

Seroprevalence of Surrogate Markers for Hepatitis B, Hepatitis C and HIV in Healthy Blood Donors at Shaikh Zayed Medical Complex, Lahore

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Introduction: This project was aimed to determine the seropositivity status for Hepatitis B surface antigen (HBsAg), anti Hepatitis C (HCV) antibodies and antibodies to Human Immune Deficiency Virus (HIV) I and II in healthy blood donors donating blood at Shaikh Zayed Hospital Lahore.

Material and Methods: The relevant data was collected during a period of 28 months from 1st January 2006 till 31st March 2008. It was a cross sectional study which entailed screening of 60719 healthy donors. The donors were aged between 16 years to 45 years. There were 93.43% males and 6.57% females.

Results: The seroprevalence of Anti HCV antibodies was 3.870%; for HBsAg it was 1.407%; for HIV antibodies it was 0.00658%. Our study demonstrated a higher seropositivity for HIV in healthy donor population than all of the previous reports except one with which it matched precisely. HBsAg showed a definite downwards inclination when compared with similar previous studies carried out in the last 7 years. Seroprevalence of anti HCV antibody was found to be similar when compared with previous studies and demonstrated a higher trend in large cities with a multiethnic population.

Key Words: MeSH: Blood donors, seroprevalence, HbsAg, antiHCV, HIV.

Introduction

Viral hepatitis by HBV and HCV viruses is a world wide public health problem, representing a significant cause of morbidity and mortality in developing countries. An estimated 2.2% of the world population is infected by HCV infection. Most of the 140 million people positive for anti HCV antibodies are chronically infected, making HCV one of the most common chronic blood borne viral infections in the world. It is estimated that 350 million people worldwide are chronic HBV carriers representing approximately 7% of the total population². Chronic HBV infection is endemic in Southeast Asia where 10% population may be infected³.

HBV and HCV virus can cause a spectrum of clinical conditions ranging from symptom free carrier state to chronic hepatitis, liver cirrhosis and hepatocellular carcinomas⁴. In highly industrialized countries, illicit use of drug injections account for most HBV and HCV infections⁵, whereas in developing countries, the majority of infections are attributable to parenteral exposure in health care settings, particularly unsafe injections⁶. Sexual transmission of HCV occurs but is inefficient and probably accounts for a small proportion of all infections⁵. Blood transfusion also accounts for a substantial proportion of cases if transfused without screening for surrogate markers and antibodies to HBV, HCV and HIV. In Pakistan prior to introduction of donor screening for hepatitis, transfusion of blood or plasma derived products was associated with significant risk of acquisition of HBV and HCV⁸. By 2003 contaminated blood and blood products accounted for 7% of the total transmission of HIV/AIDS in Pakistan⁷.

This study was conducted to evaluate the seropositivity of healthy blood donors for HIV, HBsAg & anti HCV antibodies who donated blood at Shaikh Zayed Hospital, Lahore.

The information gained by such studies provides direction for setting new goals in developing preventive strategies in Transfusion Transmitted Infections. They also provide a means for reviewing outcome of the preventive measures which are already in place.

Materials and Methods

This was a cross sectional study on 60719 healthy blood donors bled at Sheikh Zayed Hospital, Lahore during a period of 28 months from 1st January 2006 till 31st March 2008. Five ml of blood was collected from the donor, 2 ml blood was added to EDTA containing test tube for determination of blood group and haemoglobin estimation. Three ml of blood was allowed to clot; blood serum was used for cross matching, screening for Hepatitis B, Hepatitis C and HIV. Detection of HBsAg was done using ELISA technique (Monolisa® HBsAg Kit) (Sensitivity 100%; specificity 99.94%). Anti Hepatitis C antibodies were detected by a rapid binding test (Instatest HCV). All anti HCV antibody positive samples were reconfirmed by ELISA technique (bioelisa HCV 4.0) (Sensitivity 100%; specificity 99.8%). Anti HIV I and/ or Anti HIV II antibodies were detected using ELISA technique (Vironostica® HIV Uniform II Ag/Ab kit) Sensitivity 100%; specificity 99.9%. The tests were done precisely according to the instructions of the manufacturer.

