RESEARCH ARTICLE

High Prevalence of Diabetes Mellitus among Adult Patients with Viral Hepatitis C than Hepatitis B

Golam Azam[1]*, Shahinul Alam[2], Abdullah Saeed Khan[3], Rubayat Sheik Giasuddin[4], Mobin Khan[5]

[1]Associate Professor, Department of Gastrointestinal, Hepatobiliary and Pancreatic Disorders (GHPD), BIRDEM General Hospital, Shahbagh, Dhaka, Bangladesh

[2]Associate Professor, Department of Hepatology, Bangabandhu Sheikh Mujib Medical University, Shahbagh, Dhaka, Bangladesh

[3]Research Associate, The Liver Centre, Dhanmondi, Dhaka, Bangladesh

[4]Assistant Professor, Department of Medicine, Anwer Khan Modern Medical College, Dhaka, Bangladesh

[5]Professor and Director, The Liver Centre, Dhanmondi, Dhaka, Bangladesh

[*]**Address for Correspondence:** Dr. Golam Azam, Associate Professor, Department of Gastrointestinal, Hepatobiliary and Pancreatic Disorders (GHPD), BIRDEM General Hospital, Shahbag, Dhaka- 1000, Bangladesh

Received: 15 June 2017/Revised: 22 July 2017/Accepted: 25 August 2017

ABSTRACT- Background: Viral hepatitis B and C can lead to the end stage liver disease and diabetes mellitus is also a life-long chronic disease. Simultaneous presences of both of these conditions lead to synergistic detrimental outcome. So identification of diabetes mellitus at the initial evaluation of a patient having chronic hepatitis B and C is essential.

Methods: This study was designed as a retrospective single center cross-sectional study. The association of viral hepatitis B and C with diabetes mellitus was investigated at the Liver Centre, Dhaka, Bangladesh for a period of 12 years. HBsAg was tested for hepatitis B virus infection and anti-HCV for hepatitis C virus infection. Demographic, profile and biochemical data were retrieved from records.

Results: A total of 29425 cases were analyzed in the study [median age 31(19–95) years, 24615(84%) males]. HBsAg positive were 27475 and hepatitis C were 1950. Patients with hepatitis C were older than hepatitis B ($p<0.001$). Although the previous history of jaundice was similar in both infections but history of blood transfusion was more common among hepatitis C patients ($p<0.001$). Analyzing different conditions of liver disease, it was observed that hepatitis B virus infection was highly responsible for acute hepatitis than hepatitis C (10.7% vs 1.1%) ($p<0.001$). Chronic hepatitis was similar in rate (73.3% vs 59.9%). But in both conditions of cirrhosis of liver like compensated and decompensated states, hepatitis C virus was significantly responsible than the hepatitis B virus 24.7% vs 9.6% ($p<0.001$) and 14.3% vs 6.4% ($p<0.001$) respectively. The most significant finding was very higher rate of diabetes among hepatitis C which was 22.6%, while only 1.8% among hepatitis B virus infection ($p<0.001$).

Conclusion: Hepatitis C virus was highly related with the presence of diabetes than hepatitis B.

Key-words- Diabetes mellitus, Prevalence, Hepatitis B virus, Hepatitis C virus

INTRODUCTION

Globally, two billion people are infected with HBV, and 350 million of them have chronic (lifelong) infections, who are at high risk of death from liver cirrhosis and liver cancer that kill more than one million people globally each year.[1] Different studies in Bangladesh showed that the seroprevalence of hepatitis B is 3.1-4-2%.[2-4] A recent report showed 5.5% HBsAg positivity among the general population living in Savar, a semi-urban area on the outskirts of Dhaka.[5]

Access this article online	
Quick Response Code	Website: www.ijlssr.com
	DOI: 10.21276/ijlssr.2017.3.5.17

HCV infections is also a major global health problem with an estimated 170 million people chronically infected and 3-4 million people get new infections each year.[6] A recent study among rural population in Bangladesh showed only 0.5% subjects were positive for anti-HCV antibodies.[7] In a recently published article seroprevalence of hepatitis B and hepatitis C were 3.0% and 0.48% respectively among diabetics.[8] These findings are similar to previous studies.

