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RESEARCH ARTICLE

SERO PREVALENCE OF HEPATITIS B VIRUS (HBV), HEPATITIS C VIRUS (HCV) AND HIV INFECTION AMONG REPLACEMENT BLOOD DONORS AT A TERTIARY CARE HOSPITAL IN KASHMIR

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ABSTRACT

Aims: As community based studies of seroprevalence of Hepatitis B, Hepatitis C and HIV in Kashmir valley are lacking, the current analysis was aimed to look for the same in replacement blood donors in SMHS Hospital, an associated hospital of Govt. Medical College Srinagar, Kashmir.

Material and Method: Relevant information of all the replacement blood donors who had donated whole blood in the department of transfusion medicine, SMHS Hospital, Kashmir from Jan 2000 to Oct 2010 was retrieved from the departmental records. The number of donors who were found positive for HBSAg, HIV and also those found reactive for anti HCV antibodies was calculated.

Results: Out of 40616 total blood donors, 40584 were males and only 32 were females. Among all these replacement donors, 0.485% (n=197) were HBSAg positive, 0.169% (n=69) were reactive for Anti HCV and 0.041% (n=17) were positive for HIV. Since the number of female donors was very less, over all prevalence was calculated and no comparison among sexes was made. HBV and HCV positive cases were seen to have an increased trend while HIV showed a decreased trend towards the end.

Conclusion: Seroprevalence of HBV, HCV and HIV though is low in our setup compared to other states but still they are a potential threat to the recipients of the blood as well as to the community and thus stringent measures need to be taken to prevent the transmission of these infections among blood recipients and society as a whole. As replacement donors are not professional blood donors and grossly represent the community, this analysis as such may give us a rough idea about the real prevalence of these infections in our community in absence of the community based epidemiological studies and guide us in carrying out the same in future to estimate the actual prevalence and thus the disease burden in our community.

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INTRODUCTION

Hepatitis viruses B (HBV) and C (HCV) and HIV, which predominantly transmit through the parenteral route pose a serious "silent epidemic" challenge to India. Infected persons are unaware of their chronic carrier status and continue to infect others for decades and eventually burden the society with loss of productive workforce and the health care system with expenses of treating liver failures, chronic liver diseases and cancers. HBV and HCV together are estimated to have led to 500 million chronically infected persons and one million deaths annually (NCDC, 2014). According to the United Nations Joint Program on HIV/AIDS (UNAIDS), at the end of 2010, an estimated 34 million people with AIDS are living within the world (UNAIDS, 2011). The highest number of patients (22.9 million) is reported from sub-Saharan Africa

(31.6-35.2 million) (UNAIDS World AIDS Day Report, 2011). India harbors the third largest number of HIV infected individuals in the world (UNICEF, 2011). Viral hepatitis due to Hepatitis B & C is widespread. Almost 350 million people worldwide are infected with HBV (Lok, 2002 and Hussain *et al.*, 2004) and about 170 million are infected with HCV (Bonkovsky *et al.*, 2001) and in Indian population which is > 1.2 billion, the burden of these infections is quite alarming with about 5.7 (reduced to 2.5) million people infected with HIV, 43 million infected with HBV and about 15 million are infected with HCV (Nirali Shah *et al.*, 2013). A recent study by Pahuja *et al* in 2007 revealed alarming high seroprevalence of HIV, HCV and HBV (0.56%, 0.6% and 2.23% respectively) among blood donors of a metropolitan city like Delhi (Pahuja *et al.*, 2007). In the South-East Asia region, the estimated burden of chronic HBV infection is 100 million and the estimated burden of chronic HCV infection in South Asia is 50 million. HBV is the second most common cause of acute viral hepatitis after HEV in India with 3.7% point prevalence, that is

