

SEROPREVALENCE OF HIV AND HEPATITIS C INFECTION AMONG BLOOD DONORS IN CENTRAL INDIA: A STUDY OF 8 YEARS IN TERTIARY CARE CENTRE IN GWALIOR, MADHYA PRADESH, INDIA

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Abstract:

INTRODUCTION: The prevalence of HIV and HCV infection varies worldwide. The risk of contracting HIV infection from transfusion of a unit of infected blood is estimated to be over 95%. The HIV prevalence among the blood donors around the world varies with an average of around 0.1%. The seroprevalence rate of HCV among the blood donors in India is estimated to be around 0.53 to 5.1%. National AIDS Control organization (NACO) mandates to screen every unit of blood for HIV and HCV. Aim of this study was to estimate the seroprevalence of HIV and HCV among the voluntary and replacement donors over a period of 8 years at a tertiary care hospital in Gwalior.

MATERIALS AND METHODS: All the donors which were found fit after screening by trained personnel, after satisfactory answering the donor's questionnaire, their physical examination and haemoglobin (Hb %) estimation were included in the study. A total of 160629 blood units from the selected donors were collected during the period of 8 years (2015-2022) with voluntary donors and replacement donors. Three ml blood in plain vial and 2 ml blood in EDTA (ethylene diamine tetra acetic acid) vial taken from the satellite bag. All samples were screened for HIV, HCV and other TTIs. Tests for HIV and HCV were performed with commercially available enzyme immune assay kit and rapid cards.

RESULTS: Major contribution in blood donation was from male donors (94.7%). Majority of donation was done voluntarily (88.4 %). Out of the total 160629 donors tested for TTIs over 8 years, 146 (0.09%) donors were positive for HIV ($p < 0.05$) and 193 (0.12%) donors were positive for anti HCV ($p < 0.05$). There was increase in blood donation from voluntary category from 2015-2022 with a decreasing trend of HIV and HCV positivity from 2015 to 2022.

CONCLUSION: There was a decreasing trend of HIV and HCV positivity from 2015-2022. Since, no vaccine is presently available for immunization against HIV and HCV infection, transfusion transmitted HIV and HCV remains a potential threat to the safety of the blood supply.

Key Words: Voluntary, Replacement

INTRODUCTION:

HIV infection resulting from blood transfusion has been documented repeatedly since the first case report from the United States in late 1982(1). In 2017, HIV prevalence among adults (aged 15-49 years) was an estimated to be around 0.2% (2). Overall, India's HIV epidemic shows a downward trend. Between 2010 and 2017 new infections declined by 27% and AIDS-related deaths fallen by 56% (3). Considering the HCV burden in India, currently India harbours approximately 10 -15 million chronic carriers of HCV, which is a major cause of liver related mortality and morbidity of the country. The prevalence of Hepatitis C Virus (HCV) infection in the general population is estimated to be around 0.5-1.5% (4). The seroprevalence rate of HCV among the blood donors in India is estimated to be about 0.53 to 5.1% (5).

HIV and HCV transmission is attributed to high-risk sexual behaviour, unsafe healthcare practices like reuse of needles and reuse of unsterilized equipments, along with transfusion of unscreened blood and blood products. Safe medical practices, general public awareness, and issue and transfusion of the safe blood components to the patients can curb the transmission of HIV, HCV and other TTIs.

MATERIALS AND METHODS:

The study was carried out at Blood Bank, At Gajra Raja Medical College, Gwalior Madhya Pradesh from 2015 to 2022. Study participants included the blood donors who came for voluntary or replacement donation. The voluntary donations were obtained from walk in donors or in blood donation camps. Replacement donors were those donors who donated blood for ailing patients and were family members, close relatives and friends of recipient. Donors were screened by trained personnel after satisfactory answering the donor's questionnaire, physical examination and hemoglobin (Hb %) estimation. Written consent from the donor was also taken prior to donation. 3 ml blood in plain vial and 2 ml blood in EDTA (ethylene diamine tetra acetic acid) vial taken from the satellite bag. All samples were screened for HIV, HCV and other transfusion transmitted diseases. Tests were performed with commercially available HIV and HCV Elisa Kits IIIrd & IVth generation and on and off rapid card were also used for detection of HIV and HCV antigen /antibodies. The HIV and HCV data of 8 years (2015- 2022) at blood bank of Gajra Raja Medical College, Madhya Pradesh was collected, summarized and compared statistically by frequency distribution and percentage proportion. Chi Square (χ^2) test was used to determine significant difference statistically.

RESULTS:

There was total of 160629 healthy donors ageing 18 to 65 years who underwent blood donation during study period. There were 94.7% male donors (152276) and 5.3 % (8353) female donors during the study period ($p<0.05$). There were (142044) 88.4% voluntary donors and (18585) 11.6% replacement donors ($p<0.05$). In the present study increasing pattern of voluntary donation was seen from 2015 to 2022 (85% to 95%) except decline during the covid era from 2020-2021. Table 1 depicts the year wise distribution of total donation at blood bank, GR Medical College, Gwalior.

