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Seroprevalence of Hepatitis C Virus Infection Among Health Care Workers

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Summary:

Background and aims: *Parenteral route is the principal mode of transmission of Hepatitis C Virus (HCV). Health care workers are at risk of infection with HCV. Aim of study was to estimate seroprevalence of HCV amongst health care workers and identify possible risk factors of HCV infection.* ***Materials and Methods:*** *355 health care workers were selected from July 2005 to June 2006 working in different departments of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. Among them 43.5% were doctors, 32.1% nurses, 11.8% ward boys, 5.9% operation theatre staffs (OT staffs), and 6.8% others. Sera were tested for HCV antibodies by ELISA. Data analyzed by SPSS 10.0 version.* ***Results:*** *Mean age was 31.56±7.4 years. Males were 51.4% and females 48.6%. Anti-HCV was positive in 5(1.4%) cases out of 355. Most prone to HCV infection were nurses (3) followed by doctor (2). No ward boy or OT staff was affected. Previous surgical (80%) and dental procedures (60%) were the main risk factors than recipients of blood transfusion (20%), intravenous drug users (20%), and multiple sexual exposures (20%).* ***Conclusions:*** *Nurses are more prone to HCV infection. Surgical procedures are the main risk factors for acquiring HCV infection. Proper sterilization of surgical instruments is recommended.*

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Introduction:

Hepatitis C virus infection continues to be a major disease burden all over the world. In 1999, WHO estimated a worldwide prevalence of about 3% with HCV affecting 170 million people worldwide.[1] In Asia the figure is 0.3%, in China the figure ranges from 0.5%-0.8%. [2] However, there is considerable geographical 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 the risk-factors involved, drug use accounting for 60-80%,[2-5] transfusion and transplants 5-13%,[6] unsafe injection, other health care related procedure 2-18%,[7] occupational exposure 0-7% and perinatal transmission 0-40%.[8-11]

Generally, most studies of prevalence use blood donors to report frequency of HCV usually by anti-HCV antibodies and do not report follow up HCV testing. Incidence of HCV seroconversion after accidental needle stick exposure is uncertain, with reports ranging from 0-10%.[12-15] Whether health care workers have a higher prevalence of hepatitis C virus infection through percutaneous occupational exposure than the general population is unclear.[2,16-21] This study was done to estimate seroprevalence of HCV infection amongst health care workers and identify possible risk factors of HCV infection.

Materials and Methods:

In this study 355 consecutive healthcare workers of different departments of Bangabandhu Sheikh Mujib Medical University Hospital were included for detection of Anti-HCV in their sera. This study was done in the Department of Hepatology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh during the period from July 2005 to June 2006. The study populations were of different categories like doctors, staff nurses, ward boys, OT staffs and other categories of staffs (others). They were of either sex with ages ranging from 18 to 56 years.

Before the commencement of the study a well formed questionnaire was prepared consisting of employee's name, sex, date of birth, location of employment, marital status, history of jaundice, blood transfusion, intravenous drug uses, dental procedure, hospital admission, multiple sexual exposures, history of surgery and hepatitis B virus vaccination. For each

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case, after enrollment, 3 ml of blood was collected in a sterile test tube without anticoagulant from anticubital vein with all aseptic precaution. Each case was assured that secrecy will be maintained in case of positive result.

Sera were screened for antibody to HCV by ELISA-3. Reagent used was diasorin (Italy). Reactive samples were considered to be positive.

Previous blood transfusion (recipient), dental procedure, surgical procedure were catagorized as the major risk factors and multiple sexual exposures, intravenous drug abuse, alcohol abuse, diabetes mellitus & tuberculosis as the minor risk factors.

Results:

Of the 355 health care workers studied, males were 183(51.4%) and females were 172(48.6%). Amongst them 148 (43.5%) were doctors, 109 (32.1%) were staff nurses, 40 (11.8%) were ward boys, 22 (5.9%) were OT staffs and 23 (6.8%) were others; 64.6% were married and 35.4% were unmarried (Table-1). Among the major risk factors- 46.6% had history of dental procedure, 31.9% had history of surgery, 6.8% had history of blood transfusion (Table-1) and 26.6% had history of jaundice. Among the minor risk factors-7.3% had multiple sexual exposures, 4% had I/V drug abuse, 6.2% had diabetes mellitus, 2.5% had history of tuberculosis and 1.7% had history of alcohol intake. Of the 355 health care workers, 159 (44.9%) were vaccinated against hepatitis B virus.

Of the 355 cases, five (1.4%) were anti-HCV positive. Among Anti-HCV positive cases, three were staff nurses (60%) and two were doctors (40%) {Fig.-1}. Of the Anti-HCV positive cases, three were females and two were males; four were married, four had past history of jaundice, four had previous

Table-I

Demographic profile of study population (n=355).

