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Research Article

SEROPREVALENCE OF ANTI-HCV ANTIBODIES AMONG VOLUNTARY BLOOD DONORS IN FATEHABAD DISTRICT OF HARYANA

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ABSTRACT

Hepatitis C is one of the transfusion transmissible infections and continues to be a threat to safe transfusion practices. Evaluating the trend in seroprevalence of anti- HCV antibodies is useful to assist the preventive strategies. This study was aimed to know the seroprevalence of anti- HCV antibodies in voluntary blood donors in Fatehabad District of Haryana. The present retrospective hospital record-based study was conducted at the blood bank of Fatehabad district in Haryana in India over a period 2 years from August 2012 to August 2014. All the blood units collected were screened for anti-HCV antibodies by using third generation ELISA kits (HCV Erbalisa). The number of donors who were found reactive for anti-HCV antibodies was calculated. The data of HCV was analyzed with chi square test. Of the 6055 blood donors, 5752 were males and 303 were females. The percentage of whole blood donors found seroreactive for anti-HCV antibodies was 3.10% (n=188). The seroprevalence of anti-HCV antibodies in male blood donors was 2.97 (n=180) and the respective seroprevalence in female blood donors was 0.13 (n=8). A constant increase in seroprevalence of anti- HCV antibodies was observed over the period under consideration. Age wise maximum seroprevalence of anti- HCV antibodies was observed in 21 to 30 years group (1.29 %) and the minimum seroprevalence of anti- HCV antibodies was observed in above 51 yr (0.05%). The majority of donors seropositive for anti- HCV antibodies were younger than 40 years (86 donors were 163 years of age or less, and 25 donors above 40 years). The higher seroprevalence rate of HCV (3.10%) in this study, further recommends strict abiding to donor selection criteria, comprehensive screening of blood donors, better awareness among donors and reintensification of prophylactic programmes at public level to ensure the safe blood donation. Since, no vaccine is presently available for immunization against HCV infection, transfusion transmitted HCV infection remains a potential threat to the safety of the blood supply.

Keywords: *Hepatitis C, Seroprevalence, Blood Donation, Anti- HCV Antibodies*

INTRODUCTION

Hepatitis C is a transmissible liver disease and is the major cause of acute hepatitis after a blood transfusion that is neither related to Hepatitis A nor to Hepatitis B. It can range in severity from asymptomatic stage to mild episode lasting a few weeks to a serious, lifelong illness (Pears, 2010). It has been estimated that 3% of the world's population or that almost 200 million individuals have chronic HCV infection and are at risk of developing liver cirrhosis and liver cancer. Approximately 350,000 people die every year from due to HCV-related liver diseases (WHO, 2013). Several studies on voluntary and mixed blood donors have noted a prevalence of hepatitis of below 2% in India (Thakral *et al.,* 2006; Sonawane *et al.,* 2003). The common modalities of the spread of hepatitis C infection are blood transfusions, injection drug use, unsafe therapeutic injections and healthcare-related procedures. In developed countries, the predominant cause of hepatitis C infection is intravenous drug use, whereas in India blood transfusions and unsafe therapeutic injections are the predominant ways of transmitting hepatitis C (Pears, 2010). The genomic instability and the antigenic variability have seriously hampered the efforts which were made for developing an HCV vaccine (Barth *et al.,* 2006)

The study of seroprevalence rate of anti- HCV antibodies in blood donors helps in determining the safety of the blood products and for assessing the magnitude of HCV infection. The study also aimed to

determine the trend in hepatitis C infection and to compare the prevalence with that of other areas in India. Further more such study should help in the creation of long-term strategies for improving public health by preventing spread of the disease in the local population and improving prophylactic measures.

