Original Article

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THE PREVALENCE OF HCV INFECTION AMONG HEALTHCARE WORKERS IN DHAKA CITY

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Summary:

The 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 hepato cellular carcinoma (HCC) as well as the most common reason for liver transplantation. Its prevalence is lower than hepatitis B virus. Though some data on HCV infection are available from our country, little is known about the behavior of HCV infection in our population. A cross sectional study is conducted to estimate prevalence of hepatitis C virus infection among healthcare workers in Dhaka city.

In this study, prevalence of hepatitis C virus was found to be 0.4% out of apparently healthy 1000 healthcare workers. In healthcare workers, out of 4 positive subjects, one was Doctor (25%), two were nurses (50%) and one was other healthcare workers (25%). One subject had history of jaundice in the past. Two subjects had history of surgery. Two subjects had history of blood transfusion and two subjects had history of needle stick injury. Two subjects had history of dental procedure and one subject had history of shaving in saloon and one subject had history of IV drug addiction. History of Intravenous(IV) drug abuse was the significant risk factor for being HCV positivity among healthcare workers in the study. This study does not depict the national scenario. Well designed large scale study with more sensitive method are recommended.

Introduction

The Hepatitis-C virus (HCV) is one of the leading known causes of liver disease and represents a major public health problem. It is a common cause of cirrhosis and bepatocellular carcinoma (HCC) as well as the most common reason for liver transplantation. Following the identification of hepatitis A and hepatitis B, this disorder was categorized in 1974 as "non-A, non -B hepatitis."

In 1989, the Hepatitis-C virus was identified and found to account for the majority of those patients with non-A, non-B hepatitis[1].

HCV infection appears to he endemic in most of the world, with an estimated overall prevalence of 3%, representing approximately 170 to 200 million HCV infected persons world wide[2].infection is 1.8%, corresponding to an estimated 3.9 million American who have heen infected withHCV[5,6]. In Australia estimate figure is 0.55%[7], in Asia the figure is 0.3%[8] in New Zealand and in China the figure range from 0.5% to 0.8%[9]. However, there is considerable geographic variation in the incidence and prevalence of HCV infection. Much of the variability hetween regions can be explained by the frequency and extent to which different risk factors varies, like injectable drug use accounting for 60 to 80%[4,11], transfusions and transplants 5-13%[12],unsafe injections and other healthcare related procedures 2-18%[13], occupational exposures 0 to 7%[14], perinatal transmission 0 to 40%[15,16,17] have heen contrihuted to the transmission of HCV.

In our neighboring country India, anti HCV positivity among voluntary blood donors ranges from 1.5 to 1.78%, in acute viral Hepatitis 4.85 to 12.5%, Hepatic failure 10 to 43.6%, Chronic liver disease 8.8 to 48.5% and in chronic renal failure and thalasssaemics receiving multiple blood transfusions 41.9% and 22.45% respectively.

In Bangladesh, HCV seropositivity among professional blood donars is 1.2% while in the voluntary donars is nil[20].

In another study, anti HCV was positive in 24.1% of chronic liver disease, 9.6% cases of Hepatocellular carcinoma, 6.8 in post transfusion Hepatitis, 1.7% in acute viral hepatitis,5.5% in sub acute Hepatic failure[21]. HCV antibody among injectable and non injectable drug users 24.8% and 5.8% respectively[22].

Risk factors associated with acquiring HCV infection are

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transfusion of blood and blood products, injecting drug use, occupational exposures to blood (primarily contaminated needle sticks), transplantation of solid organs from infected doner, birth to an infected mother, sex with an infected partner and multiple hetero sexual partner.

Health care worker are high risk group to suffer from HCV. Health care worker (HCW) bave long been recognized to be a risk for Hepatitis virus infection through occupational exposure to blood and blood contaminated objects.

Healtb care worker particularly surgeons performing exposure prone procedures, where injury to the worker may result in the exposure of the worker's broken skin to the blood of the patient are likely to be areas risk of acquiring HCV through occupational exposure.

Needle stick in the bealth care setting continue to result in nosocomial transmission of viruses. The rate of transmission after needle stick injury involving blood known to be infected ranged from 0 to 10 percent in various studies[23,24]. No study is available about seroprevalence of HCV among bealthcare workers in Bangladesh.