Table 1: Yearly distribution of total donation at blood bank, GRMC, Gwalior from 2015-2022

Year	Total donations	Voluntary donation	(%)	P value	Replacement Donation	(%)	P value
2015	18680	16812	90.0	P value <0.05	1868	10.0	P value <0.05
2016	22620	20810	92.0		1810	8.0	
2017	22188	20523	92.5		1665	7.5	
2018	23221	21641	93.2		1580	6.8	
2019	18200	16016	88.00		2184	12.0	
2020	16800	13440	80.00		3360	20.0	
2021	16812	15046	89.5		1766	10.5	
2022	22108	20339	92.0		1769	8.0	

There was total 146 donors who were found to be HIV positive (Table 2) during the study period and high percentage of HIV positivity was seen among the replacement donors compared to the voluntary donors (table 4).

Table 2: HIV reactivity in blood donors from 2015-2022

Year	Total donations	HIV+	% prevalence	P value
2015	18680	18	0.09	<0.05
2016	22620	23	0.10	
2017	22188	24	0.10	
2018	23221	19	0.08	
2019	18200	18	0.09	
2020	16800	17	0.10	
2021	16812	16	0.09	
TOTAL	160629	146	0.09	

There was total 193 donors who were found to be HCV positive (Table 3) during the study period and comparatively high percentage of HCV positivity was seen among the replacement donors compared to the voluntary donors (table 4).

Table 3: HCV reactivity in blood donors from 2015-2022

Year	Total donations	HCV reactive	Prevalence (%)	P value
2015	18680	31	0.16	<0.05
2016	22620	30	0.13	
2017	22188	24	0.10	
2018	23221	21	0.09	
2019	18200	24	0.13	
2020	16800	20	0.11	
2021	16812	20	0.11	
TOTAL	160629	193	0.12	

Table 4: Percentage of HIV and HCV positivity among the voluntary and replacement donors

	Total donation	HIV reactive	HCV reactive
Voluntary	142044	108(0.08%)	161(0.11%)
Relative/Exchange	18585	28(0.15%)	32(0.17%)

DISCUSSION:

In the present study, there were (142044) 88.4% voluntary donors and (18585) 11.6% replacement donors. Data showed the increasing number of voluntary donations from the year 2015 (90%) to 2022 (92%). These findings are similar to the study done by Gupta P.K. et al. (6) and Pallavi P. et al. (7). Increase in voluntary donors may be attributed to the increasing public awareness. Government bodies like NACO have been actively involved in propagating voluntary blood donation in our country with an aim to achieve 100% voluntary blood donation through various national blood donation programmes. There were 94.7% male donors (152276) and 5.3% (8353) female donors during the study period. Low turnouts of female donors were because of traditional thinking of Indian society as well as females in India are generally underweight and anaemic according to donor's selection criteria (8). The overall prevalence of HIV in the present study among the blood donors was 0.09%. Studies done previously reported the prevalence of HIV to be around 0.08% to 3.87% (9) which was found to be in concordance with the present study. Lathamani K et al reported HIV prevalence of 0.08% in his study (10). On an average, in India HIV prevalence ranges from 0.2% to 1% (11,12) whereas in rural part of India, it has been reported to be as high as 2.11% (13). The prevalence of HIV in various parts of India is different. In western India, on an average HIV prevalence has been reported to be 0.47% (14), in southern India as 0.44% (15). Northern part of India including Punjab reported 0.26% HIV positivity rate among the blood donors (16). For HIV, India is second only to South Africa in terms of overall number of people living with HIV. Comparing with the prevalence in other countries, the HIV prevalence is 1.8% and 6% in West Africa (17) and Nigeria (18) respectively. The seroprevalence of anti-HCV antibodies in blood donors was 0.12 per cent. Studies from northern parts of India have reported HCV seroprevalence ranging from 0.53 to 5.1 per cent (19,20,21). The seroprevalence of anti HCV antibodies in blood donors in a study done in Nepal was reported to be 0.66% (22). In Japan and other western economically developed nations, the seroprevalence of anti HCV antibodies has been usually reported to be less than 0.5% (23). Present study revealed an overall trend of decreasing seroprevalence with increasing age, which was similar to the data reported by Jain et al. from New Delhi (24). Giri et al. (25), Pandit et al. (26), Meena et al. (27) and Gupta et al. (28) reported HCV prevalence of 0.74%, 0.21%, 0.57% and 1.45% respectively among the blood donors. The low prevalence of HCV in blood donors in Madhya Pradesh compared to other states can be attributed to the proper screening of donors and strict follow up of donor questionnaire. Using these protocols helped in eliminating the high-risk donors.

Voluntary blood donor showed slightly lesser HIV and HCV reactivity than relative/exchange donor because, voluntary blood donors are more likely to answer the questionnaire honestly in contrast to relative/exchange donors, who are more likely to hide the fact of high-risk behaviour. This has been advocated by WHO i.e. "The safest blood donors are voluntary, non-remunerated blood donors from low-risk populations" (29).

CONCLUSION:

Since no vaccine is presently available for immunization against HIV and HCV infection, transfusion transmitted infection (TTIs) remains a potential threat to the safety of the blood supply. Safe medical practices and public awareness, and concept of safe blood components to the patients can curb the transmission of TTIs.

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