Diabetes mellitus is a leading cause of death and disability worldwide.[9,10] Its global prevalence was about 8% in 2011 and is predicted to rise 10% by 2030. [11] Nearly 80% of people with diabetes live in low and middle-income countries.[11] Asia and the Eastern Pacific region are particularly affected: in 2011, China was home to the largest number of adults with diabetes (i.e. 90.0 million, or 9% of the population), followed by India (61.3 million, or 8% of the population) and Bangladesh (8.4

million, or 10% of the population).[11] In Bangladesh, the overall age-adjusted prevalence of diabetes and prediabetes is 9.7% and 22.4%, respectively.12 Among urban residents, the age-adjusted prevalence of diabetes is 15.2% compared with 8.3% among rural residents. [12]

Frequency of diabetes among hepatitis B and hepatitis C viruses are studied in some places. In a study among Japanese populations, it was shown that he prevalence of DM was higher in HCV-infected patients (20.9%; P<0.02) than in HBV-infected subjects (11.9%). [13] In the cirrhotic patients, DM was observed in 30.8% of the subjects with HCV compared with 11.8% of those with HBV (P< 0.01).[13]

Treating chronic hepatitis with available injectable and oral agents needs patients' assessment for the presence of co-morbid diseases like diabetes. This study was aimed to look for the presence of diabetes among hepatitis B and hepatitis C patients at the time of initial diagnosis.

MATERIALS AND METHODS

Study design and patients: This was a retrospective single center cohort study that included the data of patients with chronic HBV and HCV infection from The Liver Centre, Dhaka, Bangladesh between January 2001 to December 2012. Patients older than 18 years, who had been diagnosed with chronic HBV and HCV infections were included in the study. Results of blood tests like serum ALT, fasting blood glucose, 2 hours post prandial glucose, HbA1C, HBsAg and anti-HCV were retrieved from records.

Statistical analyses: The Statistical Package for the Social Sciences (SPSS)-23 (SPSS Inc.; Chicago, IL, USA) package program was used for statistical analyses. Categorical variables were presented as the number of cases and percentages, continuous variables with a normal distribution were presented as mean±standard deviation, and continuous variables without a normal distribution were presented as median (minimum-maximum). Categorical variables were compared using a chi-squared test. A p-value of <0.05 was considered statistically significant. Ethics committee approval was obtained from the ethics committee of Hepatology Society, Dhaka, Bangladesh.

RESULTS

This study comprised of 29425 cases [median age 31 (19–95) years, 24615(84%) males]. HBsAg positive cases were 27475 and hepatitis C was 1950. Patients with hepatitis C were older than hepatitis B (p<0.001) (Table 1). Previous history of jaundice was similar in both infections but history of blood transfusion was more common among hepatitis C virus patients (p<0.001). Analyzing different conditions of the liver disease and viral a etiology, it was observed that hepatitis B virus infection was highly responsible for acute hepatitis than hepatitis C (10.7% vs 1.1%) (p<0.001). Chronic hepatitis was similar in rate (73.3% vs 59.9%). But in both conditions of cirrhosis of the liver like compensated and de-compensated states, hepatitis C virus was significantly responsible than the hepatitis B virus 24.7% vs 9.6% (p<0.001) and 14.3% vs 6.4% (p<0.001) respectively. The most significant finding was very higher rate of diabetes among hepatitis C which was 22.6%, while only 1.8% among hepatitis B virus infection (p<0.001).