Blood and blood products are the treatment of choice of severe anaemia, thalassaemia, leukaemia etc. where multiple blood transfusion at a regular interval or an emergency basis is required. Routine screening of all blood donars is the sole option to prevent HCV infections.

Because there is currently no vaccine and no effective post exposure prophylaxis for Hepatitis C, priority should be given at the primary prevention of HCV. Different strategies are required to interrupt different pattern of HCV infection in area like Bangladesh where that information has not yet been assessed widely, is critical for developing appropriate prevention programs.

This study on health care workers (Doctor, Nurse, Ward boy, OT boy, Laboratory technician ete.) will help in identifying predominant mode of transmission of the virus in our society.

Meterials And Methods

Study design : Cross sectional study.

Place of study : the study was performed in BIRDEM Hospital, Dhaka Medical College and Hospital, BSMMU, Renal Dialysis Centre, Kidney Hospital and Dialysis Centre, Kidney foundation.

Study Period : March 2006 to March 2007. Sample size : 1000 apparently Healthy Health care workers.

Inclusion criteria : (1) Health care workers of 18 years or above was included in the study. (Doctors of haemodialysis Units, blood transfusion, Gastroenterology units, laboratory teehnicians, ward boy and others healthcare workers.

3) Both male and female were included on the basis of availability.

Exclusion criteria : 1. Age less than 18 yrs irrespective of sex.

2. Subjeet unwilling to participate.

Variable studied : A. Socio demographic data-Age, sex, Marital status. Occupation, duration of occupation were recorded.

B. Risk factors - for HCV infection were studied using a questionnaire included.

1. History of blood transfusion.
2. History of Surgery.
3. History of Needle stick injury.
4. History of Jaundice.
5. Family bistory of Jaundice.
6. History of IV drug abuse.
7. History of dental procedure.
8. History of illegal sexual exposure.
9. Sbaving pattern.

Data collection procedure :

Data is collected using predesigned structured questionnaire. After collection of data, every individual was tested to detect HCV positivity by HCV rapid test device. Made in UK. Sensitivity>99.0% and specificity 9806%. The HCV Rapid chromatographic immunoassay for the qualitative detection of antibody to Hepatitis C virus in whole blood, serum or plasma. All positive cases was confirmed by ELISA-3 method.

5 ml of venous blood was collected from each HCV positive individual (by Rapid test device) aseptically by one time disposable syringe and serum was separated by centrifuge machine and serum was preserved into test tube. 2 ml of serum for ELISA test was stored in deep freeze at - 200c in BIEDEM.

The ELSIA test was done all together after colleeting sample from all HCV positive case by rapid test device.

Result And Observation:

Table -1

In our study population among healthcare workers (n=1000), 4 workers (0.4%) were HCV positive, and 996 (99.6%) workers were HCV negative.

Healthcare Workers

HCV	(n=1000)	
	No.	(%)
Positive	4	(0.4)
Negative	996	(99.6)

Table-II

In HCV positive individuals among healthcare workers, 3 individuals were (75%) were male and 1 individual (25%) was female.

In HCV negative individuals among healthcare workers, 449 individuals (45.1%) were male and 547 individuals (54.9%) were female.

Table-II : Sex distribution of the respondents

Healthcare workers

Sex	Positive (n=4) No.	(%)	Negative (n=996) No.	(%)
Male	3	(75.0)	449	(45.1)
Female	1	(25.0)	547	(54.9)

Table-III

In HCV positive individuals among healthcare workers, 2 individuals (50%) were <30 years age,1 individuals (25%) was 30-40 years age, 1 individual (25%) was above 40 years age. Mean age was 33.50 6.61,

In HCV negative individuals among Healthcare Workers, 382 individuals (38.4%) were 30-40 year age and 108 individuals (10.8%) were above 40 years age. Mean age 32.25 6.79,

Table-III : Age distribution of the respondents

Healthcare Workers

Age (years)	Positive (n=4) No.	(%)	Negative (n=996) No.	(%)
<30	2	(50.0)	382	(38.4)
30-40	1	(25.0)	506	(50.8)
>40	1	(25.0)	108	(10.8)

Table-IV

In HCV positive individuals among healthcare workers, 1 individuals (25%) was doctor, 2 individuals (50%) were nurse and 1 individual (25%) was other healthcare workers.

