

SEROPREVALENCE OF HEPATITIS C VIRUS AMONG HEALTH CARE WORKERS

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Abstract:

Context: Hepatitis C virus is one of the leading causes of liver disease and represents a major public health problem. It is a common cause of cirrhosis and hepatocellular carcinoma (HCC) as well as the most common reason for liver transplantation.

Methods: A cross sectional study was carried out during the period of April 2007 to April 2008 among health care workers including phlebotomists, dialysis staffs and laboratory personnel handling blood and blood products. Total 200 health care workers from phlebotomists working at one stop collection centre of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka Medical College Hospital (DMCH), Dialysis staff working at haemodialysis units of BSMMU, Bangladesh Institute of Rehabilitation for Diabetes, Endocrine & Metabolic Diseases (BIRDEM), DMCH, National Institute of Kidney Diseases & Urology (NIKDU) had at least more than one year working exposure was enrolled in this study. After taking informed written consent detailed history was taken, clinical examination was done. 0.3 ml of venous blood was collected from each patient and tested for anti HCV by commercial kit, confirmed by ELISA method.

Result: Among 200 patients majority (55.5%) of patients were below 30 years of age and there was equal prevalence among male and female. Out of 200 health care workers 1% was found to be anti HCV positive. All positive patient had duration of exposure of >5 years and had history of needle stick injury.

Key words: Hepatitis C virus, seroprevalence, health care workers.

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Introduction:

Hepatitis C virus (HCV) is an important human pathogen. It has high prevalence and worldwide burden and produces grave consequences e.g. cirrhosis of liver, hepatocellular carcinoma necessitating liver transplantation. The incidence of all of these complications are expected to rise in the near future.^{1,2} HCV accounts for about 15% of acute viral hepatitis, 60-70% of chronic hepatitis, and up to 50% of cirrhosis, end-stage liver disease and liver cancer.³ A distinct and major characteristic of hepatitis C virus is its tendency to cause chronic liver disease.⁴ At least 75% of patients

with acute hepatitis C ultimately develop chronic infection. At least 20% of patients with chronic hepatitis C develop cirrhosis after 10 to 20 years. After 20 to 40 years, a small percentage of patient with chronic liver disease develop liver cancer.⁵ HCV infection is often silent, and clinical symptoms are absent or minimal unless .⁶ The transmission of HCV primarily occurs through exposure to infected blood and blood products. Blood transfusion, injectable drug abuse, occupational exposure in health care workers, haemodialysis, solid organ transplantation from an infected donor, high-risk sexual activity, and birth to an

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infected mother are the mode of transmission.⁷ According to the Centers for Disease Controls and Prevention (CDC), the most common risk factors for acute HCV infection in the U.S. from 1991-1995 were high-risk drug abuse in parenteral route (60%) and risky sexual behaviours (20%). Other modes of transmission (occupational, haemodialysis, household and perinatal) accounted for approximately 10% of infection.⁸ A potential risk factor can be identified in approximately 90% of persons infected with HCV.

1. In the remaining 10%, no recognizable source of infection can be identified, although most persons in this category associated with low socio-economic level.⁹ Risk for sexual transmission is rare and occurs in <5% of those couples. Mother to infant transmission of HCV is possible but uncommon, and occurred in 3-5% of babies born to HCV positive mothers.¹⁰ HCV is endemic in most parts of the world, with an estimated overall prevalence of 3%, representing approximately 170 million HCV-infected persons world-wide.¹¹ In Asia, the estimated figures range from 0.3% in New Zealand to 4% in Cambodia.¹² There is considerable geographic variation in the incidence and prevalence of HCV infection. Much of the variability between regions can be explained by the frequency and extent to which different risk factors like injection drug use accounting for 60 to 80%⁹, transfusions and transplants 5 to 13%⁹, unsafe injections and other healthcare related procedures 2 to 18%, occupational exposures 0 to 7%¹³, perinatal transmission 0 to 40%¹⁴ have been contributed to the transmission of HCV. Infection with HCV is an important occupational hazard for health care workers. In one study, transmission rates ranged from 0% to 10.3% with an average rate of 0.5%.¹⁵ HCV occupational transmissions was found to occur after percutaneous exposures and the risk of HCV transmission increased with deep injuries and procedures involving hollow bore-needle placement in the patients vein or artery. A study from India among 100 health care workers reported HCV seroprevalence to

be 4.0% and was highest (8.3%) among dialysis staff.¹⁶ Attempts have been made to assess the risk of infection associated with occupational exposure to HCV in health care settings. This study was conducted with the aim to find out anti-HCV sero-prevalence among health care workers.

Materials and Methods:

This cross sectional study was carried out during the period of April 2007 to April 2008 among Health care workers including phlebotomists, dialysis staffs and laboratory personnel handling blood and blood products. Total 200 health care workers from phlebotomists working at one stop collection centre of BSMMU, DMCH, and Dialysis staff working at haemodialysis units of BSMMU, BIRDEM, DMCH and NIKDU had at least more than one year working exposure was enrolled in this study. After taking informed written consent of the subjects, all necessary information were recorded in a pre-designed structured questionnaire. After that 3.0 ml of venous blood was collected in a sterile test tube aseptically by venipuncture with sterile disposable syringe. Blood was tested for anti HCV by commercial kit according to standard operating procedure of manufacturer's instruction (Anti HCV test done by Excel HCV rapid device, made in USA).¹⁷ Sensitivity of this method was found to be 99% with Specificity of 98.6%.^{17,18} All positive cases were confirmed by ELISA method. Statistical analysis was performed using SPSS program. Odds ratio and chi-square test were done to test the significance of the factors of study in relation with the seroprevalence of anti-HCV antibodies. Logistic regression analysis was applied to identify the risk factors. $p < 0.05$ was considered significant.

