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Research Article

Frequency of Diabetes Mellitus in Patients with Chronic Hepatitis C Infection

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ABSTRACT

Introduction: ChronicPatients with chronic hepatitis C virus (HCV) infection have hepatic and extrahepatic complications such as metabolic abnormalities and insulin resistance.

Methods: This was a descriptive cross-sectional study carried out in the multi-center, from October, 2025 to March, 2026. Fifteen patients were enrolled in each of the three clinics, and 150 patients with confirmed chronic HCV infection were enrolled by consecutive sampling. Demographic and clinical data were obtained, and fasting blood glucose and glycated hemoglobin (HbA1c) were measured.

Results: Among 150 patients, 86 (57.3%) were male and 64 (42.7%) were female. Of the 36 patients, 24.0% were diagnosed with diabetes mellitus and 114 (76.0%) were non-diabetic. The mean fasting glucose and HbA1C were higher in the diabetic patients than in the non-diabetic patients.

Conclusion: Diabetes Almost one-fourth of HCV-infected patients had diabetes mellitus. Comprehensive management of HCV should include routine metabolic screening.

Keywords: Chronic Hepatitis C, Diabetes Mellitus, Hepatitis C Virus, Glycated Hemoglobin, Fasting Blood Glucose, Metabolic Comorbidity.

INTRODUCTION

Chronic hepatitis C virus (HCV) infection continues to be a significant cause of liver disease, cirrhosis, hepatocellular carcinoma (HCC), and extrahepatic morbidity. While direct-acting antivirals (DAAs) have significantly improved sustained virological response and clinical outcomes, chronic HCV remains significant, as patients can still have hepatic and systemic complications. Current evidence demonstrates fewer liver and non-liver complications and reduced long-term mortality with DAA treatment, highlighting the wide-ranging clinical implications of HCV infection (1).

The metabolic abnormalities associated with chronic HCV infection are now becoming appreciated. Persistent viral infection can be accompanied by hepatic steatosis and abnormal glucose metabolism, which can lead to liver damage. Data showing that liver steatosis has changed after successful DAA therapy indicate that active HCV infection has an impact on hepatic metabolic status, but that metabolic risk may be maintained even after viral clearance (2). In chronic viral hepatitis, other host factors, such as genetic susceptibility, also play a role in determining the progression to HCC, highlighting the complex relationship between infection and individual risk (3).

Fibrosis, inflammation, metabolic abnormalities, and comorbid conditions are factors that affect the long-term consequences of chronic viral hepatitis. Chronic HBV has been used as a model system to show that HCC can develop despite treatment, emphasizing the need for ongoing risk assessment of chronic viral liver disease (4). Moreover, hepatitis B or C infection is common among people with other severe diseases such as tuberculosis, indicating significant overlap between chronic infectious diseases and the need for integrated clinical evaluation (5).

Patients with chronic infections may be more vulnerable to clinical illness due to comorbid

illness. Important burdens of bacterial infections have been reported in studies of patients with chronic diseases, with a focus on the impact of underlying systemic diseases on the susceptibility to complications (6). Diabetes is important because chronic hyperglycemia may affect immune function and make it more difficult to control infections. Furthermore, disease characteristics are changing, and the number of comorbidities in long-term viral hepatitis populations has risen, highlighting the need for contemporary management of viral hepatitis that includes the treatment of systemic conditions (7,8). Steatosis and fibrosis can be accompanied by diabetes and insulin resistance, which are clinically relevant. Diabetes is a significant health issue worldwide, with cardiovascular complications and prevention and early detection being crucial when it is present with chronic liver disease (9).

Metabolic abnormalities could have an impact on liver outcomes and overall health, making the link between HCV and diabetes clinically relevant. Metabolic management, beyond glycemic or lipid management, may also have implications for patients with chronic HCV infection who have failed antiviral therapy, with evidence suggesting a reduction in HCC risk with the use of metformin and statins (10). Likewise, chronic HBV studies demonstrate a decrease in HCC incidence with effective tenofovir treatment, supporting the general principle that controlling viral disease is important to help manage modifiable coexisting risk factors (11).

