

Variable Outcome of Viral Hepatitis Among Diabetes Patients and its High Prevalence

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ABSTRACT

Objective: This study aims to assess the clinical and biochemical features of people with diabetes and acute viral hepatitis.

Study Design: Prospective/Observational study

Place and Duration: Conducted at Department of Gastroenterology Mayo Hospital Lahore, during from the period July 2021 to June 2022.

Methods: Ninety-two diabetics participate in this study. The ages of the participants in the study covered the gamut from 24 to 70. Body mass index (BMI), place of residence, and level of education were collected after patients gave their informed consent. Comorbidities among all cases were assessed. Patients' vital signs and metabolic profiles were tracked continuously during their hospital stay. The analysis was done in SPSS 20.0.

Results: The current study found that men were higher than women ($p .009$). Hepatitis E was by far the most common, followed by hepatitis B and A. We found decreased ALT 841.9 ± 51.11 U/L and albumin levels 912.18 ± 22.42 mg/dl, the average blood bilirubin levels of people with diabetes were significantly higher 20.117 ± 9.251 mg/dl. 52 (56.5%) patients had smoking history. HTN, CLD and IHD was the most common comorbidities among all cases. The average length of time spent in the hospital was 25.8 ± 5.61 days. Frequency of died patients was 6 (6.5%).

Conclusion: Among patients with diabetes and AVH, we discovered that ALT was lower, bilirubin was greater, the risk of liver failure was higher, and the length of hospital stay was longer. However, this mortality rate was 6.5% in diabetes patients.

Keywords: Mortality, Clinical Outcomes, Acute Viral Hepatitis, Diabetes

INTRODUCTION

Hepatitis, often known as inflammation of the liver, can be either acute or chronic, symptomatic or asymptomatic, and is typically caused by a viral infection [1]. The effects of this viral infection on the liver, leading to damage and subsequent repercussions, might be exacerbated by a number of circumstances, including excessive alcohol use, toxin ingestion, and various suppressive medical conditions [2]. There are more than 170 million people infected with hepatitis C virus (HCV) [3,4], making it a serious global health concern. Flaviviridae are a family of viruses that share a single strand of RNA, and human cytomegalovirus (HCV) is a member of this family. HCV is often spread by contact with infected blood or body fluids, such as through a blood transfusion, organ donation, from mother to child, or any other similar situation [5]. Persistent HCV infection typically calls for a liver transplant [6].

One of the most common causes of chronic liver disease, hepatitis C virus (HCV) infection can progress to life-threatening complications such cirrhosis and liver cancer if left untreated [7].

It is well established that hepatitis C is a trigger for diabetes, although this effect is shown primarily in persons who already have predispositions to developing diabetes. There is evidence to suggest that those infected with the hepatitis C virus (HCV) are more likely to progress to type 2 diabetes [8]. Diabetes mellitus is a metabolic disorder that leads to constant high blood sugar levels [9].

Diabetes Mellitus, or simply diabetes, is a disability in which the body is unable to digest glucose, resulting in a drop in the blood sugar level. Problems with lipid, protein, and carbohydrate metabolism, as well as an elevated blood glucose level (hyperglycemia), define those who suffer from diabetes [10]. This is caused by the body's inability to secrete or respond to insulin. Type 1 diabetes affects primarily young people ages 10 to 14, whereas Type 2 diabetes affects primarily middle-aged and older people ages 21 to 59 [11].

About 3% of the global population contracts hepatitis C infection annually; nevertheless, 85% (about 170 million individuals globally) are chronically infected with hepatitis C virus (HCV). Liver cirrhosis and hepatocellular carcinoma are complications of persistent HCV infection. Major extrahepatic symptoms caused by this long-term chronic infection include porphyria cutaneous tarda,

type 2 diabetes, thyroid issues, glomerulonephritis, and lichen planus [10, 11]. The prevalence of type 2 diabetes has increased in recent years.

Possible links between HCV and the onset of diabetes mellitus were initially described by Allison et al. [12] in 1994. Since then, some studies [13] have found a greater incidence of HCV in diabetes patients compared to nondiabetic participants, while others [14] have found no such difference.