Table 1: Baseline characteristics of study subjects

	HBsAg positive (n=27475)	**Anti-HCV positive (n=1950)**	**P value**
Male n (%)	23211(84.7)	1471(75.4)	NS
Female n (%)	4264(15.3)	479(24.6)	NS
Age group (yrs) (all cases)			
18-30	36/14382(0.3)	6/268(2.2)	<0.001
31-40	152/7039(2.2)	64/450(14.2)	<0.001
41-50	168/3635(4.6)	131/483(27.1)	<0.001
51-60	120/1659(7.2)	143/438(32.6)	<0.001
> 60	39/760(5.1)	97/311(31.2)	<0.001
Previous history of jaundice (Yes) n (%)	5714(20.8)	380(19.5)	NS
History of blood transfusion (Yes) n (%)	330(1.2)	177(9.1)	<0.001
Status of liver disease			
Acute hepatitis n (%)	2940(10.7)	21(1.1)	<0.001
Chronic hepatitis n (%)	20139(73.3)	1169(59.9)	NS
Compensated cirrhosis n (%)	2638(9.6)	481(24.7)	<0.001
De-compensated cirrhosis n (%)	1758(6.4)	279(14.3)	<0.001
ALT U/L, median (range)	49(19-4541)	68(23-3318)	<0.001
Diabetes present n (%)	515(1.8%)	441(22.6%)	<0.001

In Fig. 1 age-specific prevalence of diabetes among HBsAg positive cases were shown. The prevalence of diabetes increased, according to age. The peak prevalence was in the 51-60 age group.

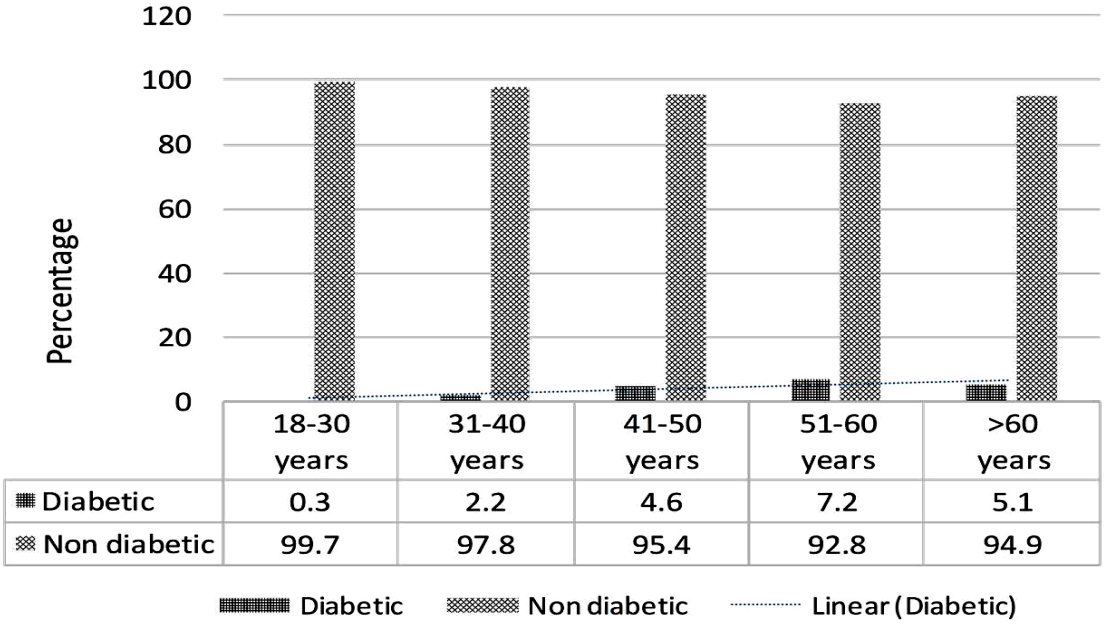

Fig. 1: Prevalence of diabetes mellitus among HBsAg positive cases according to age group

In Fig. 2 age-specific prevalence of diabetes among anti-HCV positive cases were shown. The prevalence of diabetes increased, according to age. Like hepatitis B, the peak prevalence was again in the 51–60 age group.