Variables	Values		
Age (Years)	31.56 ± 7.41 (Mean ± SD)		
Sex	Males	Females	
	51.4%	48.6%	
Job Status	Doctors	Nurses	Others
	43.5%	32.1%	24.4%
Marital Status	Married	Unmarried	
	64.6%	35.4%	
H/O Jaundice	Present	Absent	
	26.6%	73.4%	
H/O Hospitalization	Present	Absent	
	39.8%	60.2%	
H/O Surgery	Present	Absent	
	32.2%	67.8%	
H/O Blood Transfusion	Present	Absent	
	6.8%	93.2%	
H/O Dental Procedure	Present	Absent	
	46.6%	53.4%	
H/O Multiple Sexual Exposure	Present	Absent	
	7.3%	92.7%	
H/O I/V Drug Abuse	Present	Absent	
	4.0%	96.0%	

Table-II

Demographic profile of Anti-HCV positive patients (n=5).

Variables	Values	
Age (Years)	31.67± 4.51 (Mean ± SD)	
Sex	Males	Females
	2	3
Job Status	Doctors	Nurses
	2	3
Marital Status	Married	Unmarried
	4	1
H/O Jaundice	Present	Absent
	4	1
H/O Hospitalization	Present	Absent
	3	2
H/O Surgery	Present	Absent
	4	1
H/O Blood Transfusion	Present	Absent
	1	4
H/O Dental Procedure	Present	Absent
	3	2
H/O Multiple Sexual Exposure	Present	Absent
	1	4
H/O I/V Drug Abuse	Present	Absent
	1	4

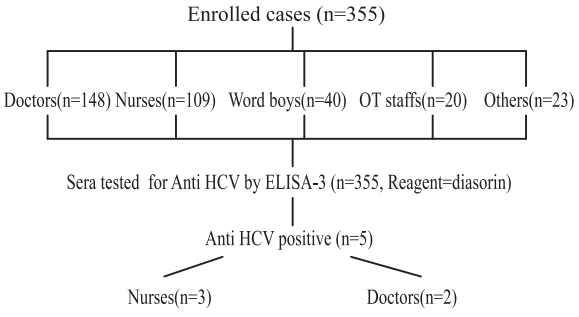

Fig-I: *Study design and outcome*

surgery, one had history of previous blood transfusion, three had previous dental procedure (Table-2), two had family history of jaundice, one had history of multiple sexual exposures and one had history of intravenous drug abuse. No OT staff or ward boy was affected. Mean age was 31.67±4.51(Mean ± SD) years. None of them had history of diabetes mellitus or tuberculosis.

In the present study, the prevalence of hepatitis C virus infection among the health care workers is 1.44%. In present study, history of surgery (80%) and history of dental procedures (60%) were two main risk factors to be anti HCV positive among the health workers. History of blood transfusion (20%), history of multiple sexual exposures (20%) and I/V drug abuse (20%) were the minimum risk factors.

Discussion:

Hepatitis C virus infection is the leading issue of concern in health care workers in Bangladesh and abroad. HCV is predominant cause of chronic hepatitis and cirrhosis worldwide and an important factor in the development of hepatocellular carcinoma. HCV infection appears to be endemic in most parts of the world with estimated overall prevalence of 3%, representing approximately 170 million of HCV affected person world wide.[1]

Dominant mode of transmission is blood to blood contact, the quoted transmission rate is 0-10% (average 1.8%) in the situation where health workers sustain a sharp injury from an affected patient[22,23]. While this is less than the comparable figure for hepatitis B virus (HBV) which has a transmission rate of 25-35%, it should be remembered that health care workers can be vaccinated against HBV but not HCV.

In several investigations on the possibility that HCV was a major occupational risk to dentists, it was concluded that nosocomial transmission of HCV in dentistry is possible but relatively unlikely.[23-26] Health workers who perform exposure prone procedures where injury to the workers may result in exposure of the patients open tissue to the blood of the workers are theoretically of increased risk of infection with blood borne viruses. According to UK health department guidelines, these occupations include surgeons, interventional physicians and intensive care unit and accident and emergency staffs.

A previous study shows seropositivity of 0% among voluntary blood donors in Dhaka; [27] this may reflect the average prevalence among general population. The current study shows seroprevalence of 1.44% among health care workers, which is higher than the general population. The high prevalence of HCV among health care workers may be due to their exposure to infected blood/blood products of patients with HCV infection. The exposure may in the form of surgical or dental procedures rather than the other routes like accidental needle- pricks, contact of cut skin surface with blood/blood products.

Conclusion:

Priority should be given to the primary prophylaxis against hepatitis C infection as there is no pre & post exposure vaccine against it. Different strategies are required to interrupt different patterns of HCV transmission. This study on randomly selected health care workers has helped in identifying predominant mode of transmission of the virus as being surgical/dental procedures in the studied population but require further study in this regard. Proper sterilization of surgical/dental instruments should be the main strategy to interrupt the transmission of hepatitis C virus infection.

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