Risk Factors of Hepatitis C Virus (HCV) Transmission among the HCV Infected Patients Admitted in a Tertiary Hospital of Bangladesh

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Abstract

Background:
Hepatitis C virus (HCV) is an important hepatotropic virus causing liver disease worldwide. Because there is no vaccine and no post-exposure prophylaxis for HCV, the focus of primary prevention efforts should be emphasized.

Objective:
The study was aimed to find out the risk factors of transmission of HCV among HCV-positive patients.

Methods:
In this observational study, a total of 30 HCV-positive indoor patients were included from the department of medicine and gastroenterology of Rangpur medical college hospital from July 2012 to June 2013 Over a period of 01 year.

Results:
The majority were male (86.7%), married (96.7%), in the age group 41-50 years (36.6%), resided in an urban area (66.6%). Regarding risk factor for HCV infection 16.7% had a history of risky sexual exposure, 3.3% was professional blood donor, 30% had a history of injury with contaminated instrument (needle stick/blade/lancet/others). 53.3% of patients had a history of blood & blood products transfusion. 76.7% studied patient shared their shaving razor. 23.3% of patient had CKD & was getting hemodialysis.

Conclusion:
As no vaccines are available for the prevention of HCV & treatment of HCV complications is difficult, the only way to control HCV is primary prevention by addressing the risk factors.

Keywords: Hepatitis C Virus, Risk Factors

Introduction:

Hepatitis C virus (HCV) is an important hepatotropic virus causing liver disease worldwide. The uncertainty about the geographic distribution of HCV infection and chronic hepatitis C, the determination of its risk factors of transmission & progression, underscore the difficulties in global prevention and control of HCV. HCV infection is endemic in most parts of the world, with an overall prevalence of 3%, representing approximately 170 to 200 million HCV-infected people world wide[1]. Because there is no vaccine and no post-exposure prophylaxis for HCV, the focus of primary prevention efforts should be emphasized. HCV infection is a potentially life-threatening condition, as many of the affected individuals progress to Cirrhosis and hepatocellular carcinoma (HCC).The true prevalence of Hepatitis C in Bangladesh is yet to be ascertained by a reliable large study. One prevalence study conducted by Mamun-Al-Mahtab et al. showed the prevalence of HCV positivity of 0.88%.[2] Another study found the prevalence of hepatitis C virus infection in the rural adult population was 0.6%.[3] The risk factors most frequently cited as accounting for the bulk of HCV transmission worldwide are blood transfusions from un-screened donors, injection drug use, unsafe therapeutic injections, and other health-care related procedures. The study was conducted to find out the risk factors of transmission of HCV among HCV-positive patients.

Methods:

In this observational study, 30 HCV-infected patients, admitted to the Department of Medicine and gastroenterology of Rangpur medical college

hospital from July 2012 to June 2013, were included by convenient sampling. HCV infection was diagnosed on the basis of anti-HCV antibody (IgG/IgM) positivity with or without positive HCV-RNA status. The particulars, history, physical and laboratory findings were recorded in a semi-structured predesigned data collection sheet. Statistical analysis was done using Statistical Packages for Social Sciences (SPSS), version 23.0 software for Windows. The qualitative variables were expressed in frequency and percentage and the quantitative variables in mean± Standard Deviation. Ethical clearance was obtained from the institutional review board (IRB) of Rangpur Medical College before the commencement of the study. Informed written consent was taken from the participants. Strict confidentiality was maintained throughout the study.

Results:

The socio-demographic characteristics of the study subjects were shown in table-I. The majority were male (86.7%), married (96.7%), in the age group 41-50 years (36.6%), resided in an urban area (66.6%), service holders (50%), and got at least primary education (80%).

