



## PREVALENCE OF HEPATITIS C VIRUS AMONG HEALTHY DONORS AT A LARGE TEACHING HOSPITAL IN LAHORE, PAKISTAN: A CAUSE OF CONCERN FOR HEALTH POLICY MAKERS.

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## INTRODUCTION

Hepatitis C Virus (HCV) is a single stranded RNA virus belonging to the family Flaviviridae and genus Hepacivirus.<sup>1,2,3,4</sup> HCV induced disease may be acute or chronic, mainly affecting the liver ranging in severity from mild asymptomatic infection to moderate liver disease with fibrosis and cirrhosis to severe life threatening manifestation of hepatocellular carcinoma. According to CDC USA about 10%-20% of chronically infected persons will develop liver cirrhosis and 1%-5% will develop hepatocellular carcinoma within 20-30 years of infection.<sup>5</sup> Alcohol use, age at infection, duration of HCV infection, and male sex are all associated with progression of liver fibrosis, development of cirrhosis, and subsequent mortality among persons with chronic HCV infection.<sup>6,7</sup> However, 15-45% cases of HCV infection can be self-resolving.<sup>8,9</sup> USA data showed that in 2004, there were 7,427 hepatitis

**ABSTRACT... Objectives:** Hepatitis C Virus (HCV) infection is life threatening but with the advent of new antiviral agents is potentially curable. Its prevalence among healthy blood donors was estimated in Mayo Hospital, Lahore, Pakistan. The aim of this study was to help in estimating disease burden in addition to early diagnosis of asymptomatic individuals necessitating treatment. **Study Design:** Retrospective single centre cross-sectional study. **Setting:** Mayo Hospital, Lahore, Pakistan. **Period:** January 2016 to December 2017. **Material and Methods:** Blood donors were tested for Anti-HCV antibodies by qualitative test based on lateral flow immunoassay using commercially made rapid test kits. **Results:** In 2016 and 2017, a total of 76530 healthy blood donors were screened for anti-HCV antibodies. Out of 76530 donors, 2095 were found to have anti-HCV antibodies constituting cumulative percentage of 2.73%. The seroprevalence was 2.49% in 2016 and reached to 2.97% in 2017. **Conclusion:** Seroprevalence of Hepatitis C among healthy blood donors is quite high at 2.73% and has slightly increased in 2017 compared to 2016. This dictates need for continued community awareness for prevention, early detection, and treatment. This study will be helpful for health policy makers to design more effective strategic planning to eradicate Hepatitis C infection.

**Key words:** Anti-HCV Antibodies, Blood Donors, Hepatitis C, Lahore, Prevalence, Pakistan.

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C-related deaths, representing an age adjusted mortality rate of 2.44 deaths per 100,000 persons (95% confidence interval 2.38-2.50).<sup>10</sup>

Basic mode of transmission of this virus is via body fluids and their products (saliva, blood, and its products). Risk factors of contracting HCV disease includes professions like barbers, health workers, sex workers, and drug abusers sharing needles. Iatrogenic sources of HCV infection include blood transfusions, dental procedures, and dialysis.<sup>11</sup> One of the most important preventable modes of transmission of hepatitis C is blood transfusion.<sup>10</sup> Each year in Pakistan, about 1.5 million blood and its products are being transfused.<sup>12,13</sup> Lahore is the second largest city of Pakistan with a population of 11 million, according to 2017 census.<sup>14</sup>

Prevalence of HCV in previous studies pertaining

to blood donors and general population has been found to be between 0.55%-17.78%.<sup>15</sup> According to an analytical study done in Lahore in 2013 included 245 blood donors and the seroprevalence of HCV in the donors was estimated to be 17.78%.<sup>15</sup>

Prevalence of HCV is greater in rural areas than urban areas. Since most of Pakistan's population resides in rural areas, it poses a greater risk because Pakistan has very low allocated funds for the health sector and disease burden is likely to increase in near future. This needs to be addressed vigilantly.<sup>8,16</sup> In this study, we have analysed the results of blood donors' screened for anti-HCV antibodies at Mayo Hospital, Lahore.

### Objectives

1. Seroprevalence of Hepatitis C among healthy donors visiting a public Tertiary Care Hospital during the years 2016 and 2017.
2. Assess disease burden in order to help in forming public health policies.

## MATERIALS AND METHODS

### Study Design

This is a retrospective single centre cross-sectional study.