Chronic HCV is not just a liver disease and can have several extrahepatic symptoms. In addition to viral eradication, reviews of DAA therapy highlight the improvement of multiple extrahepatic conditions, suggesting a systemic approach to HCV disease (12). However, for those with chronic disease, there is a potential risk for other diseases. Hepatitis B and C have also been reported in hemodialysis patients, highlighting the need to routinely screen medically vulnerable groups and to consider all metabolic and infectious diseases in these patients (13).

The relationship between HCV and impaired glucose metabolism has been more and more appreciated. HCV infection can lead to insulin resistance by various mechanisms, including chronic inflammation, dysfunction of insulin signaling, hepatic steatosis, and others, which can further elevate the risk of diabetes (14). International recommendations for hepatitis highlight the need to prevent, diagnose, treat, and manage chronic viral hepatitis, encompassing an integrated approach where treatment of key comorbidities is not a separate process from liver disease treatment, but is rather a component of liver disease treatment.

This is further exemplified by long-term experience with antiviral therapy in chronic HBV. Tenofovir alafenamide has garnered attention for its treatment efficacy and long-term patient monitoring in the real world (16). In contrast, HBV and HCV have different antiviral approaches, both warranting evaluation of factors that could influence long-term outcomes. Therefore, diabetes screening is important in chronic HCV care as hyperglycemia, if not diagnosed, may contribute to additional hepatic, cardiovascular, renal, and infectious risks.

Chronic viral liver disease is an important comorbidity because diabetes can affect the clinical course and assessment of the disease. Studies that have investigated the effect of diabetes in chronic hepatitis cohorts have confirmed that metabolic status should be considered when assessing disease outcomes (17). Therefore, it is clinically justified to estimate the prevalence of diabetes mellitus in patients with chronic HCV infection. The burden of diabetes in a defined patient population could help to prompt earlier screening, diagnosis, metabolic intervention, and coordinated follow-up of the liver, which could lead to more effective management of patients with chronic HCV and better use of clinical resources.

Objective

To describe the prevalence of diabetes mellitus among people with chronic hepatitis C infection and to highlight the significance of screening for diabetes mellitus for clinical care and management.

MATERIALS AND METHODS

Study Design: Descriptive cross-sectional study design.

Study Duration: This study took place from October, 2025 to March, 2026 for a period of six months.

Sample Size: The number of patients in this study was 150.

Sample Technique: Eligible patients who presented during the study period were enrolled using a non-probability consecutive sampling technique.

Inclusion Criteria: Patients were included if they had confirmed chronic hepatitis C infection, regardless of sex, and were 18 years of age or older. Eligible patients were those with known HCV infection for >6 months or positive HCV RNA consistent with chronic infection. Those who had a documented previous diagnosis of diabetes mellitus, antidiabetic treatment, fasting blood glucose, and/or HbA1c were included.

Exclusion Criteria: Acute hepatitis C infection, chronic hepatitis B or other important chronic liver diseases, hepatocellular carcinoma, or decompensated liver disease were exclusion criteria. Patients who were pregnant, receiving systemic corticosteroid therapy or drugs that significantly affect glucose metabolism were also excluded, as were those with incomplete clinical or laboratory data.

Methods: Eligible patients with confirmed chronic hepatitis C (cHC) infection were enrolled after written informed consent, following ethical approval. Demographic and clinical data, such as age, sex, duration of HCV infection, history of antiviral treatment, family history of diabetes, and other relevant comorbidities, were collected on a structured data collection proforma. All the participants were clinically assessed and laboratory evaluated. Diabetes mellitus was defined by previous physician diagnosis, current use of antidiabetic medication, and/or laboratory criteria. Standard laboratory methods were used to measure fasting venous blood glucose and glycated hemoglobin (HbA1c). Diabetes mellitus was defined as a fasting plasma glucose level ≥126 mg/dL, HbA1c ≥6.5%, or a past diagnosis of diabetes. Diabetic patients were considered non-diabetic. Appropriate descriptive statistical methods were used for data analysis, and data were entered into a computerized database.