The seroprevalence of HCV infection in Iranian diabetic patients has been reported in a few studies, with varying results; nevertheless, the presence of HCV-RNA has not been confirmed. Moreover, it is unknown in Iran how HCV presents itself genotypically in diabetic individuals. At present, about 8.7% of Iranians have diabetes, but that number is expected to rise to 12.3% by 2035 [15]. Even though diabetes mellitus is quite common in Iran, there is a significant lack of epidemiological data for determining the incidence of hepatitis C virus among diabetic patients.

The purpose of this research was to examine the similarities and differences between AVH in diabetics with regard to their aetiology, clinical presentation, and metabolic profile, as well as their prognosis.

MATERIAL AND METHODS

This prospective study was conducted at Department of Gastroenterology Mayo Hospital Lahore, during from the period July 2021 to June 2022 and comprised of 92 patients. Patients' demographic data was collected with their written permission and after obtaining their informed consent. Data collected included the patient's date of birth, gender, body mass index, country of residence, and level of education. Acute hepatitis survivors, patients with a history of heavy alcohol use, those with suspected ischemic hepatitis, and pregnant women were also excluded from the study.

Everyone from 24-year-olds to 70-year-olds took part. After the patient was admitted, a bedside interview was conducted using a semi-structured questionnaire. There were sections for the patient's medical history, physical exam, and test results. The hospital kept records of any workplace inquiries that were scheduled to occur in the near future. Serum from all patients

tested positive for HBs Ag, IgM anti-HBc, IgM anti-HEV, and IgM anti-HAV. CMIA (chemiluminescence immunoassay) was utilised to detect HBs Ag, IgM anti-HBc, and IgM anti-HAV. Anti-HEV antibodies were measured using IgM assays, which are now complete. The duration of each patient's follow-up was at least one year, or until they reached maximum medical improvement. Every patient had an endoscopy of their upper digestive system as a preventative measure. Furthermore, an abdominal ultrasound was performed on each patient. In addition, a fibroscan was carried out to evaluate the extent of the patient's hepatic fibrosis.

Chronic illness and smoking habits were studied. Each patient's clinical and biochemical features were evaluated during their hospital stay. SPSS version 20.0 was used for all analyses.

RESULTS

The current study found that men were higher than women (p .009). 54 (58.7%) patients had body mass index >25kg/m² and 38 (41.3%) had BMI <25kg/m². Majority of the patients were married among all cases. HTN, CLD and IHD was the most common comorbidities among all cases. (table 1)

Table-1: Included patients with baseline information

Variables	Frequency	Percentage
Gender		
Men	60	65.2
Women	32	34.8
BMI		
>25kg/m ²	54	58.7
<25kg/m ²	38	41.3
Comorbidities		
HTN	37	40.2
CKD	32	34.8
IHD	23	25

Among 92 cases, 32 (34.8%) patients were aged between 24-35 years, 48 (52.2%) had age 36-50 years and 12 (13.04%) had age >50 years.(figure)

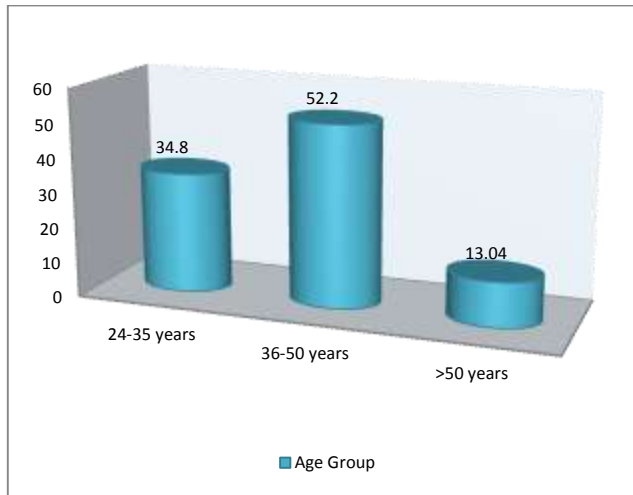


Figure-1: Age distributions among enrolled cases

Table-2: Association of viral hepatitis and biochemical parameters

Variables	Frequency	Percentage
Etiology		
Hepatitis A	70	76.1
Hepatitis B	13	14.1
Hepatitis E	9	9.8
Biochemical Results		
ALT (U/L)	841.9±51.11	
Albumin (mg/dl)	912.18±22.42	
Bilirubin (mg/dl)	20.117±9.251	
Mean Stay at Hospital (days)	25.8±5.61days	

