



HEPATITIS C VIRUS: SCREENING, DIAGNOSIS, AND INTERPRETATION OF LABORATORY ASSAYS

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ABSTRACT

Background: All blood and blood products should be tested for Hepatitis C virus (HCV) before transfusion to decrease prevalence of HCV.

Aim and Objective: The aim of present study is to determine the prevalence of hepatitis c virus (HCV) and to check the accuracy of our laboratory analysis used for HCV testing of blood donors in our blood bank.

Material and Methods: The duration of this study is of 2 year since April 2013 to March 2015. All donors are screened during counselling. The blood sample of Total Donor 26,789 including voluntary and replacement were tested for anti HCV antibody by 3 rd generation ELISA (QUALISA). Samples which are reactive or in gray zone were retested by ELISA and also confirmed by rapid HCV card.

Results: From total donor 26,789, positive for the HCV were 45 (0.16%). Out of 45, 42 (93.3%) were male, 3(6.6 %) were female positive. 25 (55.5%) were voluntary and 20 (44.4%) were replacement. Maximum donors come under the age group of 21-30 and 31 -40 and 22 (48.8%) were B RhD positive subjects found.

Conclusion: The prevalence of HCV infection is mild (0.16 %) in blood donors in blood bank of PDU medical college and hospital, Rajkot. The prevalence is equal in voluntary and replacement donors. Males are more infective than female.

Key Words: HCV infection, Anti HCV antibody, Blood donors

INTRODUCTION

Hepatitis C was first detected in 1989¹, and it has been described as a significant causative agent of post transfusion non A non B chronic hepatitis². HCV may remain latent or become activated, leading to persistent infections and in some case cirrhosis and hepatocellular carcinoma³. HCV is most commonly transmitted through direct contact with infected blood⁴. Other routes of transmission include unsafe injection practice, mother to child transfer injection drug use⁵. The impact of this infection is emerging in India. The mainstay in diagnosing infection with HCV is to initially screen high risk groups for antibodies to HCV (anti-HCV). Virological diagnosis of HCV infection is based on two categories

of laboratory tests, namely serologic assays detecting specific antibody to HCV (anti-HCV) (indirect tests) and assays that can detect, quantify, or characterize the components of HCV viral particles, such as HCV RNA and core antigen (direct tests). This article aims to give overview of emerging infection in India discussing the screening, diagnosis and interpretation of available assay.

MATERIAL AND METHOD

This study was conducted at department of pathology, PDU medical college and Rajkot. The duration of this study is of 2 year since April 2013 to March 2015. Total donors during

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this period were 26,789. A blood donor is offered an option to know his TTI status at the time of registration for blood donation after due counseling and give consent for the same. After blood donation blood sample is collected in plain vacutte at the end of phlebotomy for pre transfusion testing .The sample is allowed to clot to separate serum. The test is done by using 3 rd generation ELISA kit(QULISA, manufactured by Tulip diagnostic pvt.ltd.) and manufacturer’s instructions were strictly followed while performing each assay samples found reactive or in gray zone were retested by the same kit

and also confirmed by the rapid HCV card(RECKON, manufactured by reckon diagnostic pvt.ltd.)

RESULT

From total donor 26789, positive for the HCV were 45 (0.16%),out of 45, 42 (93.3%) were male, 3(6.6%) were female.25 (55.5%) were voluntary and 20 (44.4%) were replacement. Maximum donors come under the age group of 21-30 and 31-40. Out of 45, 22 (48.8%) were B RhD positive.

Table 1

DURATION	TOTAL DONOR	HCV Rective (%)	VOLUNTARY HCV REACTIVE	REPLACEMENT HCV REACTIVE	MALE REACTIVE	FEMALE RACTIVE
APRIL 2013 TO MARCH 2014	11637	7(0.06)	5(71.4%)	2(28.5%)	6(85.7%)	1(14.2%)
APRIL 2014 TO MARCH 2015	15152	38(0.25)	20(52.6%)	18(47.3%)	36(94.7%)	2(5.2%)
TOTAL	26789	45(0.16%)	25(55.5)	20(44.4%)	42(93.3%)	3(6.6%)

