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The Prevalence and Associated Demographic Factors of Hepatitis C Infections among Patients referred to Hospital of Infectious Diseases in Kabul, Afghanistan: A Cross-Sectional Study

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ABSTRACT

Background: Hepatitis C virus (HCV) infection is a significant global health concern. In Afghanistan, the epidemiology of HCV is not well understood due to the prolonged conflict and a fragmented healthcare system. We aimed to evaluate the prevalence of HCV among patients at the Hospital of Infectious Diseases in Kabul and analyze the demographic factors influencing infection rates.
Methods: This cross-sectional study enrolled 16553 patients who underwent serological testing for HCV from Jan to Dec 2023. Data on the demographic characteristics, including age, gender, marital status, occupation, education level, and geographic location, were collected and analyzed to determine the prevalence of HCV.
Results: The results revealed a hepatitis C prevalence of about 4% (674 positive cases). The highest prevalence was in the 21-30 yr age group (24.77%), with males making up 60.08% of cases. Most cases were among married individuals (80.71%) and those with lower education, indicating the role of socioeconomic factors in HCV transmission.
Conclusion: The findings indicate a concerning prevalence of HCV among patients in Kabul, particularly among younger adults and males. These results underscore the urgent need for public health initiatives focused on awareness, screening, and treatment to mitigate the impact of HCV in Afghanistan. Targeted interventions aimed at high-risk populations, along with educational campaigns, are essential for improving health outcomes and reducing transmission rates.

Keywords: Prevalence, Viral hepatitis, Hepatitis C virus, Infectious diseases, Sociodemographic factor, Afghanistan

Introduction

Hepatitis C virus (HCV) infection is a significant global health concern, with approximately 58 million people estimated to be living with chronic HCV globally (1, 2). The virus is primarily transmitted through blood-to-blood contact, making it a critical issue for public health systems, particularly in regions with inadequate healthcare infrastructure and limited access to screening and treatment (3, 4).

Chronic HCV infection can lead to severe complications, including liver cirrhosis, hepatocellular carcinoma, and increased mortality rates, underscoring the necessity

for effective prevention, early detection, and treatment strategies (5-7). In Afghanistan, the epidemiology of HCV remains poorly understood. Factors such as prolonged conflict, socio-political instability, and a fragmented healthcare system have contributed to the challenges in managing infectious diseases, including viral hepatitis (8). The prevalence of HCV in Afghanistan might be higher than in some neighboring countries. Still, comprehensive data on the burden of the disease are lacking, particularly in urban areas like Kabul (9). The Hospital of Infectious Diseases in Kabul serves as a critical facility for diagnosing and treating infectious diseases, including HCV. As one of the main referral centers in the country, it provides a unique opportunity to assess the prevalence of HCV among patients presenting with symptoms of liver disease or those at high risk for viral hepatitis. The importance of such facilities was highlighted in identifying and managing infectious diseases, emphasizing the role of urban hospitals in addressing public health needs (10, 11).

Understanding the demographic characteristics of HCV-infected individuals is crucial for developing targeted public health interventions. Various demographic factors, such as age, gender, and socioeconomic status, that influence HCV prevalence are reported (12). For instance, in Iran and Pakistan higher infection rates among younger adults and males, have been reported suggesting that targeted interventions for high-risk populations are essential (13).

We aimed to determine the prevalence of HCV among patients attending the Hospital of Infectious Diseases in Kabul while examining associated demographic factors such as age, gender, marital status, education level, and geographic distribution. By identifying trends and patterns in HCV infections, this research seeks to provide valuable insights for policymakers, healthcare professionals, and public health organizations to improve screening, prevention, and treatment strategies in Afghanistan. This study will contribute to the growing body of knowledge regarding HCV epidemiology in Kabul and inform future public health efforts to control and ultimately eliminate hepatitis C as a public health threat.

