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Original Article

Prevalence of Hepatitis C Virus among the Healthy Blood Donors in the Department of Transfusion Medicine of a Teaching Hospital

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Abstract

Background: Hepatitis C virus (HCV) has been described as a significant causative agent of chronic hepatitis since its characterization in 1989. HCV may remain latent or become activated, leading to persistent infections and, in some cases, cirrhosis and hepatocellular carcinoma HCV is most commonly transmitted through direct contact with infected blood. Other, less common routes of transmission of HCV include sexual intercourse with infected individuals and mother to child transfer.

Materials and Methods: This is a cross-sectional descriptive type study which was carried out in the Department of Transfusion Medicine of Rajshahi Medical College Hospital for six months from January to June 2014 to determine the prevalence of hepatitis C virus in the apparently healthy blood donors. All apparently healthy blood donors fulfilling the inclusion and exclusion were included in this study. The blood donors who were positive for anti-HCV antibodies were seropositive. Anti HCV antibody screened by ICT and confirmed by ELISA method.

Results: Among 1712 apparently healthy blood donors, 36 (2.1%) donors were anti-HCV positive, and 1676 (97.9%) donors were negative. The mean age of the study patients was 34.05 years (SD = ± 8.79). 66.7% of the study patients were male, whereas 33.3 % of donors were female among the 36 blood donors.

Conclusion: It is absolutely necessary to avoid the transmission of infection from repeat donors who are asymptomatic HCV positive. Policymakers and public health stakeholders need to introduce and implement further preventive measures targeting the routes of HCV transmission.

Keywords: Hepatitis C virus, healthy blood donors

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Introduction

Hepatitis C virus (HCV) is a meticulous factor of liver disease and one of the most important health issues worldwide[1,2]. Hepatitis C has approximately 175 million global disease burdens which represent almost 3% of the whole population in the world, each year 3 to 4 million new patients with HCV are diagnosed. HCV remains endemic in many countries of the world[3,4,5]. Statistics based on the general healthy population revealed that HCV has 5.3% seroprevalence in Pakistan, 2.2% in

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Turkey, and 7.7% in Zimbabwe.[6,7,8] Hepatitis C virus infection is not the main factor of mortality in the first decade of infection[9]. Poverty, high-risk sexual behavior, having less than 12 years of education, and having been divorced or separated are linked to an increased risk of infection[10,11] Sexual transmission of the virus appears to be an inefficient means[12] However, coinfection with HIV-1 appears to increase the risk of both sexual and maternal-fetal transmission of HCV[10,13,14] Virus can be recovered from the saliva of infected persons, [15] and although chimpanzees have been experimentally infected by the injection of saliva from HCV-infected persons, [16] casual household contact and contact with the saliva of infected persons also appear to be very inefficient modes of transmission [15,17] Nosocomial transmission has been documented, such as from patient to patient by a colonoscope,[18] during dialysis,[19] and during surgery.[20,21] Until relatively recently, blood transfusion posed a major risk of HCV infection in developed countries. The introduction in 1990 and 1992 of improved blood-screening measures based on the detection of HCV antibodies has dramatically decreased the risk of transfusion-associated HCV infection. Diagnostic tests for HCV infection are divided into serologic assays for antibodies and molecular tests for viral particles. Screening assays based on antibody detection have markedly reduced the risk of transfusion-related infection, and once persons seroconvert, they usually remain positive for HCV antibodies. However, recent data indicate that the level of HCV antibodies decreases gradually over time in the few patients in whom infection spontaneously resolves. In a cohort with a well-documented common source and known time of infection, assays for antibodies to HCV became negative after 18 to 20 years in 18 of 43 patients with spontaneous clearance of viremia.[22] This finding may also suggest that the true incidence of acute HCV infection with spontaneous clearance has been underestimated since not all infected persons have persistent serologic evidence of infection.

Materials and Methods

This is a cross-sectional descriptive type study that was carried out in the Department of Transfusion Medicine of Rajshahi Medical College Hospital for six months from January to June 2014 to determine the prevalence of the hepatitis C virus in apparently healthy blood donors. A purposive sampling technique was used. All apparently healthy blood donors fulfilling the inclusion and exclusion criteria were included in this study. Professional blood donors and donors with co-morbidities like hypertension, diabetes, etc., were excluded from this study. The blood donors who were positive for anti-HCV antibodies were seropositive. Anti HCV antibody screened by ICT and confirmed by ELISA method.