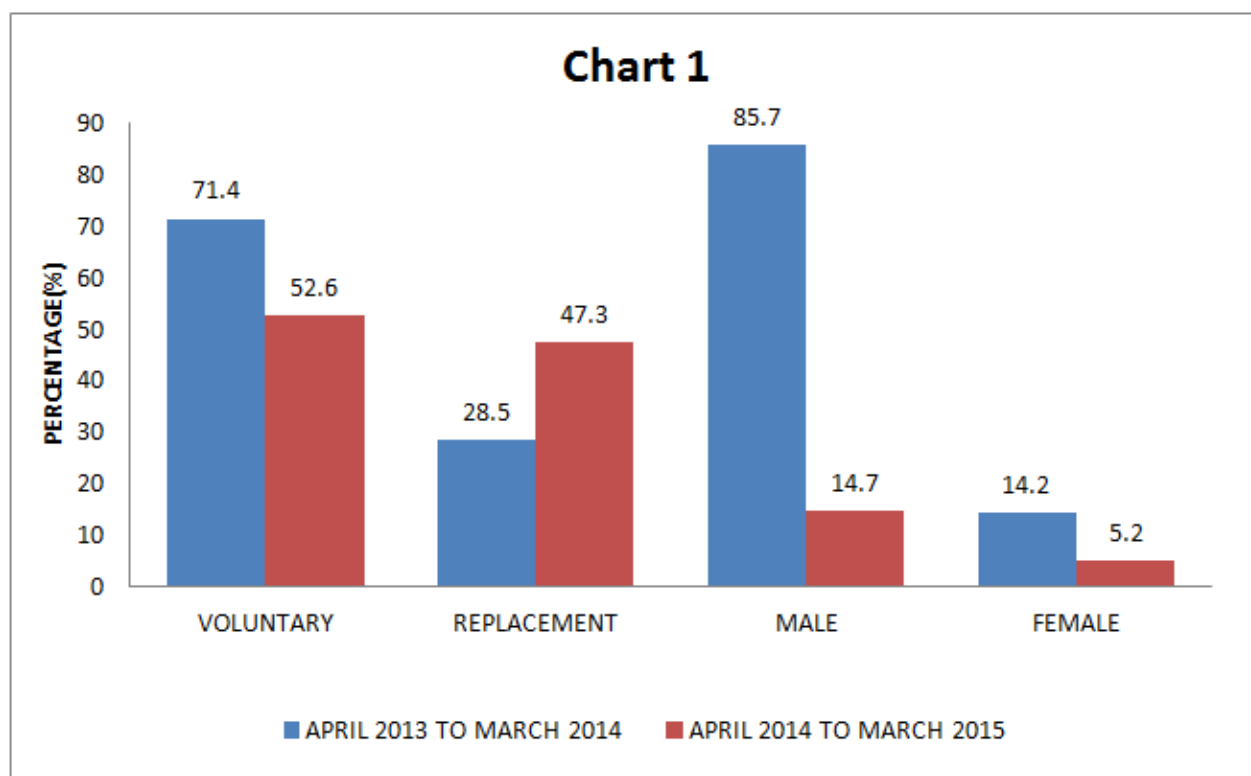


Table 2

AGE GROUP (YEAR)	APRIL 2013 TO MARCH 2014	APRIL 2014 TO MARCH 2015	TOTAL
<20	0(0%)	7(18.4%)	7(15.5%)
21-30	6(85.7%)	9(23.6%)	15(33.3%)
31-40	1(14.2%)	16(42.1%)	17(37.7%)
41-50	0(0%)	5(13.1%)	5(11.1%)
>50	0(0%)	1(2.6%)	1(2.2%)