Results:

Out of 200 patients, only 2 (1%) were anti HCV positive and 198 (99%) were anti HCV negative. Among HCV positive individuals 1 (50%) was male and 1 (50%) was female with a male to female ratio 1:1. Among HCV negative individuals 79 (40%) were male and 119 (60%) were female (Table-I).

Table-I*Distribution of patients according to sex*

Anti-HCV status	Male (%)	Female (%)
Positive	1 (50)	1 (50)
Negative	79 (40)	119 (60)

Among HCV positive individuals, 1 individual was <30 years age, 1 individual was 31-40 years of age. Mean age was 28.4±6.61. Among HCV negative individuals, 110 (56%) individuals were < 30 years age, 50 individuals (25%) were in 31-40 years age, and 38 (19%) individuals > 40 years age. Mean age was 28.5±7.25 (Table-II).

Table-II*Distribution of patients according to age*

Age distribution	Anti HCV status	
	Positive	Negative
<30 years (n=111)	1 (50%)	110 (56%)
31-40 years (n=51)	1 (50%)	50 (25%)
>40 years (n=38)	0	38 (19%)

Among 200 patients, 150 (75%) individuals were in middle socioeconomic class followed by 30 (15%) in upper and 20 (10%) were in upper class of them only two patients were anti HCV positive and both of them were in middle socioeconomic status (Table-III).

Table-III*Distribution of patients according to socioeconomic status*

Social class	Anti HCV status	
	Positive	Negative
Upper class (n=30)	0	30 (100%)
Middle class (n=150)	2 (1.3%)	148 (98.7%)
Lower class (n=20)	0	20 (100%)

Duration of exposure to risk factors was also calculated and was correlated with seropositivity of HCV. Out of 200 patient 95 (47.5%) had 5-10 years of exposure of them only 1(1.1%) were anti HCV positive, 45 (22.5%) patient had >10 years exposure of them 1 (2.2%) were anti-HCV positive and 60 (30%) had < 5 years of exposure and none of them were anti HCV positive (Table-IV).

Table-IV*Distribution of patients according to duration of exposure to risk factors*

Duration of exposure	Anti HCV status	
	Positive	Negative
<5 years (n=60)	0	60 (100%)
5-10 years (n=95)	1 (1.1%)	94 (98.9%)
>10 years (n=45)	1 (2.2%)	44 (97.8%)

Among HCV positive individuals, all had history of needle stick injury. Among HCV negative individuals, 50 had history of needle stick injury and 148 had no such history. This value was not statistically significant (p value = 0.161) (Table-V).

Among the 2 positive subjects, one (50%) was nurse and one (50%) was other health care workers. On clinical examination, among 200 health care workers, two individuals had jaundice, one had clubbing and two had hepatomegaly. Oedema, spider navi, palmar erythema, gynaecomastia, testicular atrophy, engorged abdominal vein, splenomegaly and ascites were not found in any individual.

Table-V*Distribution of patients according to history of needle stick injury*

History of needle stick injury	Anti HCV status	
	Positive	Negative
Present (n=52)	2(3.85%)	50 (96.15%)
Absent (n=148)	0	148 (100%)
>10 years (n=45)	1 (2.2%)	44 (97.8%)

Discussion:

Hepatitis C virus infection is a major cause of liver related morbidity and mortality and represents a major public health problem world wide. HCV infection is more notorious than hepatitis B virus infection (HCV) because of greater risk of chronicity and other sequelae of liver disease like chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma. Its prevalence is lower than hepatitis B virus. The overall prevalence of HCV infection is 1% to 2% in most countries but the distribution of HCV varies considerably among different populations.⁸ HCV is most frequently

transmitted by percutaneous exposure to infected blood or blood derived body fluids and very high rates of HCV infection are found among persons exposed to HCV through these routes. HCV prevalence rate in USA is about 1.8%⁹, in Africa it is 5.3%. Mediterranean region 4.6%, Western Pacific region 3.9%, South East Asia 2.13% and in Europe 1.03%.¹¹ In Pakistan, among voluntary blood donors anti HCV antibody positivity ranges from 0.44% to 1.18% and among health care workers is 6%.²⁰ In our neighboring country India, anti HCV positivity among voluntary blood donors ranges from 1.5 to 1.78% and among healthcare workers 4%²⁰. There are few studies on seroprevalence of hepatitis C virus infection in Bangladesh. Studies done by Gibney et al.²¹ in a population of Bangladeshi trucking industry by Shirin et al.²² among injectable and non injectable drug abuse, and by Khan et al.²³ in professional and non professional blood donors were < 1%, 24.8%, 5.8%, 1.2% and 0.0% respectively. In this study, prevalence of hepatitis C virus was found to be 1% out of 200 health care workers. This prevalence rate of HCV among the health care workers in this study is similar to that found in study done by Gibney et al. and Khan et al. but lower than that reported in India and Pakistan.

Conclusion:

From this study it was evident that, majority (55.5%) of the patients were below 30 years of age and there was equal prevalence among male and female. Out of 200 health care workers 1% was found anti HCV positive. All positive patient had duration of exposure of >5 years and had history of needle stick injury. Prevalence of hepatitis C is low in this small study. To get dependable conclusion regarding prevalence of HCV, further extensive studies with larger sample size should be carried out.

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