### Setting

This study was carried out at Mayo Hospital, Lahore, which has 2400 beds and is the largest teaching hospital of Pakistan. Mayo Hospital caters for a huge population around Lahore and includes a referral base from all over Pakistan. An IRB approval was obtained.

### Sample Size

Data of 76,530 healthy blood donors was collected from hospital blood bank for a period of two years (from January 2016 to December 2017).

### Inclusion & Exclusion Criteria

This study included healthy donors of age ranging from 20 to 60 years, whereas all those below 20 and above 60 years of age were excluded. Moreover, high risk populations including drug abusers, diabetics and those with chronic kidney

disease were also excluded through a blood donor history questionnaire and relevant physical examination.

### Lab Tests

Serum from blood samples of donors selected as healthy blood donors were taken. Samples were analysed on commercially made kit, IHC-302 - HCV Rapid Test Cassette by Vaxpert, Inc. Miami, Florida that detects HCV by qualitative test based on lateral flow immunoassay. The membrane of the kit is coated with HCV antigen in the test zone and HCV antibodies in the control zone. When the serum is applied it reacts with HCV antigen coated particles, the mixture then migrates upwards to test zone where it reacts with recombinant HCV antigen and generates a coloured line. The mixture then migrates further to control region where it reacts with HCV antibodies and generates another line in that region suggesting that test procedure is correct. Data collected on the donor demographics and results of HCV antibodies assay was analysed using SPSS 20.

## RESULTS

In 2016 and 2017, a total of 76530 healthy blood donors were screened for anti HCV at the time of blood donation at Mayo hospital blood bank. Out of which, 2095 were anti HCV positive, with a cumulative percentage of 2.73%.

The total number of donors tested in 2016 and 2017 were 37341 and 39189 respectively. The number of positively screened blood donors were 931 in 2016 and 1164 in 2017. The percentage was 2.49% in 2016 and 2.97% in 2017.

The total number of donors tested and the number of positively screened blood donors for 2016 and 2017 were 37341, 931 and 39189, 1164 respectively with a corresponding percentage of 2.49% and 2.97%. Anti-HCV seroprevalence in healthy blood donors of Lahore for these two years is summarized in the Table-I, Table-II, and compared in Figure-1.

Year	Month	Total Screenings	Anti HCV +ve	%
2016	January	3242	83	2.56
	February	3304	40	1.21
	March	3744	86	2.29
	April	3504	55	1.56
	May	3698	68	1.83
	June	3870	81	2.09
	July	3142	96	3.05
	August	3006	120	3.99
	September	2400	87	3.62
	October	2819	92	3.26
	November	2211	66	2.98
	December	2401	57	2.37
Total		37341	931	2.49

Table-I. Yearly data of donors' testing results for the year 2016

Year	Month	Total Screenings	Anti HCV +VE	%
2017	January	3382	93	2.74
	February	3385	70	2.06
	March	3691	108	2.92
	April	3221	99	3.07
	May	3182	92	2.89
	June	3143	85	2.70
	July	3052	88	2.88
	August	3319	171	5.15
	September	2997	127	4.23
	October	3319	77	2.31
	November	2912	78	2.67
	December	3586	76	2.11
Total		39189	1164	2.97

Table-II. Yearly data of donors' testing results for the year 2017

	2016	2017	Overall
Total Screenings	37341	39189	76530
Anti HCV positive	931	1164	2095
Percentage	2.49%	2.97%	2.73%

Table-III. Cumulative data of blood donors tested for Anti-HCV antibodies

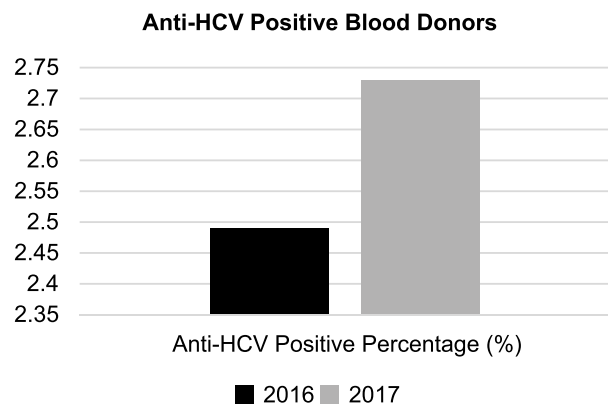


Figure-1. Comparison of yearly results (2016 vs 2017) indicating rising number of Anti-HCV positive donors

## CONCLUSION

Sero-prevalence of Hepatitis C among healthy blood donors is quite high at 2.73% and has slightly increased in 2017 compared to 2016. This dictates need for continued community awareness for prevention, early detection, and treatment. This study will be helpful for health policy makers to design more effective strategic planning to eradicate Hepatitis C infection.

