

Original Article

## Seroprevalance of anti-HCV among voluntary blood donors

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### Abstract

The present study reports the prevalence of hepatitis C virus (HCV) infection among 70,200 voluntary blood donors. Out of them, 364 (0.52%) donors were anti-HCV positive of which 308(0.44%) were male and 56(0.08%) were female. As the donors were categorized by profession, highest number of voluntary donors were students (58%) followed by Business man (21%), Service holder (19 %) and house wife (2%). Most of the donors (43%) were in the age group of 18-25yrs. Among the professional groups of voluntary blood donors, percentage of anti HCV positive cases was highest in businessmen group (1.09%) followed by housewife (0.98%), service holders (0.73%) and students (0.22%).

**Key words:** Transfusion transmitted infections (TTIs), HCV, anti-HCV

### Introduction:

Transfusion transmitted infections (TTIs) are most important public health problem <sup>1</sup> and challenge to transfusion services world wide, particularly in developing countries <sup>2</sup>. The magnitude of this problem is directly related to the prevalence of TTIs among blood donors<sup>3</sup>. HCV infection is an important TTI. It accounts for 90% of the cases of 'non-A, non-B' (NANB) hepatitis virus infections and is the major cause of parenterally transmitted hepatitis. HCV is classified as a flavivirus. It is an enveloped virus, approximately 50 nm in diameter containing a linear, single-stranded, positive-sense RNA genome enclosed with in a protein core. Transmission occurs mainly through blood and blood products. Vertical and sexual transmission may occur less commonly. Nosocomial infections are not rare. Hemophiliacs, thalassemics and CRF patients on maintenance hemodialysis, form a major risk group for HCV infections owing to the frequent use of blood, blood products and hemodialysis<sup>4</sup>.

While the risk of transmission of this virus has been considerably reduced in developed country owing to increased screening procedure<sup>5, 6, 7</sup>, this problem is not properly addressed in developing countries. It is now an emerging problem in Bangladesh also. World health organization (WHO) estimated that 3% of the world's population (More than 170 million people) is infected with Hepatitis C virus (HCV) <sup>8</sup>. The global prevalence of HCV reported by WHO ranges from 10 % to 15 % to as little as less than 0.04%<sup>1</sup>. HCV in blood donor varies from 0.4 % to 19.2%<sup>9</sup>. According to WHO records, the prevalence of HCV ranges between 1%-2.5% in Bangladesh<sup>10</sup>. In India HCV prevalence averages 1.5-2.7% <sup>11, 12</sup>. Among voluntary blood donors the prevalence of HCV in India, Japan and Germany were 0.8%<sup>3</sup>-1.78%<sup>13</sup>, 0.6%<sup>14</sup> and 0.2-0.8%<sup>15</sup> respectively. Among HCV infected persons only 20-30% has symptoms of acute hepatitis<sup>16, 17</sup>. About 75%-85% of infected older adults and 50-60% of infected Juveniles or young adults become chronically infected<sup>18</sup>. Majority of persons with chronic HCV infections are asymptomatic. Biochemical evidence of chronic liver diseases develop among 70% of chronically infected adults and only 10% of infected Juveniles<sup>18</sup>. Hepatocellular carcinoma develops among 1-5% of

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chronically infected patients. Co-infection with HIV and HBV increase HCV load and has ominous implication in the pathogenesis of chronic viral hepatitis<sup>19</sup> leading rapid progression towards cirrhosis of the liver<sup>20</sup>.

### Materials And Methods:

This prospective study was conducted to determine the prevalence of HCV infection among voluntary blood donors and its relation to socio-demographic status.

Voluntary blood donors, attending to NGO operated voluntary blood donation program of the Quantum Foundation of Dhaka, Bangladesh, were recruited for this study. Study period was January,2001 to December,2006. Total 70,200 voluntary blood donors, categorized by profession like student, Businessman, Service holders and house wife, were included as the study population. Age ranges from 18 years to 60 years (mean age -  $24.2 \pm 4.3$  years).

Venous blood sample (3ml) from each person was collected and tested for anti HCV using third generation enzyme linked immunosorbent assay (ELISA).

All of the donors were investigated about their previous or concurrent health status using a pre-structured questionnaire prior to donation as a part of MAD(Medical assessment of donor) to determine suitability of donation and were tested for five TTIs (HCV, HBV, HIV, Syphilis & Malaria) according to WHO and ISBT guideline in the Quantum lab. The study population belonged to low risk groups (LRGs) of voluntary donor entity and had no previous history of jaundice.