MATERIALS AND METHODS

The present retrospective hospital record-based study was conducted at the blood bank of Fatehabad district in Haryana in India. Data was collected over a period 2 years from August 2012 to August 2014. In this period, 6055 voluntary blood donors were included in the study. The blood donations which were collected from August 2012 to August 2014 were screened for the presence of anti HCV antibodies by using third generation ELISA kits (HCV Erbalisa) as per the manufacturer's instructions. The donors carefully selected for donation by trained personnel after a complete physical examination and screened thoroughly, as per the guidelines of the Gazette of India. (Drugs and Cosmetics Act., 1989) All the blood units collected were screened for HBV (HBsAg), hepatitis C virus (HCV), human immunodeficiency virus (HIV) 1 and 2, syphilis (VDRL) and malaria. The data of HCV alone was analyzed with chi square test and results were considered significant if P value was < 0.05.

RESULTS AND DISCUSSION

Out of the total 6055 blood donors, 5752 (94.99%) were males and 303 (5.01%) were females with male to female ratio of 19.17:1 (Table I). The overall seroprevalence rate of HCV in the present study was 3.10% as shown in Table II. A higher seroprevalence rate was observed among male donors than in female blood donors (2.97% versus 0.13% respectively) (Table II).

Age wise seroprevalence was found to be more in 21 to 30 years group with 1.29 %. The majority of the seropositive donors were younger than 40 years (163 donors were 40 years of age or less, and 25 donors above 40 years) (Table III).

Table I: Donor category and gender distribution (age: 18-60years)

Year	Total donors	Male donors		Female donors	
		No.	%	No.	%
2012	661	629	95.15%	32	4.84%
2013	3152	3035	96.28%	117	3.72%
2014	2242	2088	93.13%	154	6.87%
Total	6055	5752	94.99%	303	5.01%

Table II: HCV positivity with respect to type of blood donor

HCV positive blood donors							
Year	Total donors	Male donors		Female donors		Total HCV positive donors	
		No.	%	No.	%	No.	%
2012	661	16	2.42%	1	0.15%	17	2.57%
2013	3152	89	2.82%	2	0.06%	91	2.89%
2014	2242	75	3.34%	5	0.22%	80	3.51%
Total	6055	180	2.97%	8	0.13%	188	3.10%

Table III: Age group wise HCV positivity in blood donors

HCV positive donors									
Age Group	**2012**		**2013**		**2014**		**Total**		
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Total**
18-20 years	5(0.76%)	0(0%)	11(0.35%)	1(0.03%)	8(0.36%)	1(0.04%)	24(0.39%)	2(0.03%)	26(0.43%)
21-30 years	5(0.76%)	0(0%)	42(1.33%)	0(0 %)	30(1.34%)	1(0.04%)	77(1.27%)	1(0.01%)	78(1.29%)
31-40 years	4(0.61%)	1(0.15%)	24(0.76%)	1(0.03%)	26(1.16%)	1(0.04%)	54(0.89%)	3(0.05%)	57(0.94%)
41-50 years	2(0.30%)	0(0%)	12(0.38%)	0(0%)	8(0.36%)	2(0.08%)	20(0.33%)	2(0.03%)	22(0.36%)
>50 years	0(0%)	0(0%)	0(0%)	0(0%)	3(0.13%)	0(0%)	3(0.05%)	0(0%)	3(0.05%)
Total	16(2.42%)	1(0.15%)	89(2.82%)	2(0.06%)	75(3.35%)	5(0.22%)	176(2.91%)	8(0.13%)	186(3.07%)

Discussion

Of the 6055 voluntary blood donors, 5752 (94.99%) were males and 303 (5.01%) were females (Table I). The percentage of whole blood donors found seroreactive for anti-HCV antibodies was 3.1% (n=188). The seroprevalence of anti-HCV antibodies in male blood donors was 2.97 % (n=180) while in female blood donors it was 0.13% (n=8) (Table II).

The percentage of the anti-HCV antibodies seropositivity showed a gradual increase from 2.42% in 2012 to 3.35% in August 2014, with an overall seropositivity of 3.07% and it was statistically significant (Table II). Maximum seroprevalence of anti-HCV antibodies was observed in the age group of 21 to 30 yr (1.94%) and the minimum in the age group of 41 to 50 yr (0.36%) (Table III).