In HCV negative individuals among healthcare workers, 324 individual (32.5%) were doctors, 343 individuals (34.4%) were nurse and 329 individuals (33.3%) were other healthcare workers.

Table-IV : Occupation of the respondents

Healthcare Workers

Occupation	Positive (n=4) No.	(%)	Negative (n=996) No.	(%)
Doctor	2	(50.0)	382	(38.4)
Nurse	1	(25.0)	506	(50.8)
Other health Workers	1	(25.0)	108	(10.8)

Table-V

In HCV positive individuals among healthcare workers, 3 individuals (75%) were in 5-10 years of occupation and 1 individual (25%) was were in > 10 years of occupation.

In HCV positive individuals, mean duration of occupation was 8.00 + 2.16.

In HCV negative individuals among healthcare workers, 274 individuals (27.5%) were in 5 years of occupation, 455 individuals (45.7%) were in 5-10 years of occupation and 267 individuals (26.8%) were in more than 10 years of occupation.

In HCV negative individuals, mean duration of occupation was 8.97 + 6.94.

Table-V : Duration of occupation of

Healthcare workers

Duration of occupation (years)	HCV Positive (n=4) No.	(%)	HCV Negative (n=996) No.	(%)
<5	0		274	(27.5)
30-40	3	(75.0)	455	(45.7)
>40	1	(25.0)	267	(26.8)

Table-VI

In HCV positive individuals among healthcare workers, 1 individual (25%) had history of jaundice and 3 individuals (75%) had had no history of jaundice.

In HCV negative individuals among healthcare workers, 235 individuals (23.6%) had history of jaundice and 761 individuals (76.4%) had no history of jaundice.

Table-VI : Occupation of the respondents

Healthcare workers

History of (years)	Positive (n=4) No.	(%)	Negative (n=996) No.	(%)	Positive (n=4) No.	(%)
Present	1	(25.0)	235	(23.6)	0	
Absent	3	(75.0)	761	(76.4)	3	(100.0)

Table-VII

In HCV positive individuals among healthcare workers, 2 individuals (50%) had history of surgery, and 2 individuals (50%) had no history of surgery.

In HCV negative individuals among healthcare workers, 425 individuals (42.7%) had history of surgery, and 571 individuals (57.3%) had no history of surgery.

Chi-square test revealed that this value was not statistically

significant (P value 0.767ns).

Table-VII: History of surgery among the respondents

Healthcare workers						
History of (years)	Positive (n=4)		Negative (n=996)		Positive (n=4)	
	No.	(%)	No.	(%)	No.	(%)
Present	2	(50.0)	425	(42.7)	1	(33.3)
Absent	2	(50.0)	571	(57.3)	2	(66.7)
P value			0.767^{ns}			

Chi-square test
Ns= Not significant

Table-VIII

In HCV positive individuals among healthcare workers, 2 individuals (50%) had history of dental procedure and 2 individuals had no history of dental procedure.

In HCV negative individuals among healthcare workers, 465 individuals (46.7%) had history of dental procedure and 531 individuals (53.3%) had no history of dental procedure.

Chi-square test revealed that this value was not statistically significant)P value 0.895ns).

Table-VIII: History of dental procedure among the respondents.

Healthcare workers				
History of (years)	Positive (n=4)		Negative (n=996)	
	No.	(%)	No.	(%)
Present	2	(50.0)	465	(46.7)
Absent	2	(50.0)	531	(53.3)
P value			0.0895^{ns}	

Chi-square test
ns= Not significant
*= Significant at P<0.05

Table-IX

In HCV positive individuals among healthcare workers, 2 individuals (50%) had positive history of blood transfusion and 2 individuals (50%) had no history of blood transfusion.
In HCV negative individuals among healthcare workers, 162 individuals (16.3%) had positive history of blood transfusion and 834 individuals (83.7%) had no history of blood transfusion.

Chi-square test revealed that this value was not statistically significant. (P value 0.069ns).

Table-IX : History of blood transfusion among the respondents.

Healthcare workers				
History of (years)	Positive (n=4)		Negative (n=996)	
	No.	(%)	No.	(%)
Present	2	(50.0)	162	(16.3)
Absent	2	(50.0)	834	(83.7)
P value			0.069^{ns}	

Chi-square test
ns= Not significant
*= Significant at P<0.05

Table-X

In HCV positive individuals among healthcare workers, 2 individuals (50%) had positive history of needle stick injury and 2 individuals (50%) had no history of needle stick injury.