Table-I: Socio-demographic characteristics of the participants (n=30)

Parameter	Number (Percentage)
Age group (Years)	
>18-30	2(6.6%)
31-40	8(26.6%)
41-50	11(36.6%)
51-60	8(26.6%)
>60	1(3.3%)
Age (Mean ± SD)	45.87 ± 10.40
Age range (Years)	20-65
Gender	
Male	26(86.7%)
Female	4(13.3%)
Marital status	
Married	29(96.7%)
Unmarried	1(3.3%)
Residence	
Rural	10(33.3%)
Urban	20(66.6%)
Level of education	
0-5 class	6(20.0%)
5-10 class	8(26.6%)
Undergraduate	5(16.7%)
Graduate and above	11(36.7%)
Occupation	
Housewife	3(10.0%)
Farmer	2(6.7%)
Service	15(50.0%)
Business	1(3.3%)
Unemployed	7(23.3%)
Others	2(6.7%)

Majority of the patient presented with anorexia (76.7%) and yellow coloration of the eye and urine (60%). The main clinical findings were jaundice 60% and stigmata of CLD were present in 60%. Features of hepatic encephalopathy were present in 6.6% (Table-II).

Table-II: Common clinical presentations of hepatitis C infected patients (n=30)

Clinical features	Frequency	Percentage
Anorexia	23	76.7%
Vomiting	13	43.3%
Abdominal pain	11	36.7%
H/O joint pain	10	33.3%
Yellow coloration of eye and urine	18	60.0%
Bodyache	11	36.7%
Vomiting of blood	04	13.3%
Anaemia	18	60.0%
Jaundice	18	60.0%
Skin rash	07	23.3%
Needle prick mark	04	13.3%
Scar mark	12	40.0%
Stigmata of CLD	18	60.0%
Hepatomegaly	06	20.0%
Splenomegaly	11	36.7%
Ascites	21	70.0%
Signs of encephalopathy	02	6.6%

Regarding risk factor for HCV infection 16.7% had a history of risky sexual exposure, 3.3% was professional blood donor, 30% had a history of injury with contaminated instrument (needle stick/blade/lancet/others). 53.3% of patients had a history of blood & blood products transfusion. 76.7% studied patient shared their shaving razor. 23.3% of patient had CKD & was getting hemodialysis (Table-III).

Table-III: Risk factors of HCV transmission in studied patients (n=30)

Risk factor	Frequency	Percentage
Blood transfusion	14	46.7%
Blood products transfusion	02	6.7%
Infusion history	18	60.0%
Professional blood donor	01	3.3%
History of sharing a razor	23	76.7%
Contaminated blade injury	03	10%
Other instrumented injury	06	20%
History of hemodialysis	07	23.3%
H/O Sexual exposure	05	16.7%
History of surgical procedure	13	43.3%
History of dental procedure	06	20%
History of HCV positive patients in family	00	00%
CKD	07	23.3%
HHA	01	3.3%

Among the studied patients, 36.7% had 4 mg/dl bilirubin, 80% had raised SGPT, 43.4% had raised alkaline phosphatase, 87.6% had low serum albumin, 70% had abnormal sonographic findings, and 67.7% had varices & gastropathy on upper GI endoscopy (Table-IV).

Table-IV: Investigation profile of HCV patients (n=30)

Parameters	Frequency	Percentage
S. bilirubin (mg/dl)		
<4	19	63.3%
4-10	08	26.7%
>10	03	10.0%
SGPT		
Normal	06	20.0%
<2 × normal	22	73.3%
>2 × normal	02	6.7%
Alkaline phosphatase		
Normal	17	56.7%
Raised <2 × normal	08	26.7%
Raised >2 × normal	05	16.7%
Prothrombin time		
Normal	09	30.0%
<4 seconds prolonged	11	36.7%
4-6 seconds prolonged	07	23.3%
>6 seconds prolonged	02	6.7%
S. Albumin		
Normal	03	10.0%
<2.8 gm/dl	26	86.7%
Alpha-fetoprotein		
<10 ng/ml	17	56.7%
10-400 ng/ml	02	6.7%
>400 ng/ml	02	6.7%
HCV RNA		
Not done	10	33.3%
Positive	20	66.7%
USG of HBS		
Normal	09	30.0%
High echogenicity	06	20.0%
Hepatomegaly	03	10.0%
Hepatomegaly due to SOL	02	6.67%
Shrinkage of liver	10	33.3%
Upper GI endoscopy		
Normal	10	33.3%
Gastropathy	06	20%
Varices	14	47.7%