Hepatitis E was by far the most common, followed by hepatitis B and A. We found decreased ALT 841.9±51.11 U/L and albumin levels 912.18±22.42 mg/dl, the average blood bilirubin levels of people with diabetes were significantly higher 20.117±9.251 mg/dl. The average length of time spent in the hospital was 25.8±5.61days (table 2)

Frequency of died patients was 6 (6.5%) and the most common cause was liver failure.(figure 1)

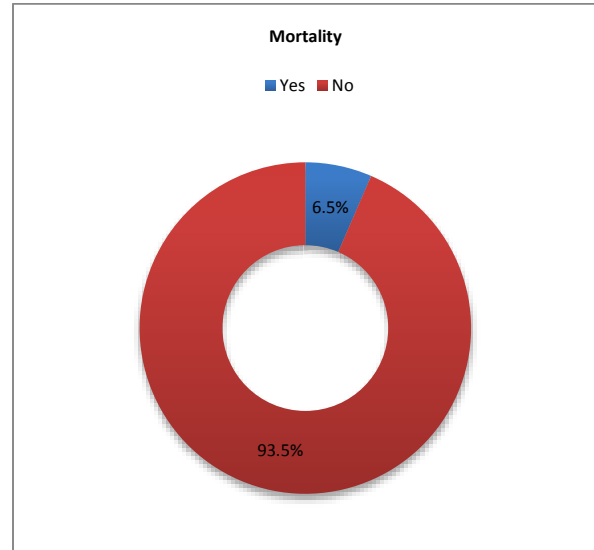


Figure-1: Prevalence of mortality among all cases

DISCUSSION

Major public health issues include hepatitis C virus infection and diabetes. Diabetes mellitus (DM) has been detected in a range from 7.4 to 43.2% [16] of people with hepatitis C virus infection. T2DM has been linked to HCV infection through many mechanisms, according to research. Some of these immune-mediated processes are the direct impacts of viruses, insulin resistance, pro-inflammatory cytokines and chemokines, and other cytokines and chemokines [17]. Compared to non-HCV-infected controls, those with HCV infection had a higher risk of developing type 2 diabetes (OR 1.63, 95% CI 1.11-2.39), as shown by a systematic review and meta-analysis by Naing et al. [18]. Infection with hepatitis C likely adds to the growing prevalence of type 2 diabetes. The purpose of this procedure for a systematic review and meta-analysis is to make a worldwide estimate of the prevalence of T2DM in HCV-infected individuals.

In this study 92 patients of diabetes were presented. Men were higher than women (p .009). 54 (58.7%) patients had body mass index >25kg/m² and 38 (41.3%) had BMI <25kg/m². Majority of the patients were married among all cases. HTN, CLD and IHD were the most common comorbidities among all cases. These results were comparable to the studies conducted in past.[19,20] Among 92 cases, 32 (34.8%) patients were aged between 24-35 years, 48 (52.2%) had age 36-50 years and 12 (13.04%) had age >50 years. Previous research presented same findings.[21] Our findings that HCV Ab (+) individuals are more likely to develop diabetes are in line with the vast majority of existing research on this topic. The pooled OR with diabetes in a meta-analysis of 17 trials comparing HCV-infected and HCV-uninfected patients was 1.68[18]. Despite the fact that our study had a lower prevalence of HCV Ab (+) patients compared to other studies and that the overall risk of diabetes in our study sample was low due to young age and low BMI, we were able to identify the cross-sectional connection between HCV infection and diabetes.