Results

A total of 60719 healthy donors were screened during a period of 28 months from 1st January 2006 till 31st March 2008 at Shaikh Zayed Hospital, Lahore. This donor cohort represented the population belonging predominantly to Lahore and its suburbs. The majority of the donors were

directed donors (42004) i.e. 69.17% with a smaller proportion consisting of replacement donors (18033) i.e. 29.7%, either close relatives or friends of the recipient. Only 1.12% donors (682) were nonnumerated voluntary donors belonging to the medical staff and students associated with Shaikh Zayed Medical Complex, Lahore. The donor cohort was between 16 to 45 years of age, 56730 (93.43%) were males and 3989 (6.57%) were females. The female donor population was found to belong predominantly to the voluntary non numerated donors which constituted 41.7% (76 in number) of the voluntary donors, however it constituted only 6.44% of the rest of the donor cohort. The HBsAg positivity was present in 854 blood donors (1.406%); Anti HCV antibodies were seen in 2350 blood donors (3.870%); and HIV positivity was present in 4 donors (0.00658%).

Discussion

The donor trends suggest predominance of directed donations, followed by replacement donations where the blood group was not available within family and friends of the patient. This is a direct consequence of lack of availability of donor data registration at district, provincial or national level. The significantly high female participation in the voluntary donor cohort points towards an untapped blood resource which is much less likely to be used if the donations continue to be directed or replaced ones.

Hepatitis B and C have emerged as major health hazards in Pakistan. Unscreened blood products have a significant role in spread of these infections. Screening of blood donors provides substantial data regarding the sero-status of healthy young male population of the local area.

Seroprevalence of anti HCV antibodies in healthy blood donors is different in different parts of the country. The results of this study showed a seroprevalence of 3.87% in the target population. The results were compared with other similar studies from Pakistan with a larger than 10,000 sample size to see the trend and geographical distribution of infectivity in Table 2 and Figure 2. Studies from smaller cities were also assessed to review the reported blood donor data of various cities of Pakistan in the last 6 years. However the sample size of these studies was relatively small so they could not be compared to the results of the present study. Studies from Sialkot reported 3.26%¹⁸, from Peshawar reported 1.34% and 2.6%¹⁵, from Quetta 1.87%²⁰, from Multan 0.27%¹⁹ seropositivity of anti HCV antibodies. It was noticed that Anti

Table 1: Comparison of HBsAg seroprevalence in blood donors in various parts of the country.

City	Author	Year	HBsAg seroprevalence % age
Lahore ^(Present Study)	Shah SAR	2008	1.406
Karachi (13)	SA Mujeeb	2007	3.3
Bahawalpur (11)	MA Khan et al	2006	2.69
Lahore (10)	Sirhindi et al	2005	3.36
Islamabad (9)	Khokhar N et al	2004	2.56
Rawalpindi (12)	Khattak MF	2002	3.3
Punjab (8)	Rahman M et al	2002	2.259

Table 2: Comparison of Anti HCV seroprevalence in blood donors in various parts of the country.