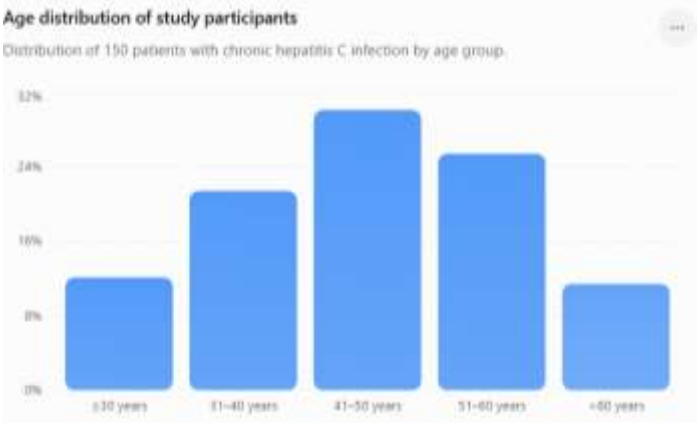
RESULTS

The number of patients included in the study was 150 with chronic hepatitis C infection. The mean age of the participants was 46.8 ± 11.2 years, with an age range of 19–72 years. Of the total participants, 86 (57.3%) were male, and 64 (42.7%) were female. The demographic data of the respondents are shown in Table 1.

Table 1. Demographic Characteristics Of Patients with Chronic Hepatitis C Infection (N=150)

Variable	Category	Frequency (n)	Percentage (%)
Age	≤30 years	18	12.0
	31–40 years	32	21.3
	41–50 years	45	30.0
	51–60 years	38	25.3
	>60 years	17	11.3
Sex	Male	86	57.3
	Female	64	42.7

The age distribution of the participants showed that the age group 41-50 years was the largest group with 30.0% of the participants, followed by the age group 51-60 years with 25.3% of the participants. The proportion of younger patients (≤30 years) was 12.0%. Men were overrepresented compared to women. The age distribution is further illustrated in Graph 1.

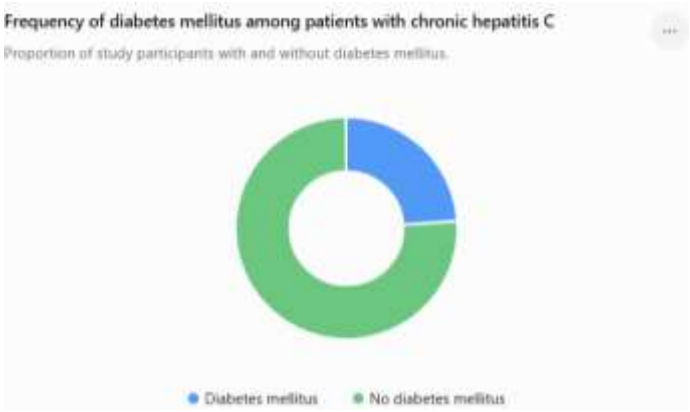


Fasting blood glucose and HbA1c were used to assess metabolic features of participants. Of the 150 patients, 36 (24.0%) met the pre-established criteria for diabetes mellitus and 114 (76.0%) did not have diabetes. Patients with a diagnosis of diabetes had higher mean fasting blood glucose and HbA1c. Details of the metabolic findings are summarized in Table 2.