### Results:

Of the total 70,200 voluntary blood donors, 59,668 were male and 10,532 were female. Among them, by profession, highest number of donors were students (58%) followed by Business man (21%), Service holder (19 %) and house wife (2%) (Table-I). Most of the donors (43%) were in the age group of 18-25yrs (Table-II). A total of 364 (0.52%) donors were anti HCV positive out of which 308(0.44%) were male and 56(0.08%) were female. Among the groups of professions of voluntary blood donors, percentage of anti HCV positive cases were highest in businessman group (1.09%) followed by housewife (0.98%), service holders (0.73%) and students (0.22%) (Table-IV). Anti HCV positive cases had no previous history of jaundice as they belonged to LRGs of voluntary donor entity.

Table-I. Show the male and female distribution of donors by profession.

Donors profession	Male donors	Female donors	Total number of donors
Students	34608	6108	40716(58%)
Businessman	12530	2212	14742(21%)
Service	11337	2001	13338(19%)
Housewife	1193	211	1404(02%)
Total	59668(85%)	10532(15%)	70200(100%)

Table-II shows donors by age group and sex.

Donors age	Male donors	Female donors	Total number of donors
18-25 Yrs	25658	4528	30186(43%)
26-30 Yrs	13724	2422	16146(23%)
31-40 Yrs	14917	2633	17550(25%)
41-50 yrs	4176	738	4914(07%)
>50 but<60yrs	1193	211	1404(02%)
Total	59668(85%)	10532(15%)	70200 (100%)

Table-III shows blood donors by screening reactivity of anti-HCV antibody.

Donors Category	Total number of donors	Anti-HCV negative donors	Anti-HCV positive donors
Voluntary blood Donors	70200(100%)	69836 (99.48%)	364(0.52%)

Table-IV shows anti-HCV positivity among different professional groups of voluntary blood donors.

Donors Profession	Total number of donors	Male anti-HCV positive donors	Female anti-HCV positive donors	Total Anti-HCV Total Anti-HCV
Students	40716	77	14	91(0.22%)
Businessmen	14742	136	25	161(1.09%)
Service holders	13338	83	15	98(0.73%)
Housewife	1404	12	02	14(0.98%)
Total	70200	308(0.44%)	56(0.08%)	364(0.52%)

### Discussion:

Voluntary blood donors are healthy adults who only donate blood in emergencies. This study was conducted to determine the prevalence of HCV among voluntary blood donors. Different studies were carried out on different study population in different study period to know the prevalence of HCV<sup>21, 22</sup>. In a study, 12.5% thalassemic children were found to have HCV antibody while only 0.9% age matched controls had the

seropositivity in our country 23. In 1993, according to a comparative study between Bangladesh and Japan, HCV seropositivity was found positive in 1.2% professional blood donors and nil among voluntary blood donors in Bangladesh<sup>14</sup>. Another study in Bangladesh in 2004, it was reported that HCV prevalence were 1% and 12% among voluntary and professional donors respectively<sup>24</sup>. Current prospective study included 70200 voluntary blood donors among which 0.52% is found positive for anti-HCV. The finding is relatively comparable with the above mentioned study results. The variation of the results is due to different number of study population and different study period. In this study, among voluntary blood donors student's population is highest in number but prevalence of anti-HCV is highest in businessman group of voluntary donors with male predominance.

As most of our blood centers are poorly managed (less sensitive screening and lack of quality control), it is speculated that among the blood recipients, a large number may develop chronic HCV infections. Moreover the natural history of HCV is quite variable after exposure. There is a window period for the disease when anti-HCV is not positive but the virus remains in the blood. This is the critical period when we do not get anti-HCV positivity by screening and virus is transmitted through blood transfusion. A study showed, out of 118 dialysis cases 101 were positive for HCV RNA, but only 56 patients were positive for anti-HCV. Most of the dialyzed patients were acute cases and during the six weeks follow-up all the 45 dialyzed patients turned positive for anti-HCV with elevated ALT. Presence of HCV RNA in the serum was taken as the indicator for active infection<sup>4</sup>. This situation necessitates stringent screening procedure for the viral infection.

There is no protective vaccine against HCV till today. Also, treatment of chronic cases is very much costly now. As the chronicity and complication of HCV positive cases is more in comparison to other hepatitis virus, it is better to think about its prevention. Public health intervention should be the most effective method for preventing HCV. Most modern and sensitive screening of blood/blood products, adequate sterilization of reusable syringe, destruction of disposable needles, proper management of blood banks, and health education by increasing community awareness would be the best options to prevent HCV infection for a developing country like us.

### Acknowledgement:

Authors are grateful to the authority of voluntary blood donation program of the Quantum Foundation of Bangladesh for their support in conducting this research study.

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