Results

Table 1: Prevalence of hepatitis C virus in the apparently healthy blood donors (n= 1712)

		Number	(%)
Anti HCV BY ELISA (Confirmatory)	Positive	36	2.1
	Negative	1676	97.9
	Total	1712	100

Among 1712 apparently healthy blood donors, 36 (2.1%) donors were anti-HCV positive, and 1676 (97.9%) donors were negative. The mean age of the study patients was 34.05 years (SD = ± 8.79). The age distribution of patients revealed the highest 47.2% in 29 to 39 years. The mean age is 34.05 (SD±8.79).66.7% of the study patients were male, whereas 33.3 % of donors were female among the 36 blood donors. People in all occupations were susceptible to HCV, but higher percentages were found in day labor (25%) and service holder (25%). Among the infected people, 66.7 % were married, and 30.6% were unmarried. Donors were Illiterate (38.9%), and donors with up to primary education were 25%, up

to higher secondary was 13.9%, up to SSC were 11.1%, and among the graduates were 11.1%. Among the HCV-positive blood donors, about 58.3% were from urban, and 41.7% were from rural areas. Among 36 HCV-positive blood donors, about 16.7% were intravenous drugs user, and 83.3% of donors did not use the intravenous drug. About 22.2% of donors had a history of previous blood or blood product infusion, and 77.8% had no history of previous blood or blood product infusion. In this study, 24 male blood donors were positive for anti HCV; among them, 41.1% had self-shaving practice, and 58.9% were used to shave in the barbershop. In this study, out of 9 married female blood donors, 44.4% had a history of normal vaginal delivery of their child, and 55.6% had a history of caesarian section. In this study, 22.2 % of blood donors had a history of extramarital sexual relations. 50% HCV positive blood donors Serum ALT levels were elevated less than two times normal, 16.6% were elevated more than two times normal, and 33.3% were within the normal limit.

Table 2: Demographic profile of positive case (n - 36):

Patient characteristics	**Frequency (n=36)**	**Percentage**
Age group		
18 - 28 years	12	33.3
29-39 years	17	47.2
40-49 years	3	11.1
50-59 years	4	8.3
Mean ± SD	**34.05±8.79**	
Sex		
Male	24	66.7
Female	12	33.3
Occupation		
Farmer	6	16.7
Student	2	5.6
Day labor	9	25
Service(GO/NGO)	9	25
Housewife	7	19.4
Marital status		
Married	24	66.7
Unmarried	11	30.6
Others	1	2.7

Patient characteristics	Frequency (n=36)	Percentage
Education		
Illiterate	14	38.9
Primary	9	25
SSC	4	11.1
HSC	5	13.9
Graduate	4	11.1
Residence		
Urban	21	58.3
Rural	15	41.7
IV drugs		
Users	6	16.7
Non-users	30	83.3
Previous blood or blood product infusion		
Present	8	22.2
Absent	28	77.8

Table 3: Prevalence of hepatitis C virus in healthy blood donors in relation to their shaving behavior (n=24)

Shaving behavior	Frequency (n=24)	Percentage
Self	10	41.1
Barber	14	58.9
Total	24	100

Table 4: Prevalence of hepatitis C virus in healthy female blood donors in relation with the mode of their child delivery (n=9)

mode of delivery	Frequency (n=9)	Percentage
NVD	4	44.4
C/S	5	55.6
Total	9	100

Table 5: Prevalence of hepatitis C virus in healthy blood donors in relation with their multiple sexual partners (n = 36)

Multiple sexual partners	Frequency (n=36)	Percentage
Present	8	22.2
Absent	28	77.8
Total	36	100

Table 6: Prevalence of hepatitis C virus in healthy blood donors in relation with their serum ALT level (n = 36)

ALT level	Frequency (n=36)	Percentage
Normal	12	33.3
< Twice	18	50
> Twice	6	16.7
Total	36	100