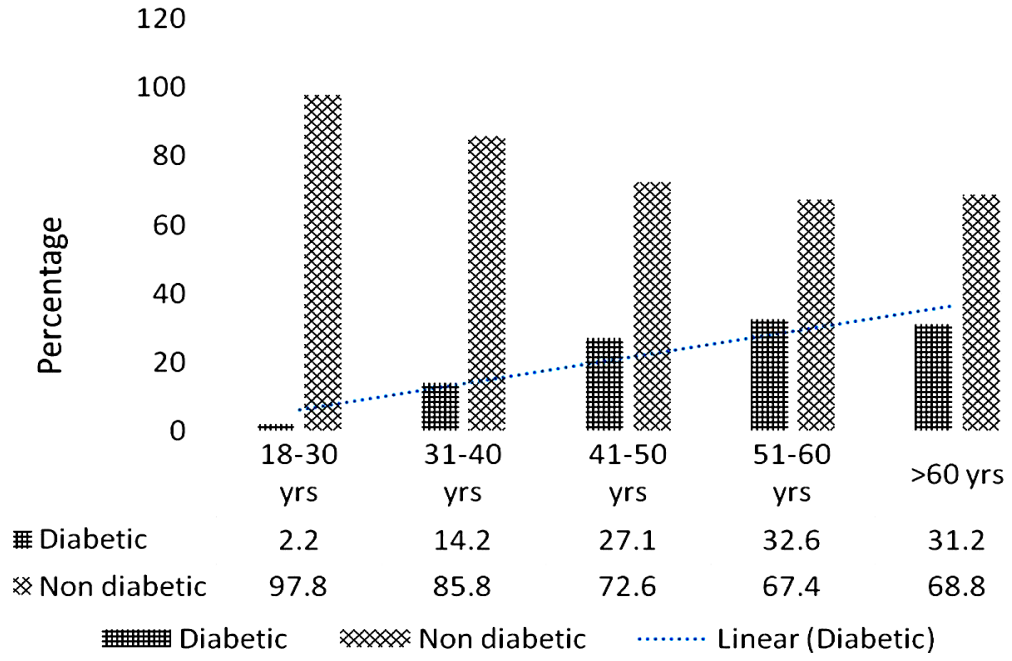

Fig. 2: Prevalence of diabetes mellitus among anti-HCV positive cases according to age group

In Fig. 3, prevalence of diabetes among the two viral infections was shown. There was a significant difference between these two groups of infections. Diabetes was about 12.5 times more common among viral hepatitis C than hepatitis B ($p<0.001$).