Hepatitis E was by far the most common, followed by hepatitis B and A. We found decreased ALT 841.9±51.11 U/L and

albumin levels 912.18 ± 22.42 mg/dl, the average blood bilirubin levels of people with diabetes were significantly higher 20.117 ± 9.251 mg/dl. The average length of time spent in the hospital was 25.8 ± 5.61 days. Conflicting evidence supports a link between HBV infection and diabetes. Some studies [22] found that the prevalence of diabetes was greater in HBsAg (+) patients than in HBsAg (-) patients, whereas others [23] did not. Although a lack of association between HBV infection and diabetes or glucose intolerance was shown in a 10-year prospective research limited to people without cirrhosis [24], the study's small sample size makes its conclusions difficult to draw. We found that HBsAg was significantly associated with diabetes in both cross-sectional and incident analyses, and this link persisted after controlling for several baseline factors, including the existence of fatty liver disease, in the current study's large sample. Despite the fact that Ejele et al. [25] and Balogun et al. [26] found a lower prevalence (3.0% in the Niger Delta region and 0% in Ibadan) than what was found here, the results of the present investigation were more definitive. Similar research by Ndako et al. [27] among diabetics similarly found a lower frequency in Jos, 11.0%. In our study, frequency of died patients was 6 (6.5%) and the most common cause was liver failure.

Mason [28] found that over 20% of diabetic individuals with chronically high blood aminotransferases also exhibited indications of HCV infection. Also, Osi and Sanna. [29] found that the majority of diabetes individuals who tested positive for anti-HCV also showed signs of abnormal liver function tests, with a hepatocellular and cholestasis pattern being the most common biochemical change. Most of the patients with diabetes and hepatitis C in this study had ALT levels that were only one to two times the upper limit of normal, which is extremely low for this population.

CONCLUSION

Among patients with diabetes and AVH, we discovered that ALT was lower, bilirubin was greater, the risk of liver failure was higher, and the length of hospital stay was longer. However, this mortality rate was 6.5% in diabetes patients.