## DISCUSSION

Hepatitis C, a blood born infection, is a deadly disease mainly affecting the liver, causing fibrosis, cirrhosis, and hepatocellular carcinoma.

It is among the leading transfusion transmissible infections (TTIs).

Pakistan being an endemic country for HCV has a prevalence of 4.9% in general population, according to a systematic review.<sup>17</sup> According to latest analysis of World Health Organization, there is an increase in global mortality due to hepatitis virus from 0.89 million in 1990 to 1.45 million deaths in 2013. Global morbidity has also increased in terms of years lived with disability from 0.65 million to 0.87 million and Disability-Adjusted Life-Years (DALY) from 31.7 million to 42.5 million.<sup>18</sup>

Review of literature by Umer et al. published in 2016, summarized 13 studies of seroprevalence of HCV infection in blood donors from various areas in Pakistan during the period of 2009 to 2014 encompassing a total of 403,436 blood donors.<sup>19</sup> The reported prevalence ranged from 1.65% to 20.8%.<sup>19</sup> It included data pertaining to 245 blood donors from Lahore by Akhtar, et al. These donors were tested using ELISA technique in 2013.<sup>15</sup>

HCV prevalence among blood donors in other big cities of Pakistan like Rawalpindi, Islamabad, and Multan was 2.52% in 2005, 8.34% in 2010 to 2011 and 3.44% during 2013 respectively.<sup>20,21,22</sup>

Every blood product needs to be screened for HCV as recommended by WHO by both Nucleic Acid Amplification Testing (NAAT) and serological methods. In Pakistan, due to limited resources, unavailability of standard care and variable practices across blood banks, HCV screening is greatly needed to be assured and standardized.

Although HCV screening among healthy donors will not truly show its prevalence in the population, but it will help in estimating disease burden in an apparently healthy population. Hence, it will help towards ensuring a safer transfusion strategy. For example, by implementing Nucleic Acid Amplification Testing (NAAT) by PCR in pre-transfusion testing in Lahore and in the rest of Pakistan in general.<sup>19,23,24,25</sup> Another important benefit would be early treatment of newly

diagnosed asymptomatic patients since highly effective and well tolerated direct acting anti-viral agents have been discovered and are being used in clinical practice for the treatment of HCV with excellent results.<sup>26,27,28,29,30</sup>

In our study out of 76,530 blood donors, 2,095(2.73%) were seropositive for hepatitis C. Its seroprevalence according to different studies in other cities of Pakistan seem to be comparable with our results. In our study, seroprevalence was 2.49% in 2016 and 2.73% in 2017. This high prevalence could probably be due to multiple sexual partners, use of unsterilized syringes, surgical instruments, and unsafe transfusion practice. High prevalence of HCV is a threat to health of inhabitants of Pakistan. Pakistan's health sector is already overburdened with other infectious diseases with low budget allocated for healthcare. There is also a lack of trained health care workers in addition to poor awareness about transmission and severity of disease of hepatitis C. Its increasing trend is alarming and requires attention of the public to help avoid further spread of this disease.

There are indications that the momentum is building to better address viral hepatitis. Several countries, such as Egypt, Georgia, and Mongolia, have adopted elimination goals, and in May, 2016, WHO adopted the first-ever global hepatitis strategy with a goal to eliminate viral hepatitis as a public health threat by 2030, defined as a reduction in incidence by 90% and mortality by 65%.<sup>18,31</sup>

There is an urgent need to properly channelize our resources. Strict screening along with proper audit of present resources is required. Education of the masses and health care workers through organised seminars, pamphlets, magazines, and electronic media is required. People at risk of hepatitis co-infection like drug abusers, sex workers, etc. must undergo blood screening on a regular basis. Hospitals and smaller clinics need to improve sterilization techniques. In addition to taking preventive measures, therapeutic efforts are required to be made for disease eradication which includes use of newly discovered direct

acting antiviral; which are very effective drugs but are expensive. These drugs should be made readily available in hospitals for HCV elimination. Increasing treatment coverage and adopting preventive measures can reduce HCV prevalence in population including blood donors.




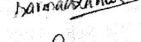

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