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over 40 million HBV carriers, India is considered to have an intermediate level of HBV endemicity. Every year, one million Indians are at risk for HBV and about 100,000 die from HBV infection. The population prevalence of HCV infection in India is 1% (NCDC, 2014). In Switzerland, the incidence rate of these infections among blood donors between year 1996 & 2003 was found to be as follows: HIV: 95%, CI: 1.35 (0.62-2.57), HCV: 95%, CI: 1.50 (0.72-2.75), and HBV: 95%, CI: 5.36 (3.00-8.85) (Niederhauser *et al.*, 2005). In a study conducted by Hosseien Khedmat *et al.* (2009), from Iran has shown the incidence rate per 100,000 in 345,412 blood donors in 2005 to be 3.2 (95%CI: 1.6- 5.7) for HIV, 80 (95% CI: 71-90) for HCV, 488 (95% CI: 465- 511) for HBV. Transfusion of blood and blood products though a life saving modality of treatment, can prove hazardous in the recipients by causing various infectious and non-infectious complications if the blood to be transfused is infected and not screened properly (Makroo *et al.*, 2013).

Mortality and morbidity resulting from transfusion of infected blood have far reaching consequences not only for the recipients but for their families, their communities and the wider society as well (WHO, 2002). In different studies, the prevalence has been estimated as 3-10% for HBV and 2.2-14% for HCV antibodies (Zuberi, 1998; Mujeeb *et al.*, 2000 and Asif *et al.*, 2004) and 0.084-3.87% in case of HIV (Chattoraj *et al.*, 2008). So to assess the actual prevalence of these infections in our setup in order to adopt preventive strategies is the need of the hour. Keeping in view the above reports available from different corners and the nonavailability of such studies from our state, the present analysis was carried out to know the seroprevalence of these infections in our blood donors, compare it with data from other parts in the Country and also to know the importance of carrying out various surveillance studies in this direction and take the appropriate preventive measures to decrease the disease burden in the community.

Aims & Objectives

- 1) To know the disease burden and seroprevalence of Hepatitis B, Hepatitis C and HIV among blood donors.
- 2) To know the importance of carrying out surveillance studies for these infections in our setup.
- 3) Comparison with the similar other studies conducted in other parts of the India.

MATERIALS AND METHODS

Relevant information of all the donors who had donated blood in the department of transfusion medicine of Government Medical College Kashmir over a period extending from Jan 2000- Oct 2010 was retrieved. Tabulation was done and the percentage of HBSAg positive, Anti HCV antibody reactive and those positive for HIV was calculated. Trend of these infections over these years was observed and also a comparison of seroprevalence of the same in our setup was made with the observations from some other states.

RESULTS AND DISCUSSION

Out of 40616, majority (99.92%) were males while as only a fraction (0.07%) was females (Table 1). Since the number of

female donors was very less, overall seroprevalence among all donors was calculated without making any comparison between two sexes. This small number of female donors could be because of the reason that in our setup, females do not come forward for blood donation. The seroprevalence of HBV, HCV and HIV among our donors was found to be 0.485%, 0.169% and 0.041% respectively (Table 2). Coming to the trend which these infections showed over these years is evident in Table 3 (Fig.1).

Table 1. Year & Gender wise break up of Blood Donors

YEAR	MALE (n=)	FEMALE (n=)	TOTAL(n=)
2000	3253	07	3260
2001	2822	01	2823
2002	3117	22	3139
2003	2270	0	2270
2004	3549	0	3549
2005	3504	2	3506
2006	1188	0	1188
2007	4641	0	4641
2008	5513	0	5513
2009	6562	0	6562
2010	4165	0	4165
TOTAL	40584	32	40616

Table 2. Distribution of sero-positive cases

INFECTION	Total no. of donors (n= 40616)	Percentage (%)
Hepatitis B Virus (HBV)	197	0.485%
Hepatitis C Virus (HCV)	69	0.169%
Human Immunodeficiency Virus (HIV)	17	0.041%