Discussion

In this study, an attempt has been made to define the seroprevalence of the Hepatitis C virus among the 1712 healthy donor population. I got 36 (2.1%) were anti-HCV-positive blood donors. The overall proportion of HCV seropositivity among blood donors is almost the same as in Indonesia, 2.1% [23] and relatively lower than Saudi Arabia, 3.2% [24] Brazil, 2.9% [25], and substantially lower than 6.5% reported from Thailand.[26] HCV seroprevalence among blood donors in this study is slightly greater than the reported figures of 0.9–1.3% from Italy[27], 0.35% from UK [28], and 0.54% from USA [29]. HCV prevalence in the US blood donors is significantly lower than corresponding estimates of 1.8% in the general population, reflecting the efficacy of donor risk factor exclusion policies [29, 30]. In a study done in a community of India,[31] anti-HCV seropositivities were found 1%. A study done in Orissa reported anti-HCV seroprevalence was 1.98%. Strategies of exclusion of donors on known risk factors history may play a substantial role in the reduction of post-transfusion HCV infection in recipients of blood transfusion. There is a lack of the same type of studies in our community with a large population that can identify the actual prevalence of HCV. In this study, we also observed that a higher percentage of HCV blood donors were day labor (25%), a significantly higher percentage of them were illiterate (38.9%), and married (66.7%). Some risk factors like shaving behavior of the male blood donors who use common shaving materials were also significant, who used to shave in the barbershop with common shaving materials had a higher prevalence (58.9%), mode of delivery of the child of the female blood donors was also important, higher prevalence (45.6%) was seen among the female who had cesarean delivery than normal vaginal delivery.[32] The most common risk factors studied in our donors for acquiring HCV infection were sharing shaving kits or visiting a roadside barber (62%). This history was elicited more in rural than urban blood donors. Alanine transferase levels were found to be elevated in a total of 66.7% of our anti-HCV-positive blood donors. In a community-based study from India[32],

ALT levels were found to be elevated in 87% of blood donors, thus indicating chronic hepatitis in the majority of the blood donors biochemically. On serial follow-up of these anti-HCV-positive blood donors, the majority of them showed fluctuations in their ALT levels. In another community-based study in India[33], it has been observed that only 31 percent showed ALT elevation. This apparent difference in HCV causing more severe liver injury in our donors needs future studies on HCV genotype infecting our population. The sample size of seroreactive donors who responded for confirmation of the diagnosis and follow-up was small, and thus, future studies on larger sample size would help in drawing valid and better conclusions.

The overall prevalence and age, sex relation is consistent with the observations of Chukwurah, Ogbodo & Obi [34], where they found out of the 1229 blood donors screened in our center for HCV between 2005 and 2009, 25 were found to be seropositive, giving an overall prevalence rate of 2.0%. There were 1001 males and 228 females with a male to female ratio of 4.4:1. The mean age of the blood donors was 30.1±8 .5years. In this study, I found that the mean age of the study patients was 34.05 years (SD=±8.79), 66.7% of the study patients were male, and 16.7% HCV positive blood donors were intravenous drugs user. Shrestha et al.[35] also found transmissible transfusion infections were dominant among male blood donors compared to female blood donors; male to female ratio was 2:1. Higher HCV seroprevalence among males compared to females was statistically significant. HCV prevalence was highest among blood donors 31 to 40 years age group, Prevalence of HCV was relatively higher among the intravenous drug users that were similar with this study. In this study, we observed that 22.2% of donors had a history of previous blood or blood product infusion, 16.7% of HCV positive blood donors were intravenous drugs user, and about 22.2% of blood donors had a history of extramarital sexual relations. Akhtar et al[36] also seroprevalence of HCV in these donors was 1.8%, cases were more likely than controls to have reported past hospitalization once or more than once. The use of a glass syringe to give therapeutic injection increased the risk of HCV seropositive significantly more among cases than in controls. A significant number of cases had reported sexual contact with commercial sex workers. Chaudhary et al. [37] and Jeremiah et al. [38] have also shown a similar pattern of age, sex distribution of the HCV positive blood donors, but the overall prevalence of HCV was less (0.6%) in earlier and more (5%) in the later than this study. Makroon et al. [39]also observed similar age, sex distribution with a low prevalence, Damaty et al. [40] described similar age, sex distribution, more from urban areas than rural areas, but the prevalence of HCV among blood donors of different blood banks of Egypt was very high (10.6%).

Conclusion

It is absolutely necessary to avoid the transmission of infection from repeat donors who are asymptomatic HCV positive. As the blood bank population may underestimate the prevalence of HCV in comparison to the national survey, this type of study should be done in a community with a large population. Policymakers and public health stakeholders need to introduce and implement further preventive measures targeting the routes of HCV transmission.

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