies, indicating a total prevalence of 0.28%. Positive tested students for HCV antibodies were male; this shows that 0 (0.00%) of the 339 female students tested positive, compared to 0.55% (2/361) [Table 2]. There was statistical significance in the number of cases according to gender ($P < 0.05$).

Regarding the distribution of positive results according to the age groups of the examined students, the results showed no positive cases in the 17–20 years of age group, while the results showed one positive case in the 21–25 years of age group (1/176: 0.56%) and another case in the age group >26 (1/13: 7%) [Table 3].

The two students who tested positive for HCV antibodies did not have clinical symptoms suggestive of chronic active hepatitis. One of the students also had normal liver function tests, while the other positive student had slightly elevated alanine transaminase levels (74 IU/L).

One of the positive students mentioned that he had a needle stick injury approximately a year ago while undergoing training in a private laboratory, which raises questions about the existence of an epidemiological history or known prior exposure to HCV infection. However, he did not mention the appearance of clinical symptoms indicating the occurrence of asymptomatic clinical hepatitis.

DISCUSSION

Hepatitis C is an important infection because a significant percentage of acute cases develop into chronic hepatitis and carries the risk of developing liver fibrosis (cirrhosis) or primary hepatocellular carcinoma.[1,2]

The main focus of the infection control agenda is HCV infection, which has drawn a lot of attention. In many nations worldwide, it is regarded as a serious public health issue.[4] The high risk of infection exposure for medical students and other health care professionals has brought attention to the pressing need for an infection control program.[9,10]

Table 1: Distribution of subjects' ages and genders

Age (years)	Gender		Total (%)
	Male (%)	Female (%)	
17–20	238 (34.90)	273 (39.00)	511 (73.00)
21–25	116 (16.70)	60 (8.70)	176 (25.14)
26–30	7 (1.0)	6 (0.85)	13 (1.8)
Total	361 (51.57)	339 (44.4)	700 (100)

Mean age=19.8 (±2.75)

Table 2: Prevalence of HCV antibodies among students who were tested by gender

Gender	HCV status		Total (%)
	Positive (%)	Negative (%)	
Male	2 (0.55)*	359 (99.45)	361 (100)
Female	0 (0.00)	339 (100)	339 (100)
Total	2 (0.28)	698 (99.72)	700 (100)

*=P<0.05

Table 3: HCV antibody prevalence according to age

Age (Years)	HCV status		Total
	Positive (%)	Negative (%)	
17–20	0 (0.00)	511 (100)	511 (100)
21–25	1 (0.56)	175 (0.56)	176 (99.44)
>26	1 (7.0)	12 (93.0)	13 (100)
Total	2 (0.28)	698 (99.72)	700 (100)

HCV: Hepatitis C virus

Studies show a range of prevalence rates of HCV antibodies among medical students, with some reporting rates as low as 0.20% and others as high as 2.4%. In general, healthcare workers, including medical students, are at a higher risk of HCV infection due to potential exposure to infected blood or body fluids.[10-12]

The global prevalence rate of 3% set by the World Health Organization is higher than the frequency rate of 0.28% found in this study. Prevalence rates of HCV have varied in Nigeria and other African and Middle Eastern countries, according to previous investigations carried out in different demographic groups.[14,16,17] According to certain studies, Low HCV prevalence rates were found among blood donors in Kano, Nigeria (0.40%), Namibia (0.90%), Sudan (1.90%), Senegal (0.80%), and Ghana (0.90%).[17]

Higher prevalence rates, however, were found in earlier Nigerian studies: 4.50% among sickle cell disease patients in Benin who receive frequent blood transfusions, 5.70% among human immunodeficiency virus (HIV) patients in Jos, 8% among university freshmen in Ilorin, 5% in Port-Harcourt, and 12.30% in Benin.[12,18] High incidence rates have also been observed in a number of Middle Eastern and African locations. For instance, prevalence rates among blood donors in Ghana, Saudi Arabia, and Egypt were found to be 19.20%, 5.70%, and 5.20%, respectively. These differences in prevalence rates might be caused by a variety of factors. First, because of the high risk of exposure in the particular population subgroup under study, such as sickle cell disease patients, HIV/acquired immunodeficiency syndrome patients, commercial blood donors, etc., or because of the common unhealthy health practices in such areas, it may accurately reflect the global regional variation in HCV prevalence.[19] Second, the reason might be variations in the diagnostic techniques and the precision of the several tests used in the study.[14,16] Third, it may indicate the effect of the birth cohort on the disease's prevalence; that is, since most of the study's participants were under 30, this may indicate how the prevalence of the disease has been impacted by recent improvements in health practices.

According to our study, the highest prevalence of anti-HCV was found in age groups over 26 (7%), followed by those between 20 and 25 (0.56%), and none of the subjects under 20 years old tested positive. Since only 13 students over the age of 26 years participated in the study, the observed difference may not accurately reflect the prevalence of HCV antibodies in the various age groups in the general population.

In line with some earlier research conducted in other nations, the current study revealed that the prevalence of HCV antibodies was higher in men (0.28%) than in women (0.00%).[12,14,20] However, the prevalence of HCV antibodies was higher among female participants in other studies carried out in Ilorin, Jos, and the Nigerian Niger Delta.[16,21] Given the low overall prevalence of HCV antibodies in the study population, it is challenging to pinpoint a specific cause for this higher male dominance.[19,21]

Regarding the presence of risk factors among positive individuals, this study showed that one of the positive individuals was exposed to a needle stick injury with the patient's blood while training in a medical laboratory a year before the study was conducted. This shows the importance of exposure to blood or body fluids by health care workers or medical students in acquiring infection with HCV.[8]

Recent studies still show a low prevalence of HCV among medical students. In Lahore, only 1% of the participants showed positive results for HCV.[22]

It is interesting to know that even hospitalized patients can be a source of infection to students and healthcare workers. Among the 42,805 in-hospital patients tested in a tertiary hospital in Italy, 1297 (3.03%) were HCV Ab positive. The prevalence of HCV Ab was greater in patients over the age of 76 (5.3%), whereas it was lower in the youngest birth year cohort (2000–2022, 0.16%).[20]

In the near future, a thorough survey of HCV prevalence will be carried out in Nigeria to ascertain the national prevalence, regional prevalence differences, high-risk groups, and the associated risk factors for contracting the disease, as the majority of patients (>80%) will develop chronicity with the devastating consequences that go along with it.[16]

Therefore, it is necessary to conduct a future survey of other groups in society regarding the occurrence of HCV infection and to take measures to limit the spread of this infection in society in general and among university students, especially students in medical colleges and departments, given

that these are considered an important risk group for blood-borne infections.[19,22]

CONCLUSION

This study showed a relatively low prevalence of HCV antibodies among students at Cihan University-Erbil. However, even this low prevalence indicates the incidence of HCV infection among university students, who represent a broad part of society. The presence of antibodies to HCV in students of medical colleges and departments at the university may indicate that these students acquired HCV infection during practical training in hospitals or medical laboratories.

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