A relatively low anti-HCV seroprevalence of 0.66 per cent in blood donors has been reported from Delhi (Pahuja *et al.*, 2007). However, two studies done in blood donors of Delhi reported relatively higher anti-HCV seroprevalence rates of 1.57 % and 2.5 %, respectively (Jain *et al.*, 2003; Sood *et al.*, 1992).

Studies from northern parts of India have reported HCV seroprevalence ranging from 0.53 % to 5.1% in blood donors (Makroo *et al.*, 1998; Choudhury., 1995). In a recent study done in Hisar, Haryana, the seroprevalence of anti-HCV antibodies was calculated to be 0.91% (Arora *et al.*, 2010). In general, majority of studies carried out in India indicated anti-HCV antibody seroprevalence ranging between 0.4% and 1.09% (Garg *et al.*, 2001; Adhikari *et al.*, 2010; Bhattacharaya *et al.*, 2007).

Table IV: Comparison of various studies about seroprevalence of anti-HCV antibodies in India

Study	**Place**	**Year**	**Study period**	**No. of donors**	**Prevalence of HCV**
Garg *et al.*, (2001)	Rajasthan	2001	May 1999-June 2004	46957	0.29%
Thakral *et al.*, (2006)	Chandigarh	2006	June 2001-Jan2002	16250	0.44%
Pahuja *et al.*, (2007)	New Delhi	2007	2002 – 2005	28956	1.01%
Bhattacharya *et al.*, (2007)	West Bengal	2007	2004 –2005	106695	0.35%
Adhikari *et al.*, (2010)	Sikkim	2010	2001 – 2008	3735	0.27%
Arora *et al.*, (2010)	Southern Haryana	2010	Oct.2002-April 2006	10374	0.91%
Present Study	Fatehabad (Haryana)	2014	August 2012-August 2014	6055	3.10%

The anti-HCV seropositivity showed a decreasing trend with age in our study. Maximum seroprevalence of anti-HCV antibodies was observed in the age group of 18 to 30 yr, as also shown in another study from Delhi (Jain *et al.,* 2003). On the contrary, some studies have reported an increasing trend of anti-HCV seroprevalence with advancing age (Thakral *et al.,* 2006).

The seroprevalence of anti-HCV antibody as observed in our donor population was relatively high (3.10%) as compared to other studies. The main reason of high seroprevalence of HCV infection in our region was use of unsterilised needles and syringes by local private medical and dental practitioners. Most of the patients had a history of treatment/injections from these doctors in the last 1.5 month -1.5 years. It was also observed that sharing of shaving kits and visiting roadside barbers have played an important role in HCV transmission in blood donors in this region.

The reasons for the variation in the prevalence of anti-HCV antibodies among blood donors in different regions in most of the studies are widespread drug abuse and lack of awareness about the prevention and treatment of Hepatitis C, especially in rural areas. No vaccine is presently available for immunization against HCV infection. And to add to the problem, the window period for HCV has a long range (6-12 weeks), during which anti HCV cannot be detected in the blood, thus making the blood donation very dangerous and life threatening for the recipient. The HCV positive donors should be informed about their disease, counseled and referred to a hepatologist. They should also be permanently deferred for future donations.

Conclusion

The increasing trend in seroprevalence of anti-HCV antibodies (2.42% in 2012 to 3.35% in 2014, with an overall seropositivity of 3.07%) should be considered seriously by the health authorities. The study found that the major mode of HCV transmission was improper sterilization and reuse of needles/syringes. Public awareness, educational and motivational programs, introduction of donor counseling and ensuring a 100% voluntary blood donation will be effective in ensuring the safe blood donation and decreasing the hepatitis C rate.

There is also immediate need of developing locally relevant guidelines for the counseling and the further management of the HCV seropositive donors. The results of these studies will help in making long term strategies to improve the public health and to decrease the transmission of this deadly virus.

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