Method and Materials

Sample size

The following formula was used to calculate the sample size. Considering an alpha error of 5%, a prevalence of 0.5 (to calculate the largest possible sample size), and a precision of 0.00762, the sample size was calculated to be 16,550 people, randomly collected from hospital records.

$$N = \frac{Z^2_{1-\frac{\alpha}{2}} P(1-P)}{d^2} \quad N = \frac{1.96^2 0.5(0.5)}{0.00762^2} \cong 16550$$

The population consisted of all patients presenting to the hospital for evaluation of infectious diseases. The inclusion criteria required all patients who consented to participate in the study were enrolled, thus creating a diverse sample that reflects the demographic characteristics of individuals seeking care at the institution. Data were collected through medical records and laboratory testing. Information gathered include: age, gender, marital status, occupation, education level, and geographic location, results of HCV serological testing with PCR to confirm positive case.

The data collection process involved trained medical staff who ensured the accuracy and confidentiality of patient information. Consent was obtained from all participants before data collection. Patients were included in the study if they met the following criteria:

All patients 18 yr and older were eligible for participation. Patients were referred to the Hospital of Infectious Diseases in Kabul during the study period (2023). Patients who provided written informed consent to participate in the study. Patients who underwent serological testing for HCV.

Data Analysis

Data analysis was performed using descriptive statistical methods. The prevalence of HCV among the evaluated patients was calculated by dividing the number of confirmed positive cases by the total number of patients assessed. Further analysis categorized patients based on the demographic variables such as age, gender, marital status, occupation, and education level. Statistical analysis was performed in SPSS version 26 software (IBM Corp., Armonk, NY, USA) using Chi-square statistical test and binary logistic regression.

Ethical Consideration

According to the regulations of the Infectious Diseases Hospital and the ethical considerations approved by the WHO for research, all researchers are required to prepare all their activities during data collection at the request of the hospital authorities. This research should not impose any additional burden on the hospital's patients and staff.

Results

The study assessed 16553 patients referred to the Infectious Diseases in Kabul. Out of these, 674 were positive for hepatitis C, indicating a prevalence rate of approximately 4% (*P*-value< 0.0001). Individuals aged 51-60 yr were twice as likely to be infected compared to younger individuals (OR=2.602, *P*-value<0.0001). Those over 60 yr had a threefold increased likelihood of infection (OR=3.173, *P*-value<0.0001). The prevalence of hepatitis C was similar between males and females, with (*P*-value=0.472), indicating no significant difference. The infection rate among married individuals was nearly half that of single individuals (OR=0.649, *P*-value<0.0001). Unemployed individuals had a prevalence rate nearly double that of employed individuals (OR=0.601, *P*-value<0.0001). Illiterate individuals had a higher prevalence compared to those with university education (OR=0.435, *P*-value<0.0001). The prevalence in individuals with secondary education was similar to those with primary education (*P*-value=1.000). There was no significant difference in hepatitis C prevalence between individuals in Kabul and those in other provinces (*P*-value=0.066) (Table 1).

Discussion

In this study, the prevalence of hepatitis C among 16,553 patients referred to the Infectious Diseases Hospital in Kabul was investigated, of which about 4% (*P*-value<0.0001) were infected with hepatitis C. The spread of hepatitis C as a serious health challenge in many countries is influenced by various social, economic and cultural factors (14-16). Comparison of this study with the previous studies (17, 18), showed the prevalence of hepatitis C in the general population to be 1.1% and 0.9%, respectively; which is not consistent with the present study. Compared to other countries, the prevalence of HCV, in Southeast Asia has a high prevalence with about 94.6 million infected individuals (19), Egypt 10.4% (20), and Victoria 1.1% (21). These differences can be caused by several factors, including access to health services, public awareness, high-risk behaviors, and quality of health care.

Table 1: Prevalence and associated demographic factors of hepatitis c infections among study population