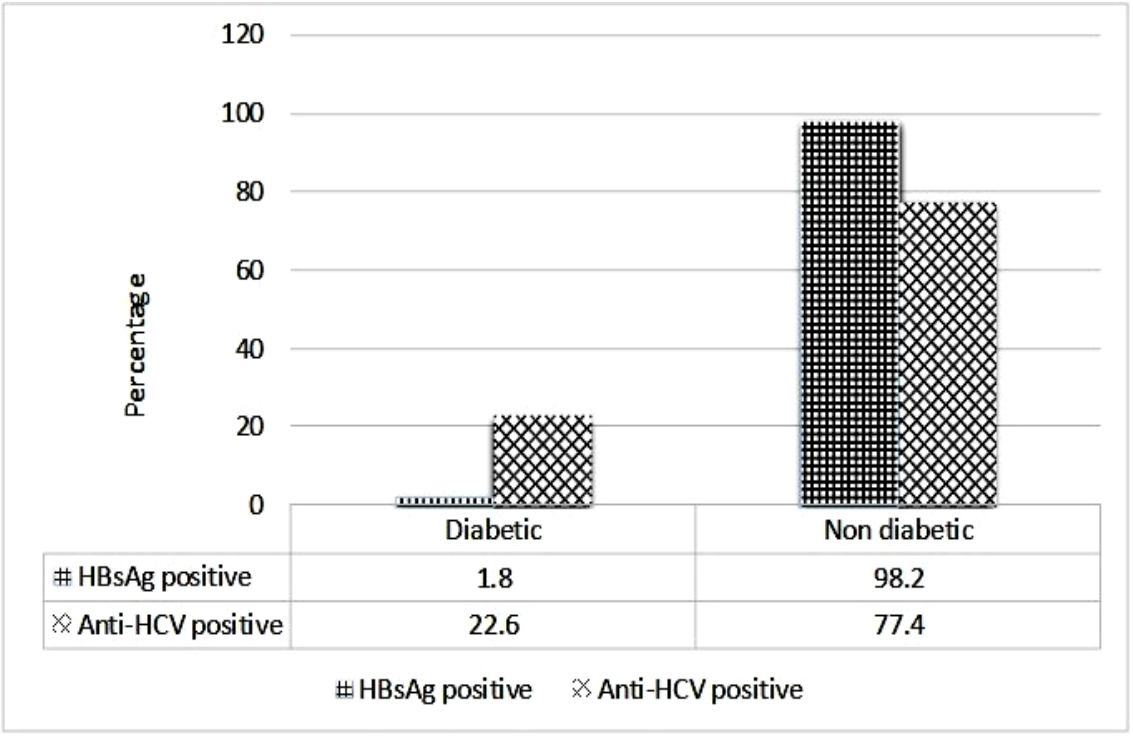

Fig. 3: Prevalence of diabetes among chronic viral hepatitis B and C

DISCUSSION

Viral hepatitis B and C can lead to the end stage liver disease in many instances. Chronic hepatitis, cirrhosis of the liver and hepatocellular carcinoma are the deadly consequences. Diabetes mellitus is also a life-long chronic disease. Macro and microvascular complications lead to the end stage of this metabolic non communicable disease. So one is infectious and other is non infectious having the potential of chronicity in both situations. Simultaneous presences of both of these conditions lead to synergistic detrimental outcome. So identification of diabetes mellitus at the initial evaluation of a patient having chronic hepatitis B and C is essential and vice versa. In a recent study carried out at BIRDEM hospital in Dhaka, where the seroprevalence of hepatitis B and C were done among newly detected diabetics.[8] This result was similar to that of normal population showed in different studies.[3,4]

Prevalence of diabetes was looked for among chronic viral hepatitis B and C in this study. In our study, it was shown that chronic hepatitis C patients were older than hepatitis B patients (Fig. 1 and 2). This can be explained by the persistent presence of antibody against hepatitis C virus in serum even after recovery from active infection. The results are cumulative for age. On the contrary, in case of hepatitis B virus infection, HBsAg disappears when the active infection resolves and seroconversion occurs. This finding was similar to other studies. [14] Previous history of jaundice was similar in both infections. History of blood transfusion was significantly higher among hepatitis C virus infections than hepatitis B. This result was also concordant with other study. [15]

When we looked for different stages of liver disease, acute hepatitis was more common among hepatitis B than hepatitis C. Chronic hepatitis was similar but both compensated and decompensated cirrhosis were remarkably higher among chronic hepatitis C patients. These findings suggest that hepatitis C virus leads to more chronicity with rapid development of end stage liver disease than hepatitis B. Median serum ALT was higher in hepatitis C patients than hepatitis B.

Most remarkably a high significance of diabetes mellitus among chronic hepatitis C patients (Fig. 3), which is 12.5 times more common than hepatitis B. We had the speculation that hepatitis C virus lead to more diabetes probably due to its extra hepatic manifestation on pancreatic beta cells. The results are also suggesting our hypothesis. The pathophysiology of chronic hepatitis C with damage to the pancreatic beta cell needs further research work. This observation was noted in some studies.[16-18].

CONCLUSIONS

We aimed to explore the impact of viral hepatitis B and C on the prevalence diabetes mellitus. It is needed to know the presence of both these conditions for managing each other. Hepatitis C virus was highly related with the presence of diabetes than hepatitis B. Exact pathogenesis of diabetes with hepatitis C virus needs further studies.

AUTHOR CONTRIBUTIONS

Golam Azam conceptualized the hypothesis, designed the research, analyzed the data and wrote the paper, Shahinul Alam analyzed the data, Abdullah Saeed Khan and Rubayat Sheik Giasuddin collected the data, Mobin Khan edited the manuscript.

REFERENCES

[1] Hepatitis B: 2008 [http://www.who.int/mediacentre/factsheets/fs204/en].

[2] Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. www.thelancet.com published online, 2015.