In HCV negative individuals among healthcare workers, 784 individuals (78.7%) had positive history of needle stick injury and 212 individuals (21.3%) had no history of needle stick injury.
Chi-square test revealed that this value was not statistically significant. (P value 0.162ns).

Table-X: History of needle-stick injury among the respondents.

Healthcare workers				
History of Needle-stick injury	Positive (n=4)		Negative (n=996)	
	No.	(%)	No.	(%)
Present	2	(50.0)	784	(78.7)
Absent	2	(50.0)	212	(21.3)
P value			0.069^{ns}	

Chi-square test
ns= Not significant

Table-XI

In HCV positive individuals among healthcare workers, 1 individuals (33.3%) had history of saving in saloon and 2

individuals (66.7%) had no history of saving in saloon.
In HCV negative individuals among healthcare workers, 99 individuals (22%) had history of saving in saloon and 350 individuals (78%) had no history of saving in saloon. This table is representative of male respondents only.

Table-XI: History of shaving in saloon among the respondents.

History in saloon	Positive (n=4) Healthcare workers No.	(%)	Negative (n=996) No.	(%)
Present	1	(33.3)	99	(22.0)
Absent	2	(66.7)	212	(78.0)
P value	0.0639^{ns}			

NOTE: Table is representative of male respondents only
Chi-square test
ns= Not significant

Table-XII
In HCV positive individuals among healthcare workers, 1 individuals (25%) had history of IV drug abuse and 3 individuals (75%) had no history of IV drug abuse .
In HCV negative individuals among healthcare workers, 9 individuals (0.9%) had history of IV drug abuse and 987 individuals (99.1%) had no history of IV drug abuse.

Table-XII : History of IV drug abuse among the respondents.

IV drug Abuse	Positive (n=4) Healthcare workers No.	(%)	Negative (n=996) No.	(%)
Present	1	(25.0)	9	(0.9)
Absent	3	(75.0)	987	(99.1)
P value	.000***			

Chi-square test
***= significant

Discussion
Hepatitis C virus infection is a major eause 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 (HBV) because of greater risk of ehronieity and other sequelae of liver disease like chronic hepatitis, cirrhosis of liver and hepato eellular carcinoma. Its prevalence is lower than hepatitis B virus.
An estimated overall prevalenee of 3% representing approximately 170 to 200 million HCV-infected persons world wide[2].
There ate few studies on sero prevalenee of hepatitis C virus infection in Bangladesh. Studies done by Laura Gibney et al, 128 in a population of Bangladeshi trucking industry, by Shirin T et al,[22] among injectable and non injectable drug abuse, and by khan M et al,[20] in professional and non professional blood donors were <1%,24.8%,5.8%,1.2% and 00% respectively.

This cross study was conduеted in BIRDEM Hospital, Dhaka Medical College & Hospital, BSMMU, renal Dialysis Centre, Kidney Hospital & Dialysis Centre, Kidney Foundation.
In this study, prevalence of hepatitis C virus infection among healthcare workers was determined. Apparently healthy 1000 adult healthcare workers were included in this study.
In this study, prevalence of hepatitis C virus was found to be 0.4% out of 1000 healtheare workers.
In case of healthcare workers out of 4 positive subjects, one was Doctor (25%), two were nurse (50%), and one was other healthcare workers (25%). One subject had history of jaundice in the past. Two subjects had history of surgery. Two subjects had history of blood transfusion and two subjects had history of needle stick injury. Two subjects had history of dental procedure and one subject had history of frequent shaving in saloon and one subject had history of IV drug addiction.
History of IV drug abuse was the significant risk factor for being HCV positivity among healthcare workers in the study.
This prevalence rate of HCV among the healthcare workers in the study is similar to that found in study done by Laura Gibney and Khan et al[23], but lower than that reported in India and Pakistan.
Conclusion:
Prevalence of hepatitis C is low in this small study.
History of IV drug abuse was the significant risk factor for being HCV positivity among healthcare workers in the study.

