Seroprevalance of anti-HCV among voluntary blood donors

Munshi M Habibullah¹, Hazera Khatun², Ayesha Khatun³, Fareha Jesmin Rabbi⁴

¹Department of Safe Blood Transfusion, WHO, Dhaka, ²Department of Pathology, NICR&H, Dhaka, ³Department of Transfusion Medicine, BSMMU, Dhaka ⁴Department of Clinical Immunology, NIKDU, Dhaka.

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 ¹ and challenge to transfusion services worldwide, particularly in developing countries ². The magnitude of this problem is directly related to the prevalence of TTIs among blood donors³. 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 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 hemodialysis⁴.

While the risk of transmission of this virus has been considerably reduced in developed country owing to increased screening procedure⁵. ⁶. ⁷, 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) ⁸. The global prevalence of HCV reported by WHO ranges from 10 % to 15 % to as little as less than 0.04%¹. HCV in blood donor varies from 0.4 % to 19.2%⁹. According to WHO records, the prevalence of HCV ranges between 1%-2.5% in Bangladesh¹⁰. In India HCV prevalence averages 1.5-2.7% ¹¹, ¹². Among voluntary blood donors the prevalence of HCV in India, Japan and Germany were 0.8%-1.78%¹³, 0.6%¹⁴ and 0.2-0.8%¹⁵ respectively.

Among HCV infected persons only 20-30% has symptoms of acute hepatitis¹⁶, ¹⁷. About 75%-85% of infected older adults and 50-60% of infected Juveniles or young adults become chronically infected¹⁸. 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 Juveniles¹⁸. Hepatocellular carcinoma develops among 1-5% of
Table-I. Show the male and female distribution of donors by profession.

<table>
<thead>
<tr>
<th>Donors profession</th>
<th>Total number of donors</th>
<th>Male donors</th>
<th>Female donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>40716</td>
<td>34608</td>
<td>6108</td>
</tr>
<tr>
<td>Businessman</td>
<td>14742</td>
<td>12530</td>
<td>2212</td>
</tr>
<tr>
<td>Service</td>
<td>13338</td>
<td>11337</td>
<td>2001</td>
</tr>
<tr>
<td>Housewife</td>
<td>1404</td>
<td>1193</td>
<td>211</td>
</tr>
<tr>
<td>Total</td>
<td>70200</td>
<td>59668</td>
<td>10532</td>
</tr>
</tbody>
</table>

Table-II shows donors by age group and sex.

<table>
<thead>
<tr>
<th>Donors age</th>
<th>Total number of donors</th>
<th>Male donors</th>
<th>Female donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25 Yrs</td>
<td>30186</td>
<td>25658</td>
<td>4528</td>
</tr>
<tr>
<td>26-30 Yrs</td>
<td>16146</td>
<td>13724</td>
<td>2422</td>
</tr>
<tr>
<td>31-40 Yrs</td>
<td>17550</td>
<td>14917</td>
<td>2633</td>
</tr>
<tr>
<td>41-50 yrs</td>
<td>4914</td>
<td>4176</td>
<td>738</td>
</tr>
<tr>
<td>&gt;50 but&lt;60yrs</td>
<td>1404</td>
<td>1193</td>
<td>211</td>
</tr>
<tr>
<td>Total</td>
<td>70200</td>
<td>59668</td>
<td>10532</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Donors Category</th>
<th>Total number of donors</th>
<th>Anti-HCV negative</th>
<th>Anti-HCV positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary blood</td>
<td>70200</td>
<td>69836</td>
<td>364</td>
</tr>
<tr>
<td>Donors</td>
<td></td>
<td>(99.48%)</td>
<td>(0.52%)</td>
</tr>
</tbody>
</table>

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

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

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 leading to rapid progression towards cirrhosis of the liver.

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 ± 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 Businessman (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.
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Reference:

seropositivity in our country 23. In1993, 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. 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. 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.