Table 3. Year Wise Trends of Seroprevalence of HBV, HCV and HIV in our Hospital blood donors

YEAR	HBSAg	HCV	HIV
2000	16 (0.491%)	02 (0.061%)	04(0.122%)
2001	24 (0.850%)	01 (0.035%)	05((0.176%)
2002	20 (0.641%)	02 (0.064%)	01(0.032%)
2003	08 (0.352%)	00 (0.0%)	01(0.044%)
2004	17 (0.479%)	12 (0.338%)	00 (0.0%)
2005	14 (0.399%)	09 (0.256%)	01(0.028%)
2006	05 (0.420%)	02 (0.168%)	00(0.0%)
2007	29 (0.624%)	13 (0.280%)	03(0.064%)
2008	18 (0.326%)	07 (0.126%)	00(0.0%)
2009	25 (0.380%)	13 (0.198%)	00 (0.0%)
2010	21 (0.504%)	08 (0.192%)	00 (0.0%)

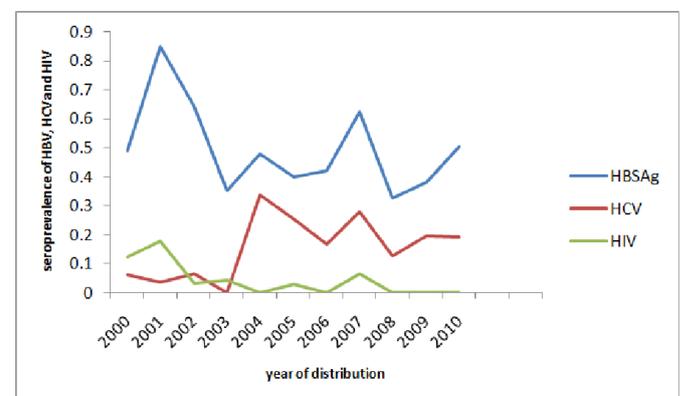


Fig. 1.

It shows an increasing trend in case of HBV and HCV infections and a decreasing trend was observed in case of HIV infection towards the ending years

When the results of our analysis were compared with the other available data from different parts of India, we observed that the seroprevalence of HBV and HIV was less in our setup while as that of HCV was comparable to some parts like South Haryana and Ahmadabad while in other parts, its prevalence was also low. Hepatitis B and C transmission occurs primarily by exposure to infected blood which may be due to transfusion, organ transplant, i.v drug abuse, body piercing, tattooing, haemodialysis and occupational exposure. In South East Asia, China and sub-Saharan Africa, HBV infection usually is acquired perinatally or in early childhood leading to a high prevalence of chronic infection (5-20%). In contrast, 80% infections in USA, Canada and Western Europe occur in adults via sexual contact or iv drug use leading to lower baseline prevalence (0.1%) (Centers for Disease Control and Prevention, 2002).

HCV infection is known to have significant association with history of blood transfusion at least 6 months previously, direct patient care or laboratory work, i.v drug use, multiple sexual partners or sexual or household contact with an infected person. Highest prevalence is among the hemophiliacs who received factor concentrate transfusion before 1992 (Wasley and Alter, 2000). The global seroprevalence of HCV among blood donors varies from 0.4-19.2% (Memon and Memon, 2002) and the estimated risk of HCV transmission is between 0.10-2.33percent per million units' transfused (Bihl *et al.*, 2007). Carrier rate of HBSAg varies from 0.1-0.2% in Britain and USA, 3% in Greece and Southern Italy and up to 15% in Africa and Asia (Sherlock and Dooley, 2002). Different reports in Pakistan have estimated the prevalence of HBSAg in voluntary blood donors as 2.93 % (0.82%-5%) and anti HCV positive cases as 1.7% (Zuberi, 1998; Mujeeb *et al.*, 2000 and Asif *et al.*, 2004). In Georgia, reports from a study in 2013 have estimated that 7.3% (6.9 confirmed) were reactive for anti HCV, 4.1% (3.4% confirmed) were positive for HBV and 0.06% were positive for HIV (Butsashvili *et al.*, 2001). A study from West Bengal (Calcutta) shows prevalence of HBSAg, HCV and HIV as 2.27%, 1.62% and 0.64% respectively (Swapan Kumar Sinha, *et al.*, 2012). With every unit of blood, there is 1% chance of transfusion associated problems including transfusion transmissible infections (TTIs).