REFERENCES

- Rosen HR. Chronic hepatitis C infection. *N Engl J Med*. 2011;364(25):2429–38.
- Gane EJ. The natural history of recurrent hepatitis C and what influences this. *Liver Transplant*. 2008;14(2):36–44.
- Foster GR, Goldin RD, Thomas HC. Chronic hepatitis C virus infection causes a significant reduction in quality of life in the absence of cirrhosis. *Hepatology*. 1998;27:209–12.
- Shinn JH, Liang KC. Chronic hepatitis C and Diabetes Mellitus. *Chinese J Med Assoc*. 2006;69(4):143–5.
- Alter MJ. Epidemiology of Hepatitis C virus. *J Hepatol*. 1997;26:625–55.
- Vescovo T, Refolo G, Vitagliano G, Fimia GM, Piacentini M. Molecular mechanisms of hepatitis C virus-induced hepatocellular carcinoma. *Clin Microbiol Infect*. 2016;22(10):853–61.
- Elfiky AA, Elshemey WM, Gawad W, Desoky O. Molecular modeling comparison of the performance of NS5b polymerase inhibitor (PSI-7977) on prevalent HCV genotypes. *Protein J*. 2013;32(1):75–80.
- Mehta SH, Brancati FL, Strathdee SA, Pankow JS, Netski D, Coresh J, Szklo M, Thomas DL. Hepatitis C virus infection and incident type 2 diabetes. *Hepatology*. 2003;38(1):50–6.
- Imam K. Clinical features, diagnostic criteria and pathogenesis of diabetes mellitus. *Adv Exp Med Biol*. 2012;771:340–55.
- Peck T, Price C, English P, Gill G. Oral health in rural South African type 2 diabetic patients. *Trop Dr*. 2006;36(2):111–2.
- Atkinson MA, Eisenbarth GS, Michels AW. Type 1 diabetes. *Lancet*. 2014;383:69–82.
- Allison ME, Wreghitt T, Palmer CR, et al: Evidence for a link between hepatitis C virus infection and diabetes mellitus in a cirrhotic population. *J Hepatol* 1994; 21: 1135–1139
- Jadoon NA, Shahzad MA, Yaqoob R, et al: Seroprevalence of hepatitis C in type 2 diabetes: evidence for a positive association. *Virology* 2010; 7: 304.
- Costa LM, Mussi AD, Brianeze MR, et al: Hepatitis C as a risk factor for diabetes type 2: lack of evidence in a hospital in central-west Brazil. *Braz J Infect Dis* 2008; 12: 24–26.
- Guariguata L, Whiting DR, Hambleton I, et al: Global estimates of diabetes prevalence for 2013 and projections for 2035. *Diabetes Res Clin Pract* 2014; 103: 137–149.
- Kwon S, Kim S, Kwon O, Kwon K, Chung M, Park D, et al. Prognostic significance of glycaemic control in patients with HBV and HCV-related cirrhosis and diabetes mellitus. *Diabet Med*. 2005;22(11):1530–5.
- Antonelli A, Ferrari SM, Giuggioli D, Di Domenicantonio A, Ruffilli I, Corrado A, et al. Hepatitis C virus infection and type 1 and type 2 diabetes mellitus. *World J Diabetes*. 2014;5(5):586.
- Naing C, Mak JW, Ahmed SI, Maung M. Relationship between hepatitis C virus infection and type 2 diabetes mellitus: meta-analysis. *World J Gastroenterol*: WJG. 2012;18(14):1642.
- Fayaz Ahmed Memon, Farah Bashir, Kapeel Raja, Muhammad Kamran, Faisal Rahman, Muhammad Saqib Habib. Prevalence of Viral Hepatitis and its Variable Outcome Among Diabetic Patients. Vol. 16 No. 04 (2022): Pakistan Journal of Medical & Health Sciences
- Ndako, J.A., Owolabi, A.O., Olisa, J.A. et al. Studies on the prevalence of Hepatitis C virus infection in diabetic patients attending a tertiary health-care facility South-west Nigeria. *BMC Infect Dis* 20, 664 (2020).
- Ambachew, S., Eshetie, S., Geremew, D. et al. Prevalence of type 2 diabetes mellitus among hepatitis C virus-infected patients: a protocol for systematic review and meta-analysis. *Syst Rev* 8, 60 (2019).
- Lao, T. T., Tse, K. Y., Chan, L. Y., Tam, K. F. & Ho, L. F. HBsAg carrier status and the association between gestational diabetes with increased serum ferritin concentration in Chinese women. *Diabetes Care* 26, 3011–3016 (2003).
- Wang, C. S., Wang, S. T., Yao, W. J., Chang, T. T. & Chou, P. Community-based study of hepatitis C virus infection and type 2 diabetes: an association affected by age and hepatitis severity status. *Am J Epidemiol* 158, 1154–1160 (2003).
- Huang, Z. S. et al. Asymptomatic chronic hepatitis B virus infection does not increase the risk of diabetes mellitus: a ten-year observation. *J Gastroenterol Hepatol* 25, 1420–1425,
- Ejele O, Erhabor O, Nwauche CA. The risk of transfusion-transmissible viral infections in the Niger-Delta area of Nigeria. *Sahel Med J*. 2005;8(1):16–9.
- Balogun WO, Adeleye JO, Akinlade KS, Kuti M, Otegbayo JA. Low prevalence of hepatitis-C viral seropositivity among patients with type-2 diabetes mellitus in a tertiary hospital. *J Natl Med Assoc*. 2006;98(11):1805.
- Ndako JA, Echeonwu GON, Shidali NN, Bichi IA, Paul GA, Onovoh E, Okeke LA. Occurrence of Hepatitis C Virus infection in type 2 diabetic patients attending Plateau state specialist hospital Jos Nigeria. *Virology*. 2009;6:98
- Mason AL, Lau JY, Hoang N, Qian K, Alexander GJ, Xu L, Guo L, Jacob S, Regenstein FG, Zimmerman R, Everhart JE, Wasserfall C, Maclaren NK, Perrillo RP. Association of diabetes mellitus and chronic hepatitis C virus infection. *Hepatology*. 1999;29:328–33.
- Francesca W, Lutje V, Declan D, Valerie S. Sexual transmission of Hepatitis C Virus infection in a heterosexual population: A systematic review [version 1; referees: 2 approved]. *HRB Open Res*. 2018.