Discussion:

In Bangladesh, HCV seropositivity among professional blood donors is 1.2% while in the voluntary donors is nil.[4] In another study, Anti-HCV was positive in 1.7% in acute viral hepatitis, 5.5% in sub-acute hepatic failure, 6.8% in post-transfusion hepatitis, 24.1% in chronic liver disease, 9.6% cases hepatocellular carcinoma.[5] HCV antibodies among clinically jaundiced patients were 2.5%,[6] healthy married women 0.9%,[7] 24.8% among injectable, and 5.8% in non-injectable drug users.[8] In another study 12.5% of thalassaemic children had HCV antibodies while the age-matched controls had only 0.9%.[9] There is limited data about the risk factors of HCV transmission in our country. This is a hospital-based study, patients of HCV admitted to the department of Medicine & Gastroenterology of Rangpur Medical College Hospital were studied to determine the risk factors of HCV transmission. In our study, the mean age of the study population was 45.87 ± 10.40 years. Many previous reports have shown mean age of the HCV patients was 37.6 ± 14.2 years (range: 1-87)[10] and 40.22±13.09 years.[11] Worldwide most of the HCV-affected patients were male. Alashek et al. has shown that two-thirds of the patients were males.[10] Jahanbakhsh et al. also found an almost similar result, in his study out of 11561 patients, 9645(83.4%) were male.[11] In our study 86.7% of the study populations were male. These findings may be due to wide exposure of the male to the different risk factors and the females are less exposed to doctors, particularly in developing countries. In Bangladesh, HCV seropositivity among professional blood donors is 1.2% while in the voluntary donors is nil.[4] In our study only 3.34% of patients was professional blood donor, whilst half of the patients were service holder, farmer, and housewife were less common. HCV is spread by direct contact with contaminated blood or blood products, especially among injecting drug users, contaminated needles and syringes are the most important vehicles of transmission. Transmission by household contact and sexual activity is low. Only a small percentage of HCV is transmitted at birth from mother to child. About 5% of infants born to HCV infected women become infected at the time of birth. If inadequately sterilized equipment is used, transmission via percutaneous procedures (e.g. ear, nose and body piercing, tattooing, circumcision) can occur. HCV cannot be transmitted via casual contact, coughing, sneezing, hugging, food or water sharing eating utensils.[12] In our study, the majority (43.33%) of the patients had multiple risk factors exposure, transfusion (53.4), and infusion history (60%) was the commonest along with other factors like surgical procedure (43.3%), hemodialysis (23.3%), dental procedure (20%), & risky sexual exposure (16.7%). 6.7% had a history of only sharing razors and 6.7% had only a history of contamination with a surgical instrument. 23.3% of my study people had CKD having hemodialysis. All patients having hemodialysis acquired HCV infection subsequently as they were negative for HCV during initiation of hemodialysis. So, proper sterilization of surgical & dialysis instruments and generation of awareness regarding sharing of razors, needles, and syringes may be important steps of prevention of transmission of HCV. HCV antibody among clinically jaundiced patients was 2.5%, healthy married women 0.9%, 24.8% among injectable, and 5.8% in non-injectable drug users.[8] In our study, 60% of patients had clinical jaundice. There are no symptoms in most cases of acute hepatitis C. The onset of the disease is usually insidious, with anorexia, vague abdominal discomfort, nausea and vomiting, fever and fatigue, progressing to jaundice in about 25% of patients, less frequent than hepatitis B. Rapid, fulminant liver failure associated with HCV infection is rare. Probably as many as 70-90% of infected people fail to clear the virus during the acute phase of the disease and become chronic carriers.[12] In our study majority of the patients presented with anorexia (76.7%) and yellow coloration of the eye and urine (60%). The main clinical findings were jaundice 60% and stigmata of CLD were present in patients. Report of alpha-fetoprotein was available in 70%(21) of the patients out of which 19%(4) patients having >10 ng/ml and HCV RNA was done in 66.7%(20) cases, all of them were positive. At the time of diagnosis, 70% of patients had sonological abnormalities of the liver ranging from high echogenicity (20%) to shrinkage of the liver (33.3%). This revealed the silent killer nature of HCV and more than two-thirds of the patients developed cirrhosis and/or hepatocellular carcinoma at the time of diagnosis. So prevention of HCV transmission should be the main step to protect from this killer disease.