[3] Rumi MAK, Siddiqui MA, Salam MA, Iqbal MR, Azam MG, et al. Prevalence of infectious diseases and drug abuse among Bangladeshi workers. Southeast Asian J. Trop. Med. Public Health, 2000; 31(3): 571-574.

[4] Rumi MAK, Begum K, Hassan MS, Hasan SMM, Azam MG, et al. Detection of hepatitis B surface antigen in pregnant women attending a public hospital for delivery: implication for vaccination strategy in Bangladesh. Am. J. Trop. Med. Hyg., 1998, 59(2): 318-22.

[5] Mahtab MA, Rahman S, Karim MF, Khan M, Foster G, et al. Epidemiology of hepatitis B virus in Bangladeshi general population. Hepatobiliary Pancreat Dis. Int., 2008, 7: 595-600.

[6] Hepatitis C: 2008 [http://who.int/mediacentre/factsheets/fs164/en/].

[7] Khan M, Mustafa MG, Ahmad N, Alam S, Baig RH, et al. Seroprevalence of hepatitis C virus in rural population of Bangladesh. Ind. J. Gastroenterol, 2010; 29(1): 44–45.

[8] Azam MG, Bhuiyan TM, Hoque MN, Rahman MA, Khan AKA. Seroprevalence of Hepatitis B and C Virus Infections among Type 2 Diabetic patients in a tertiary care diabetic centre in Dhaka City. Int. J. Gastroenterol. Hepatol. Transpl. Nutr., 2016; 1(4): 17-22.

[9] Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010 a systematic analysis for the Global Burden of Disease Study, 2010. Lancet, 2012; 380: 2095–128.

[10] Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010 a systematic analysis for the Global Burden of Disease Study, 2010. Lancet, 2012; 380: 2197–223.

[11] International Diabetes Federation (IDF) [Internet]. Country estimates table 2011. IDF diabetes atlas. 6th ed. 2012. Available from: http://www.idf.org/sites/default/files/EN_6E_Atlas_Full_0.pdf [accessed 7 June 2013].

[12] Akter S, Rahman MM, Abe SK, Sultana P. Prevalence of diabetes and prediabetes and their risk factors among Bangladeshi adults a nationwide survey. Bull. World Health Organ., 2014; 92: 204–213 A.

[13] Arao M, Murase K, Kusakabe A, Yoshioka K, Fukuzawa Y, et al. Prevalence of diabetes mellitus in Japanese patients infected chronically with hepatitis C virus. J. Gastroenterol., 2003; 38(4): 355-60.

[14] Hanafiah KM, Groeger J, Flaxman AD, Wiersma ST. Global epidemiology of hepatitis C virus infection New estimates of age-specific antibody to HCV seroprevalence. Hepatol., 2013; 57(4): 1333–42.

[15] Mollah AH, Nahar N, Siddique MA, Anwar KS, Hassan T, et al. Common transfusion-transmitted infectious agents among thalassaemic children in Bangladesh. J. Health Popul. Nutr., 2003; 21(1): 67-71.

[16] Mehta SH, Brancati FL, Sulkowski MS, Strathdce SA, Szklo M, et al. Prevalence of type 2 diabetes mellitus among persons with hepatitis C virus infection in United States. Ann. Intern. Med., 2000; 133(8): 592-99.

[17] Everhart JA. Confluences of epidemics. Does hepatitis C cause type 2 diabetes? Hepatol, 2001; 33: 762-3.

[18] Caronia S, Taylor K, Pagliaro L, et al. Further evidence for an association between non–insulin dependent diabetes mellitus and chronic hepatitis C virus infection. Hepatol., 1999; 30(4): 1059-63.

How to cite this article:

Azam G, Alam S, Khan AS, Giasuddin RS, Khan M: High Prevalence of Diabetes Mellitus among Adult Patients with Viral Hepatitis C than Hepatitis B. Int. J. Life Sci. Scienti. Res., 2017; 3(5):1365-1369. DOI:10.21276/ijlssr.2017.3.5.17

Source of Financial Support: Nil, **Conflict of interest:** Nil