Table 2. Metabolic Characteristics of Study Participants (N=150)

Variable	Diabetic (n=36)	Non-diabetic (n=114)	Total (n=150)
Mean fasting blood glucose (mg/dL)	154.6 ± 32.8	96.7 ± 12.4	110.6 ± 31.2
Mean HbA1c (%)	7.4 ± 1.1	5.4 ± 0.4	5.9 ± 1.0
Previously diagnosed diabetes, n (%)	29 (80.6%)	—	29 (19.3%)
Newly identified diabetes, n (%)	7 (19.4%)	—	7 (4.7%)

Of those with diabetes, 7 were newly diagnosed during the study evaluation, while most had a prior diagnosis. The prevalence of DM was 24.0%. Graph 2 shows the percentage of the population who have diabetes mellitus and who do not have diabetes mellitus.



The clinical features by diabetes status are shown in Table 3. The mean age, BMI, fasting glucose, and HbA1c were higher in the diabetic group compared to the non-diabetic group. Among diabetic patients, 22 (61.1%) were male, and 14 (38.9%) were female. The results show that diabetes was a significant comorbidity within this population with chronic HCV infection.

Table 3. Clinical Characteristics According To Diabetes Mellitus Status

Characteristic	Diabetes present (n=36)	Diabetes absent (n=114)
Mean age (years)	52.7 ± 9.4	44.9 ± 11.2
Male, n (%)	22 (61.1)	64 (56.1)
Female, n (%)	14 (38.9)	50 (43.9)
Mean BMI (kg/m²)	28.1 ± 3.7	25.6 ± 3.2
Mean fasting glucose (mg/dL)	154.6 ± 32.8	96.7 ± 12.4
Mean HbA1c (%)	7.4 ± 1.1	5.4 ± 0.4

In general, diabetes mellitus was found in almost 25% of the people who were infected with chronic hepatitis C. The observed frequency represents a clinically relevant burden of metabolic comorbidities in the studied population and provides justification for routine evaluation of glucose status in the care of chronic HCV infection.

DISCUSSION

In the present study, the frequency of diabetes mellitus was found to be 24.0% in chronic hepatitis C patients (n = 150). This is a metabolic burden and is a reason to take diabetes into account when caring for hepatology patients. The data indicate that HCV therapy has an impact on liver and extrahepatic events (1). The observed

frequency is biologically plausible, as chronic HCV infection is linked to hepatic steatosis and metabolic abnormalities. Successful direct-acting antiviral treatment improves steatosis, indicating that active infection can be a contributing factor to metabolic abnormalities, but conventional risk factors may remain after viral clearance. The relevance of metabolic assessment still holds true (2).

The presence of diabetes in chronic HCV could affect long-term hepatic risk. Viral, metabolic, genetic, and environmental factors are interrelated, and host susceptibility plays a role in the development of HCC. Diabetes was not evaluated for genetic risk here, but it may identify patients who should be evaluated for long-term diabetes (3). Chronic hepatitis B has shown that HCC can develop in patients who have been treated and those who have not been treated, highlighting the fact that antiviral treatment does not remove all risk factors for adverse outcomes. Diabetes could also be another metabolic risk to consider when treating HCV infection, beyond just viral clearance, fibrosis evaluation, and liver monitoring (4).

Chronic viral hepatitis is often seen in combination with other diseases. Overlap with hepatitis B or C infection is shown in the tuberculosis populations. This will help to facilitate integrated clinical assessment in which HCV patients are assessed for liver disease and metabolic comorbidities like diabetes (5). Diabetes is important in people with HCV because they might be more susceptible to infections and complications. Hyperglycemia has been shown to affect immune function and make the management of infections difficult. In such patients, the presence of this should lead to a focus on glycemic control and preventive care (6).

The mean ages of the participants with diabetes and those without diabetes in this study were 52.7 and 44.9 years, respectively. This is a clinically plausible scenario; as metabolic comorbidities are a feature of aging. Long-term trends in chronic hepatitis also show the trend of aging and an evolving comorbidity profile, in support of age-specific risk assessment (7). In the patient with chronic HCV infection and diabetes, it is important to assess hepatic fibrosis because metabolic abnormalities can occur along with progressive liver injury. Non-invasive fibrosis assessment is supported by evidence in chronic liver disease. Fibrosis assessment in conjunction with glucose assessment could give a more comprehensive view of the disease severity and risk (8).