Variable	*Characteristic*	*Total (%)*	*Hepatitis C N(%)*		*OR*	X^2	*P-value*
			Negative	Positive			
All Samples	-	16553	15879(95.76)	674(4.24)	-	-	-
Age group(yr)	Less than 20	1111(6.84)	1072(96.49)	39(3.51)	Ref	148.5	<0.0001
	21-30	4838(29.79)	4671(96.548)	167(3.452)	0.983		
	31-40	4494(27.67)	4337(96.506)	157(3.494)	0.995		
	41-50	3838(23.63)	3708(96.613)	130(3.387)	0.964		
	51-60	1272(7.83)	1162(91.352)	110(8.648)	2.602		
	Over 60	686(4.22)	615(89.65)	71(10.35)	3.173		
Gender	Male	9972(61.41)	9567(95.939)	405(4.061)	Ref	0.516	0.472
	Female	6267(38.59)	5998(95.708)	269(4.292)	1.059		
Marital status	Single	2171(13.67)	2041(94.012)	130(5.988)	Ref	18.81	<0.0001
	Married	13708(86.33)	13164(96.032)	544(3.968)	0.649		
Occupation	Unemployed	2136(13.15)	2003(93.773)	133(6.227)	Ref	26.67	<0.0001
	Employed	14106(86.85)	13565(96.165)	541(3.835)	0.601		
Education level	Illiterate	4450(27.4)	4210 (94.607)	240(5.393)	Ref	56.2	<0.0001
	Primary Education	6520(40.15)	6300(96.626)	220(3.374)	0.613		
	Secondary Education	2912(17.93)	2755(94.609)	157(5.391)	1.000		
	University Education	2357(14.51)	2300(97.582)	57(2.418)	0.435		
Geographical Location	Kabul	10300(63.43)	9850(95.631)	450(4.369)	Ref	3.378	0.066
	Other Province	5939(63.43)	5715(96.228)	224(3.772)	0.858		

In our study, individuals aged 51-60 yr were twice as likely to be infected compared to younger individuals. Those over 60 yr had a threefold increased likelihood of infection. As compared to another study (22), persons aged 55–64 yr were 6.4 times as likely to have current HCV infection compared with persons aged 18–40 yr. Age is known as a key factor in the prevalence of HCV (23). Middle-aged and older people are at greater risk of contracting these viruses due to greater risks associated with high-risk behaviors and increased exposure to contaminated blood, which indicates the need for special attention to this age group in prevention and treatment programs (2).

In terms of gender, the prevalence of hepatitis C was similar in men and women and no significant difference was observed. This issue might be due to social and cultural factors influencing risky behaviors. Marital status and educational background were also significant factors associated with HCV prevalence in this study. The majority of HCV-positive individuals were married (80.71%). In terms of education, illiterate people with a prevalence of 5.393% are at higher risk than people with a university education. These findings highlight the importance of education and information about hepatitis C, especially among less literate populations. These findings align with the work which suggested that social determinants such as education and marital status significantly influence health outcomes in Afghanistan (24). Lower

educational attainment can limit awareness of HCV transmission routes and preventive measures, highlighting the need for targeted educational programs to increase awareness in vulnerable populations (2).

Although there was no significant difference in the prevalence of hepatitis C between the residents of Kabul and other provinces, this issue might depend on social and cultural factors associated with each region. The need for health interventions should be designed based on local and social characteristics The public health implications of these findings are substantial. The relatively high prevalence of HCV among young adults and males in Kabul underscores the urgency for implementing comprehensive screening and treatment programs. Effective public health strategies should include targeted outreach to high-risk populations, particularly focusing on education about transmission methods and preventive practices. Additionally, integrating HCV screening into routine healthcare services could facilitate early detection and treatment, potentially reducing the long-term burden of HCV-related complications. Furthermore, concerted efforts are needed to strengthen the healthcare infrastructure in Afghanistan to ensure that patients have access to necessary treatments. The WHO (2021) emphasizes the importance of scaling up hepatitis C treatment services globally, particularly in low-income countries where the burden of disease is greatest. Addressing the barriers to healthcare access, including stigma and cost, will be crucial for improving health outcomes for those affected by HCV in Afghanistan.

This study had limitations that should be acknowledged. The cross-sectional design restricts the ability to establish causality. Additionally, the sample was drawn from a single hospital, which moght not fully represent the broader population of Afghanistan.

Conclusion

This study contributes to the understanding of HCV epidemiology in Kabul and highlights the need for targeted public health interventions. By focusing on demographic trends and associated risk factors, healthcare policymakers can better address the needs of affected populations and work towards reducing the prevalence of HCV in Afghanistan. Continued research is essential to monitor HCV trends and evaluate the effectiveness of public health strategies over time. Future studies should consider a multicenter approach to gather more comprehensive data across different regions.

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Conflict of interest

The authors declare that there is no conflict of interests.

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