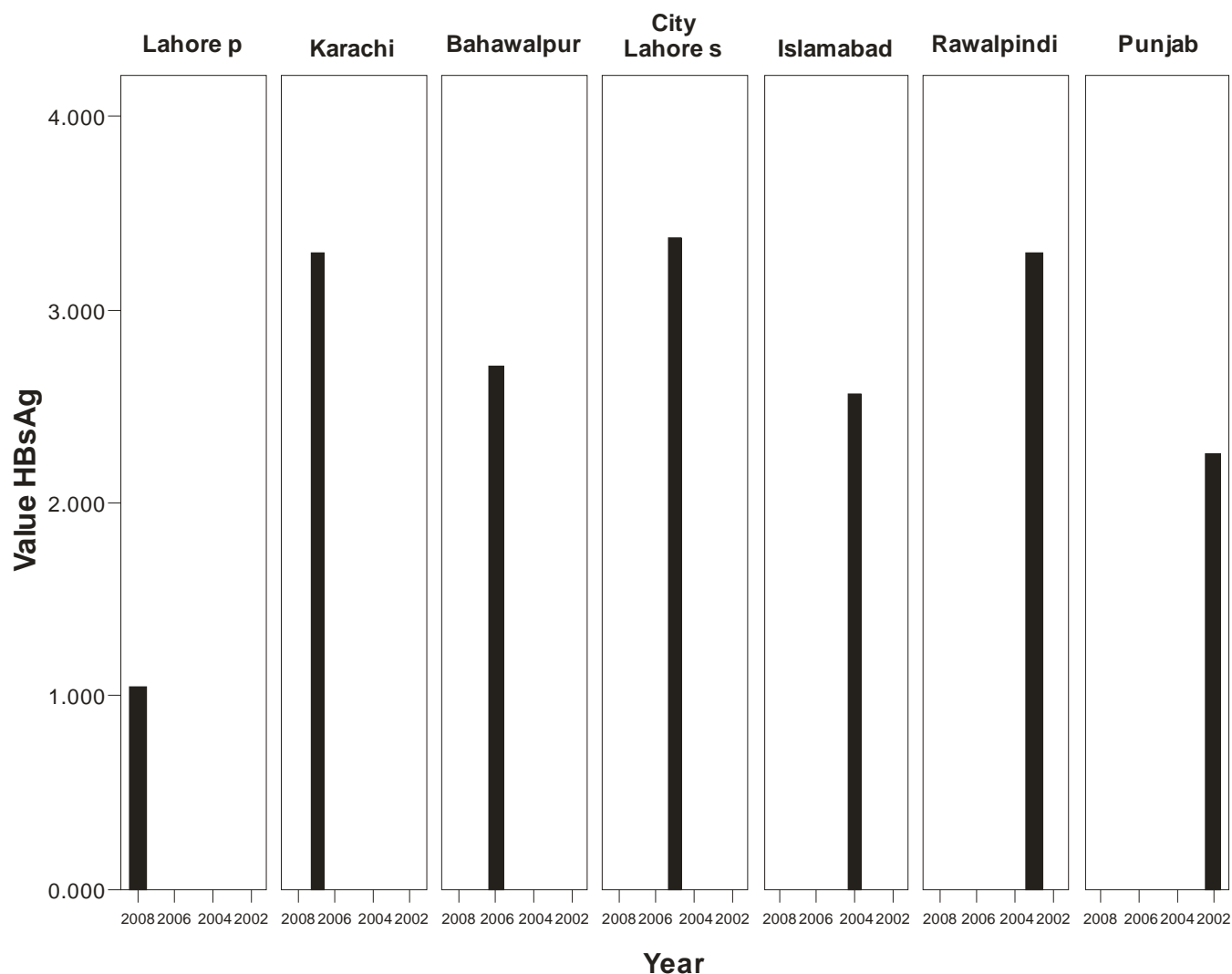
City	Author	Year	AntiHCV seroprevalence % age
Lahore ^(Present Study)	Shah SAR	2008	3.87
Karachi (13)	SA Mujeeb	2007	3.3
Bahawalpur (11)	Khan MA	2006	2.52
Lahore (10)	Sirhindi	2005	4.16
Islamabad (9)	Khokhar N	2004	5.31
Rawalpindi (12)	Khattak MF	2002	4.0

Table 3: Comparison of Anti HIV antibodies seroprevalence in blood donors in various parts of the country.

City	Author	Year	Anti HIV antibodies seroprevalence % age
Lahore ^(present Study)	Shah SAR	2008	0.00658
Bahawalpur (11)	Khan MA	2006	0
Lahore (10)	Sirhindi	2005	0
Punjab (8)	Rahman M	2002	0.001
Rawalpindi (12)	Khattak MF	2002	0.007

HCV infectivity has remained at a somewhat similar level during the last 6 years and showed a geographical distribution with a higher percentage in larger well populated cities of Lahore, Islamabad, Rawalpindi and Karachi.

Seroprevalence of HBV, on the other hand, showed a similar level in healthy blood donors tested in different parts of the country. The results of this study i.e. 1.406% were compared with other similar studies from Pakistan with a large sample size in Table 1, Figure 1. It was found to be somewhat lower than the other large pool studies carried out previously. It was reduced by about 0.9% when compared with a similar study reported from the same hospital in 2005¹⁰. Other studies from smaller cities with smaller sam-



Key: Lahore p stands for present study
Lahore s stands for study by Sirhindi et al.

Figure 1: Comparison of reported seroprevalence of HBsAg from different cities along with the year of publication of the study.