The risk of TTIs has declined dramatically in high income nations over the past two decades, but the same may not hold true for the developing countries (Pallavi *et al.*, 2011). Various studies in India have shown the prevalence of HBV ranging from 0.66% (Gupta *et al.*, 2004) to 2.23% (Pahuja *et al.*, 2007), HCV ranging from 0.1% (Arora *et al.*, 2010) to 1.09% (Gupta *et al.*, 2004) and HIV ranging from 0.084% (Gupta *et al.*, 2004) to 0.56% (Pahuja *et al.*, 2007) (Table 4, Fig.2). Our study has shown the seroprevalence of HBV, HCV and HIV as 0.48%, 0.17% & 0.04% respectively. The lower seroprevalence of these infections in our society could be due to the reason that many modes of transmission of these infections like homosexuality, tattooing, body piercing and commercial sex workers are either less or absent due religious and social bindings. From our study it can be concluded that although the seroprevalence of all the three infections during these years has remained low comparing to other parts of the Country, but an increasing trend of HBV and HCV towards the last three years warrants the need for further surveillance studies in this direction so that the appropriate

preventive measures are taken to decrease the spread of these infections and reduce the disease burden.

Table 4. Seroprevalence of HBV, HCV and HIV in India

Comparison of seroprevalence rate in different parts of India				
Place	HBSAg%	HCV%	HIV%	Reference
Ludhiana	0.66	1.09	0.084	Gupta N. et al (2004)
Delhi	2.23	0.66	0.56	Pahuja S et al (2007)
Lucknow	1.96	0.85	0.23	Chandra T et.al (2009)
South Haryana	1.7	0.1	0.3	Arora D et al (2010)
West Bengal	1.46	0.31	0.28	Bhattacharya P et al (2007)
Banglore	1.86	1.02	0.44	Srikrishna A et al (1999)
Ahmedabad	0.98	0.11	0.16	Nirali shah et al (2013)
Present Study	0.48	0.17	0.04	2010

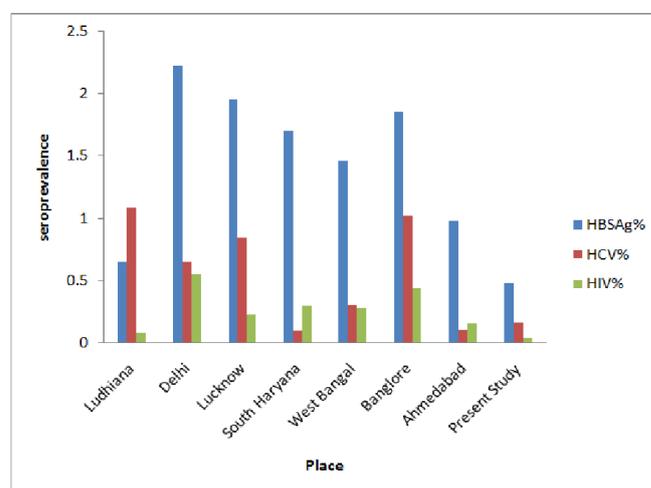


Fig 2.

Limitation

As replacement donors are healthy individuals and number of female donors is very less, this analysis may not give the actual estimate of seroprevalence of these infections and thus warrants the need for carrying out community based surveillance studies in our set up; also due to less number of females coming forward for blood donation in our country, a comparison of seroprevalence between two sexes could not be made.

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