The frequency identified here is 24.0%, which is clinically significant, as diabetes is linked to cardiovascular and systemic complications. Early identification allows lifestyle changes, glucose monitoring, and treatment. Routine diabetes screening may be a chance to prevent complications that might otherwise go undetected in HCV clinics (9). Hepatic outcomes may also be affected by metabolic treatment. Metformin and statins have been shown to have benefits beyond glycemic and lipid control in selected chronic HCV patients, with evidence of reduced HCC risk. Therefore, the diagnosis of diabetes should trigger multidisciplinary management instead of just documentation (10).

Despite the importance of effective antiviral treatment in chronic HCV management, metabolic risk should be kept in mind. Tenofovir therapy has been shown to decrease the risk of HCC in chronic hepatitis B. While HBV and HCV are different in their therapeutic approach, this illustrates the principle that viral control and risk modification should occur concurrently (11). HCV infection should be viewed more as a systemic infection, as chronic infection can cause extra-hepatic manifestations. Evidence reviewing direct-acting antiviral therapy refers to the improvements in extrahepatic conditions that occur following viral clearance. This is consistent with the diabetes prevalence observed here and underscores the need for screening for metabolic abnormalities during care of HCV (12).

Viral hepatitis can be present in medically vulnerable populations with the presence of comorbidities. The prevalence of hepatitis B and C among hemodialysis patients is well documented and is a good example of the need for systematic screening for infectious disease. While no dialysis patients were investigated here, this evidence would support the comprehensive evaluation of HCV patients with complex medical histories (13). These results are biologically relevant to the association of HCV, insulin resistance, and diabetes. Viral effects, inflammatory cytokines, immune mechanisms, and impaired insulin signaling are all potential mechanisms by which HCV may contribute to insulin resistance. Therefore, the frequency of 24.0% could be a result of the classical metabolic risk factor as well as disease-related changes (14).

Prevention, diagnosis, treatment, and ongoing follow-up are all essential components of comprehensive viral hepatitis management. Diabetes screening should be part of the routine assessment as undiagnosed hyperglycemia can lead to hepatic and extrahepatic morbidity. Early identification enables coordination of antiviral, metabolic, cardiovascular, and lifestyle measures based on patient-specific needs (15). Chronic hepatitis B experience over the long term confirms the value of long-term treatment monitoring and outcome evaluation. This study is related to HCV, but ongoing follow-up is relevant. Virological control should not be the end of surveillance, especially in patients with metabolic disease, which can have a long-term impact on health (16).

Long-term outcome assessment in chronic viral hepatitis may be affected by diabetes. Evidence assessing the role of diabetes in the prediction of hepatocellular carcinoma (HCC) in chronic hepatitis patients shows that diabetes can have an impact on prognosis in these populations. Therefore, the identification of diabetes in HCV patients is important, and prospective studies are needed to elucidate the relationships between diabetes, fibrosis, steatosis, treatment response, and outcomes (17).

CONCLUSION

This study showed that diabetes mellitus is a frequent metabolic comorbidity in patients with chronic hepatitis C infection, affecting 24.0% of cases in the studied population. The results underscore the significance of the metabolic derangements, such as insulin resistance and diabetes, associated with chronic HCV infection. Diabetic patients had higher fasting blood glucose and HbA1c levels and were generally older than non-diabetic patients. These findings highlight the need to go beyond viral clearance to monitor liver disease in chronic HCV patients. Fasting blood glucose and HbA1C levels can be used as a routine method of screening for diabetes, and can help to identify diabetes at an early stage and provide early intervention, especially in those with other metabolic risk factors. Long-term complications and overall outcomes may be decreased with integrated management involving hepatology and metabolic care. Additional multicenter prospective trials with larger patient numbers are suggested to assess the association between diabetes, HCV treatment, fibrosis, steatosis, and long-term hepatic outcomes.

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