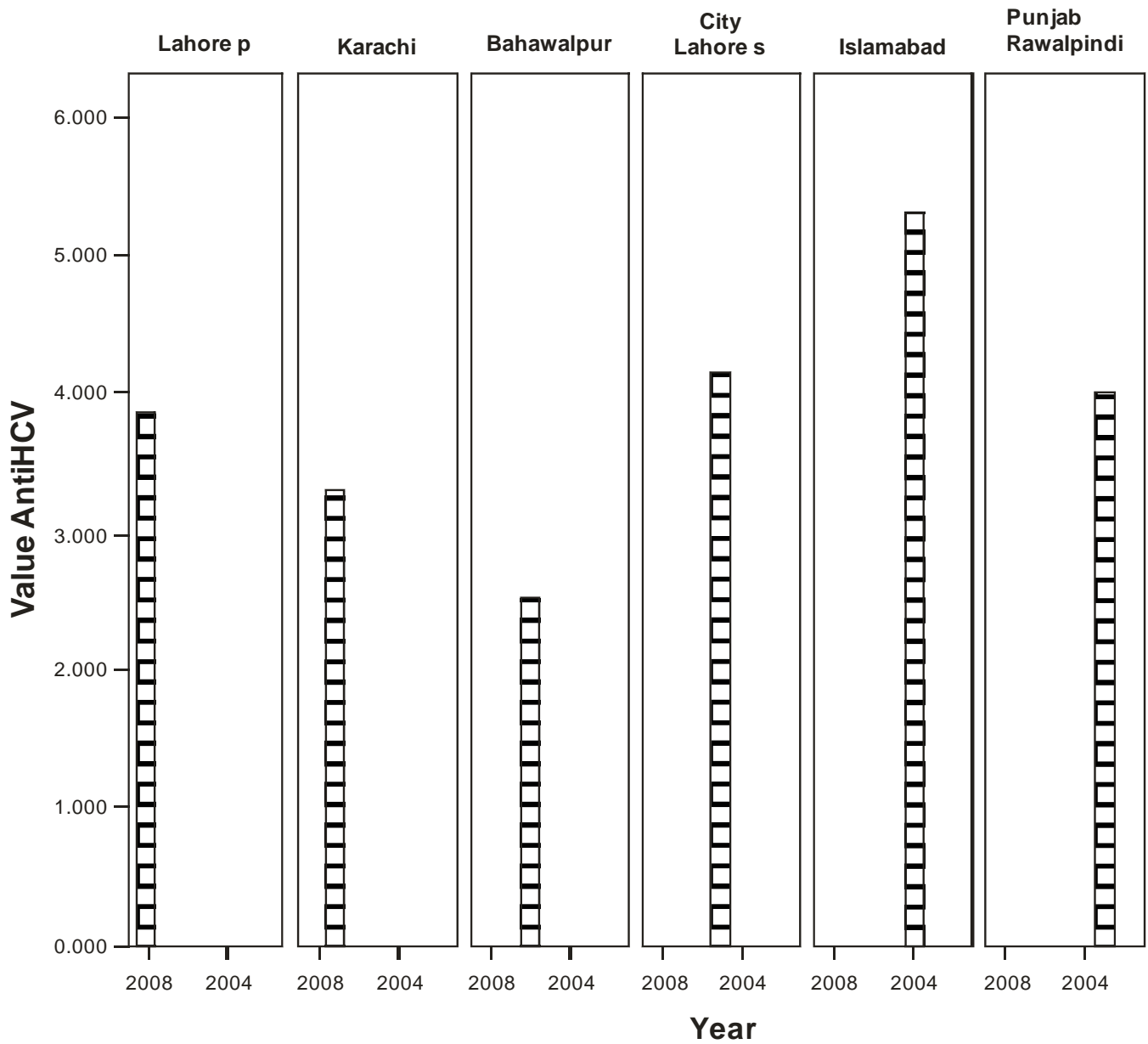
ple size reported 1.75% and 1.4% HBsAg seropositivity from Peshawar¹⁵, 3.37 from Multan²⁰. The present study indicated a lower seropositivity for HBsAg than the previously reported statistics from similar large pool studies. The most likely cause could be the nationwide free immunization drive for Hepatitis B which has similarly reduced the infectivity of Hepatitis B in other Southeast Asian countries.^{23,24}

HIV antibody seroprevalence has been reported to be very low in healthy blood donor population of Pakistan. The present study reported a seroprevalence of 0.00658% which is identical to that reported from Rawalpindi i.e. 0.007%¹². Earlier from Lahore Sirhindi and from Bahawalpur MA Khan reported no HIV positive cases in a large pool of donors.^{10,11} Seroprevalence of HIV was reported as 0.001%⁸ from Punjab (Table 3, Figure 3). Other reports were nil

seroprevalence from Rawalpindi,^{11,22} Quetta¹⁹ and Peshawar¹⁰ in blood donors. Our study demonstrated a seropositivity of 0.00658% in healthy donor population which is somewhat higher than most of the reports from Pakistan till now.