Referenee
1. Choo QL, kuo G, Weiner AJ overby LR, Bradly DW, Houghton M. Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. Science 1989;244:359-362
2. WHO. Global surveillance and control of hepatitis C. report of a WHO Consultation organized in collaboration with the Viral Hepatitis Prevention Board, Antwerp, Belgium. J Viral Hepat 1999;6:35-47.
3. Centers of Disease Control and Prevention: Recommendations for prevention and control of hepatitis C virus (HCV) infection and HCV-related chronic disease. MMWR 47 (No RR-19):1,1998.
4. Alter MJ, Kruszon-Moran D, Niman OV, McQuillan GM, Gao, Fengxiang, Moyer Linda A, et al. The prevalence of hepatitis C virus

infection in the United States. N Engl J Med 1999; 341:556-562.
5. Lauer GM, Walker BD. Hepatitis C virus infection. N Engl J Med 2001;345:41-52.
6. Armstrong GL, Wasley A, Simard EP, McQuillan GM, Kuhnert WL, Kulnert WL, et al. The prevalence of hepatitis C virus infection in the United States, 1999 through 2002. Ann Intern Med 2006; 144:705-714.
7. Mison L M, Young IF, O'Donghue M. prevalence of hepatitis C virus and genotype distribution in an Australian volunteer blood donor population. Transfusion 1997;37:73-78.
8. Kato JH, Chen DS. Transmission of hepatitis C virus in Asia Past and present presectives J Gastroenterol Hepatol 2000; 15(Suppl): E83-90
9. Leung N W Y, Leung J C K, Tam J S. Does hepatitis C virus infection contribution to hepatocellular carcinoma in Hong Kong. Cancer 1992;70: 40-44.
10. Sharlock S & Dooley J. Disease of the Liver and Billary System. 11th Edition 2002, www.geocitiescom.
11. Farrell GC, Weltman M, Dingley J, Lin R. Epidemiology of hepatitis C virus infection in Australia. Gastroenterol Jpn 1993; 28 (suppl 5): 32-36.
12. Alter MJ. Epidemiology of hepatitis C virus in the West. Semin Liver Dis 1995; 15:5-14.
13. Alter MJ, Coleman PJ, Alexander WJ. Importance of heterosexual activity in the transmission of hepatitis B and non-B hepatitis. JAMA 1989; 262:1201-1205.
14. Lodi G, Portar SR, Teo C, Scully C, Prevalence of HCV infection in health care workers of UK dental hospital. Vr Dental J 1997; 183:329-332.
15. Aizaki H, Saito A, Kusakawa I. Mother to child transmission of hepatitis C virus variants with an insertional mutation in it's bypervariable region. J Hepatol 1996; 25:608-613.
16. Catalano D, Pollio F, Ercolano S, Maternal-fetal transmission of HCV. Role of HIV as a risk factor. Min Gynacol 1999;51:117-119.
17. Fischler B, Lindh G, Lindgren S, et al. Vertical transmission of hepatitis C virus infection. Scand J Infect Dis 1996;28:353-356.
18. Jaiswal SPB, Chitnis D S, Naik G. Prevalence of ant-HCV antibodies in central India. Ind J Med Res 1995; 104: 177-81.
19. Irshad M, Acharya SK and Joshi YK. Prevalence of anti-HCV antibodies in the general population and in selected groups of patients in Delhi; Indian J Med Res 1995; 102:162-164.
20. Khan M, Husain M, Yano M. Comparison of seroepidemiology of hepatitis C in blood donors between Bangladesh and Japan. Gastroenterologia Japoncia 1993;28 (suppl 5): 28-31.
21. Khan M, Kiyosawa K, Yano M et al. HCV seroprevalence in liver disease in Bangladesh [Abstract] IXth biennial scientific meeting, Asian Pacific Association for the Study of the Liver, Kualalampur, Malayasia 1994.
22. Shirin T, Ahmed T, Iqbal A, Prevalence and resk factors of hepatitis B virus, bepatitis C virus, and human immunodeficiency virus infection among drug addict in Bangladesh J. Health Popul Nutr 2000; 18(3):145-150.
23. Laura Gibey, Saquib N, Metzger J, Chowdhury, P, Siddiqui MA, Hassan MS. Human immunodeficiency virus, bepatitis B and C in Bangladesh's trucking industry prevalence and risk factors. International Journal of Epidemiology 2001;30:878-884. History of chronic parenterally-acquired hepatitis C with an unusually rapid progression to cirrhosis. J Hepatol 1997;26:1-5.