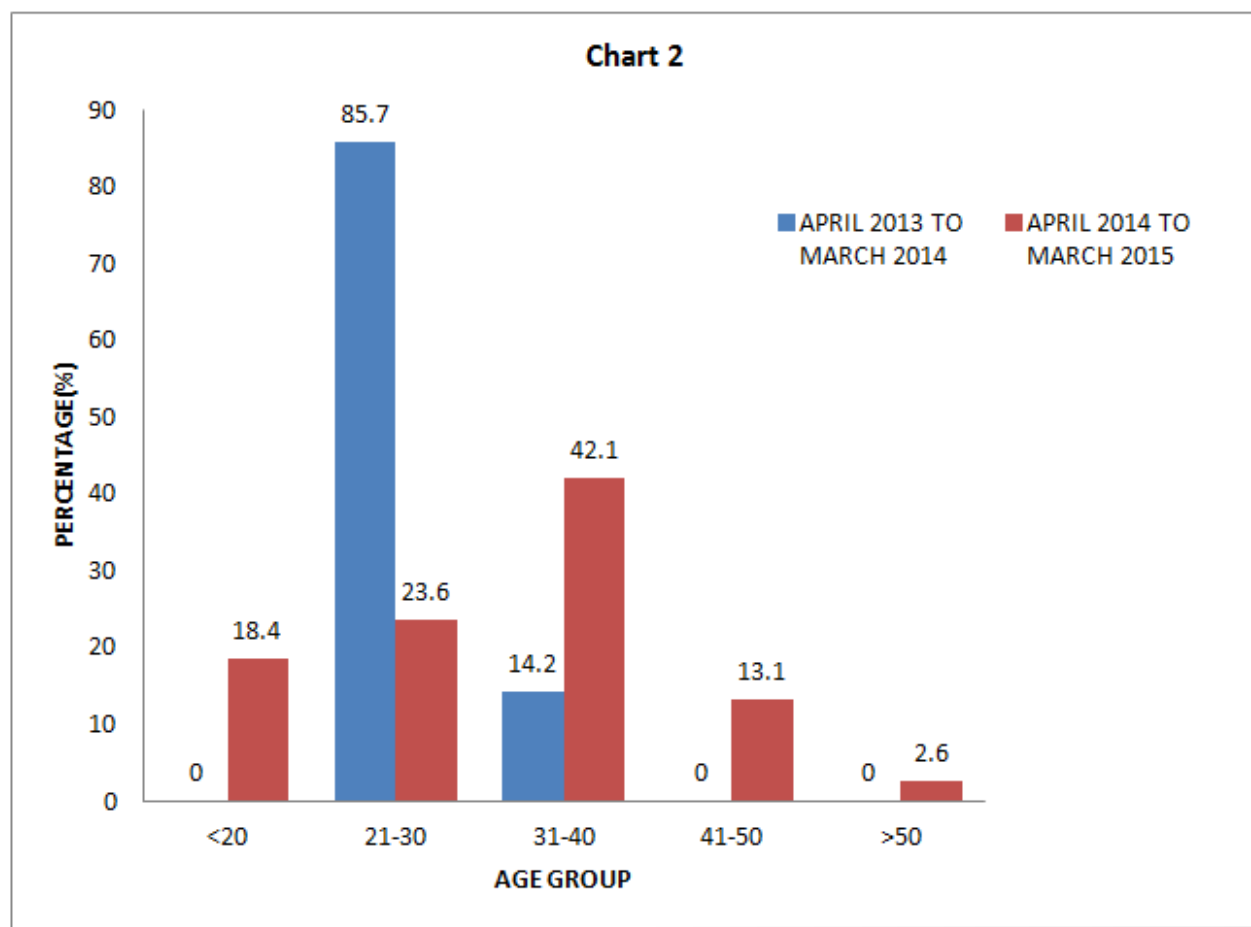


TABLE 3

BLOOD GROUP	APRIL 2013 TO MARCH 2014	APRIL 2014 TO MARCH 2015	TOTAL PERTICULAR GROUP POSITIVE
A POSITIVE	2	7	9(20%)
A NEGATIVE	0	1	1(2%)
B POSITIVE	2	18	20(44%)
B NEGATIVE	1	1	2(4%)
O POSITIVE	2	7	9(20%)
O NEGATIVE	0	1	1(2%)
AB POSITIVE	0	3	3(7%)
AB NEGATIVE	0	0	0(0%)