Conclusion

The present study presented data from a large donor pool size and may be considered representative of the young healthy male population from Lahore and its suburbs. It demonstrated a lower seropositivity for HBsAg than the previously reported statistics from similar large pool studies. The most likely cause could be the nationwide free immunization drive for Hepatitis B. It was noticed that the reported Anti HCV seroprevalence level remained at a somewhat similar level during the last 6 years and showed a geogra-



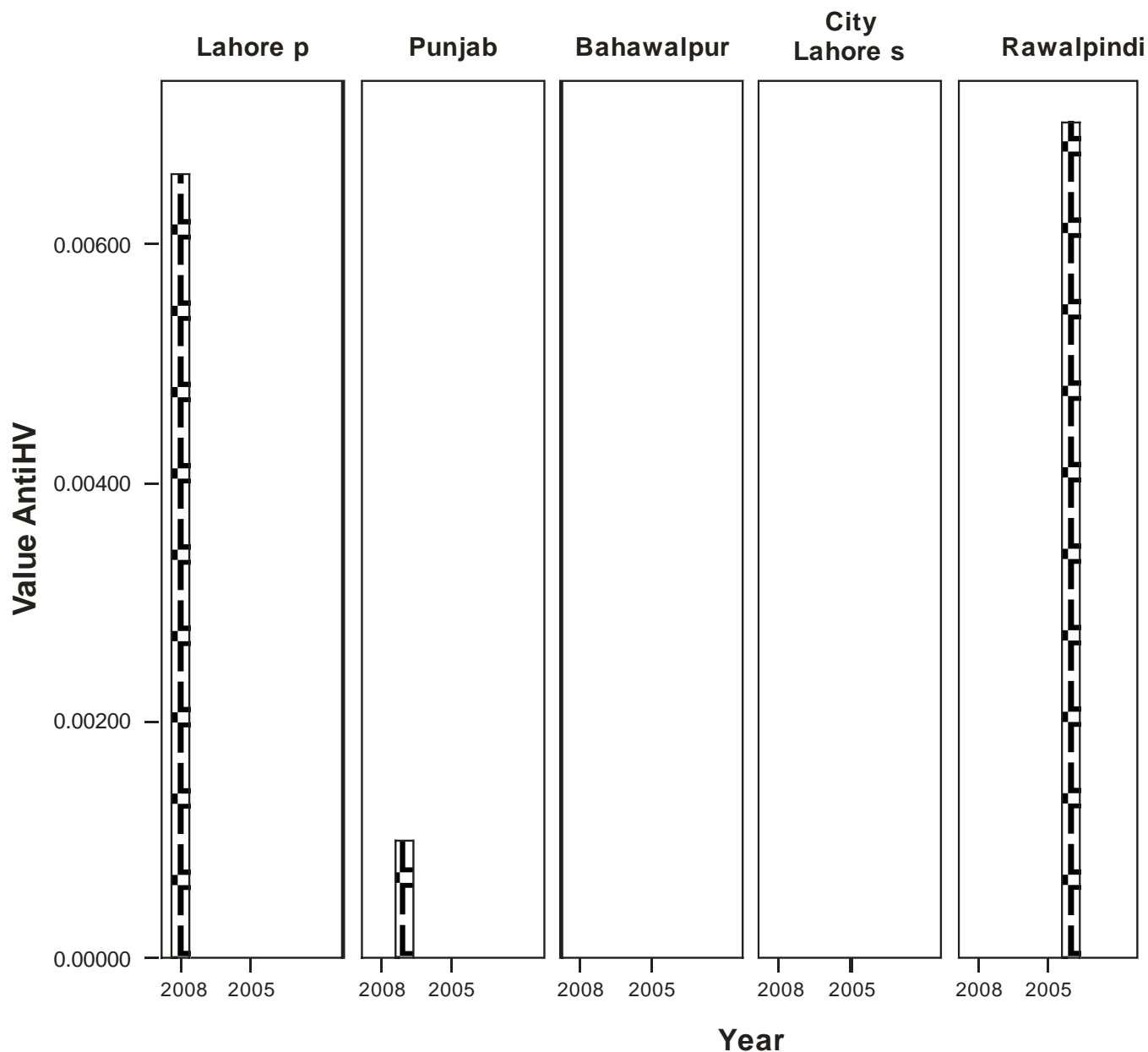
Key: Lahore p stands for present study
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Figure 2: Comparison of reported seroprevalence of Anti HCV from different cities along with the year of publication of the study.

phical distribution with a higher percentage in larger well populated cities. Seropositivity for HIV in this study was higher in healthy donor population than most of the large pool donor screening studies reported in local literature. This rise of HIV reactive cases in supposedly healthy blood donors who are being tested for directed blood donations is suggestive not only of a higher endemic status, but also of an increasing segment of unaware population at risk of spreading the disease.

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