Conclusion:

This hospital-based observational study was

carried out to study of risk factor stratification of hepatitis C virus-infected patients admitted in RpMC&H. As no vaccines are available for prevention of HCV & treatment of HCV complications is difficult, the only way to control HCV is primary prevention by addressing the risk factors. So, proper sterilization of surgical, dental, dialysis instruments and generation of awareness regarding risk factors like sharing of razor, needle, and syringes may be important steps of prevention of transmission of HCV.

Limitation:

As the population size was small, it was difficult to reach a definite conclusion and it may not reflect the exact picture. Large seroprevalence & risk factor assessment studies should be conducted in our country.

References:

1. 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 Jan;6(1):35-47.
2. Mahtab MA, Rahman S, Karim MF, Khan M, Foster G, Solaiman S,et al. Epidemiology of hepatitis B virus in Bangladeshi general population. Hepatobiliary Pancreat Dis Int. 2008 Dec;7(6):595-600.
3. Safiullah AB, Bhuiyan MR, Miah MA, Raihan AS. Prevalence of hepatitis C virus infection in rural adult population of Bangladesh. Bangladesh Med Res Counc Bull. 2009 Apr;35(1):30-2. doi: 10.3329/bmrcb.v35i1.2319.
4. Khan M, Husain M, Yano M, Hashizume K, Yousuf M, Tanaka E,et al. Comparison of seroepidemiology of hepatitis C in blood donors between Bangladesh and Japan. Gastroenterol Jpn. 1993 May;28 Suppl 5:28-31. doi: 10.1007/BF02989200.
5. Khan M, Kiyokawa K, Yano M et al. HCV seroprevalence in liver disease in Bangladesh [Abstract] IXth biennial scientific meeting, Asia Pacific Association for the study of the Liver, Kualalampur, Malaysia 1994.
6. Salimillah M, Rumi MAK, Azam MG, Tahera Y, Hasan KN, Khan AYMH, et al. Etiologic agents of acute viral hepatitis in Bangladesh. Scandinavian Journal of Immunology 2001; 54 (suppl 1): 136 [Abstract]
7. Bogaerts J, Ahmed J, Akhter N, Begum N, Rahman M, Nahar S,et al.Sexually transmitted infections among married women in Dhaka, Bangladesh: unexpected high prevalence of herpes simplex type 2 infection. Sex Transm Infect. 2001 Apr;77(2):114-9. doi: 10.1136/sti.77.2.114.
8. Shirin T, Ahmed T, Iqbal A, Islam M, Islam MN. Prevalence and risk factors of hepatitis B virus, hepatitis C virus, and human immunodeficiency virus infections among drug addicts in Bangladesh. J Health Popul Nutr. 2000 Dec;18(3):145-50.
9. Mollah AH, Nahar N, Siddique MA, Anwar KS, Hassan T, Azam MG. Common transfusion-transmitted infectious agents among thalassaemic children in Bangladesh. J Health Popul Nutr. 2003 Mar;21(1):67-71.
10. Alashek W, Altagdi M. Risk factors and genotypes of hepatitis C virus infection in libyan patients. Libyan J Med. 2008 Dec 1;3(4):162-5. doi: 10.4176/080425.
11. Jahanbakhsh Sefidi F, Keyvani H, Monavari SH, Alavian SM, Fakhim S, Bokharaei-Salim F. Distribution of hepatitis C virus genotypes in Iranian chronic infected patients. Hepat Mon. 2013 Jan;13(1):e7991. doi: 10.5812/ hepatmon. 7991.
12. Center for Disease Control & Prevention. Hepatitis C general fact sheet, June 2010; 21-1075.https://www.cdc.gov/hepatitis/hcv/pdfs/hepcgeneralfactsheet.pdf. [Accessed 21 January 2022]