CHART 3

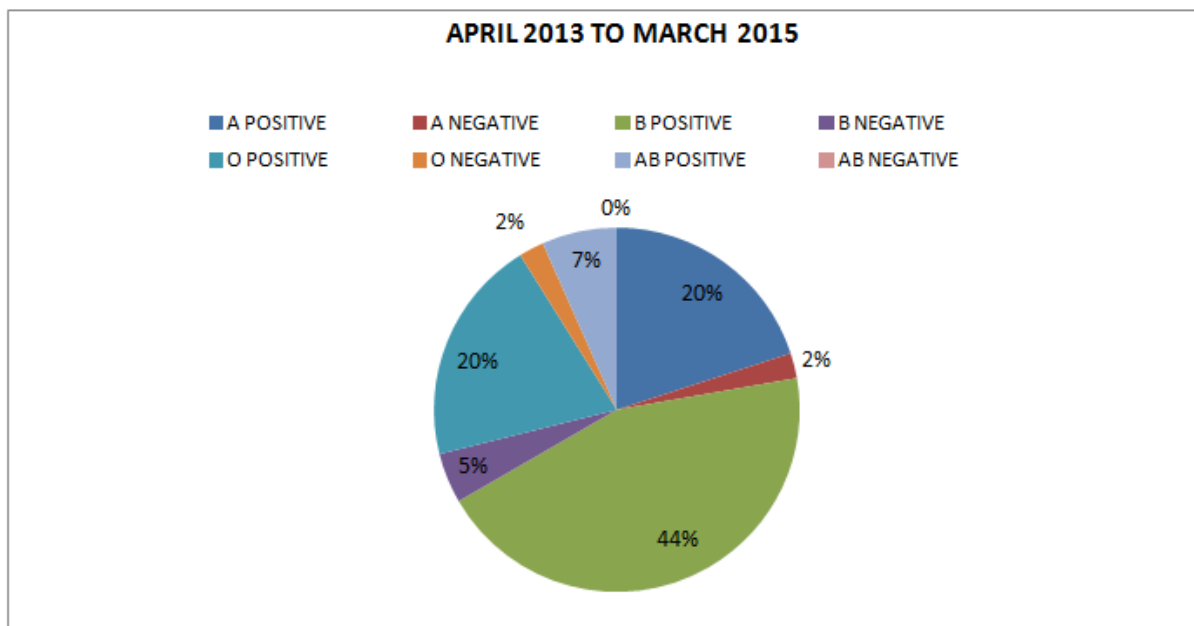


Table 4

State	Type of subjects	Total subjects	Detection by	% HCV	Study detail author
Gujarat(Rajkot)	Blood donors	26,789	ELISA	0.16%	Mital et al 2015
Punjab	Blood donors	44,064	ELISA	1.09%	Gupta et al 2004
Delhi	Voluntary blood donors	15,898	ELISA	1.57%	Jain et al 1999
Delhi	Voluntary blood donors	15,992	ELISA	1.85%	Panigrahi et al 1996
Delhi	Voluntary blood donors	19,531	ELISA	1.49%	Nanu et al 1997
Delhi	Voluntary blood donors	52,500	ELISA	0.5%	Singh et al 1999
Delhi	Voluntary blood donors	235	ELISA	1.5%	Irshad et al 1995
Gujarat	Commercial blood donors	85	ELISA	55.3%	Nandi et al 1994
Gujarat	Voluntary blood donors	94	ELISA	4.3%	Nandi et al 1994
Maharashtra	All blood donors	2726	RIBA	0.7%	Arankalle et al 1995
Maharashtra	Commercial blood donors	73	ELISA	87.3%	Jha et al 1995
Maharashtra	Rural blood donors	12,240	ELISA	0%	Sonwane et al 2003
Rajasthan	All blood donors	46,957	ELISA	0.29%	Garg et al 2001
Tamil Nadu	All blood donors	3,574	ELISA	0.75%	Chandrasekharan et al 2000
Tamil Nadu	All blood donors	22,245	ELISA	1.4%	Das et al 2002

DISCUSSION

In our study, 45 donors were HCV positive out of 26,789. Comparison of our study with the study done in different part of Gujarat is given below:

It is observed that male donors are more positive than female as same study done at Ambrose Ali University, Ekpoma, Ni-

geria⁶ out of 300 patient given in below:

Table 5

Donor Subjects	Number tested (%)	HCV-positive (%)
MALE	264(88.0)	12(4.5%)
FEMALE	36(12.0)	3(8.3%)

We found that there is no major difference between voluntary and replacement donor. In in study of Nigeria⁶ replacement donors were more frequent (63%) than voluntary donors. In our study HCV positive largest age group is 31-40 year while in study of Nigeria largest age group found was 21-30 year. In a study conducted in Germany,⁷ it was observed that HCV-infected women were significantly more often Rhesus-negative than men. On the other hand, a more recent study in the United States of America.⁸ found no association between blood groups and HCV. The previous study found that anti-HCV results correlated with age and sex whereas the latter study did not find any significant association of HCV with either age or sex. In study of Nigeria most of positive donor were HCV positive as shown below table. In our study most of the B positive donors are HCV positive.

Table 6

Blood group	Frequency (%)	HCV prevalence (%)
O RhD-positive	219 (73.0)	9 (4.1)
AB RhD-positive	12 (4.0)	3 (25.0)
A RhD-positive	30 (10.0)	3 (10.0)
B RhD-positive	9 (3.0)	0 (0.0)
O RhD-negative	12 (4.0)	0 (0.0)
A RhD-negative	9 (3.0)	0 (0.0)
AB RhD-negative	3 (1.0)	0 (0.0)
B RhD-negative	6 (2.0)	0 (0.0)

CONCLUSION

Screening of blood donors for HCV can efficiently exclude those donors who are persistent low level carrier, those in the

window period of acute infection. The study suggests that despite testing of blood units hepatitis C infection is still a significant problem.

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