

HIV Infection, HIV/HCV and HIV/HBV co-infections among Jail Inmates of Lahore

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ABSTRACT

Objective: Human immunodeficiency virus (HIV) infection constitutes an important prison health care concern but data on HIV epidemiology among jail inmates of developing world including Pakistan is limited. The present study was carried out to find out the prevalence of HIV infection among inmates of two jails of Lahore, Pakistan.

Methodology: Cross sectional prevalence survey of a total of 4915 jail inmates (4498 male and 417 females) was conducted during a seven months period, from May 2009 to November 2009 in the inmates of "District and Central Jails of Lahore". They were divided into four groups according to age. A blood sample was collected from each survey participant. All collected blood samples were screened for HIV antibodies, HBsAg and anti-HCV with rapid testing immunochromatographic (ICT) kits. All positive test results were confirmed by using the ELISA technique.

Results: The overall HIV prevalence rate was 2.01% and 77.78% of them had co-infections. HIV/HCV co-infection was detected in 73.74% of HIV positive inmates. Among women prisoners, one Pakistani and four Africans were found HIV positive. HIV infection and HBV/HCV co-infection was more prevalent in the age group 16-30 years.

Conclusion: The prevalence rate of HIV infection and its HBV/HCV co-infection in jail inmates is much higher than the general population and the prevalence rate reported earlier from other jails in Pakistan. Health information on jail populations is important as this is a vulnerable group, with frequent movement in and out of the general community. Urgent prevention efforts are needed as HIV prevalence is already 2%.

KEY WORDS: HIV, Sero-Prevalence, Inmates, Jails.

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INTRODUCTION

Epidemic of human immunodeficiency virus (HIV) infection is considered pandemic by the World Health Organization (WHO) and is spreading rapidly despite enormous efforts to control its spread.¹ The increased prevalence of HIV in prison system has been demonstrated repeatedly, but HIV prevalence varies regionally and across different demographic and risk groups.²⁻³

Centers for Disease Control and Prevention (CDC) estimates that about 1.1 million Americans who are HIV positive, one quarter (225,000) do not know their status and up to one-fourth of the people living with HIV infection in the USA pass through a prison

system each year.^{4,6} The reported high prevalence of HIV infection in inmates is largely attributed to illegal injectable drug use and sex related high risk activities particularly anal intercourse.⁷⁻⁹ While most inmates living with HIV/AIDS acquire it in the outside community before imprisonment, there is evidence that the risk of being infected in prison is great because of the shared routes of transmission.^{3,5}

Prisons do not exist in isolation from the general community. The majority of prisoners return to the cities and towns they came from. Resumption of risk behaviors such as unprotected sex and drug abuse shortly after release from prison is common.⁷⁻⁸ Injectable drug use and incarceration are closely linked; this poses a greater risk of HIV transmission within the prison, which is compounded by a lack of HIV preventative measures.⁶⁻⁸ When jail inmates are eventually released, they become a community health care concern.⁵

Whether infection was acquired within or outside the prison system, the prevalence of HIV among inmates is disproportionately higher compared with the general population. HIV prevalence rate of above 10% has been observed in prisons of many countries: Brazil, Burkina Faso, Cameroon, Côte D'Ivoire, Cuba, Estonia, Indonesia, Lithuania, Malawi, Malaysia, Romania, Rwanda, Slovakia, South Africa, Ukraine, Vietnam, Yemen and Zambia.¹⁰ Injecting illegal drug use is common in prison populations and eight countries reported greater than 10% prevalence of IDUs in prison. HIV prevalence among IDU prisoners was found above 10% in China, India, Indonesia, Iran, Libya, Russia, and Serbia.^{10,11}

There is lack of HIV prevalence data on vulnerable populations in Pakistan. Prison population is an important segment of the community in this regard. Testing is not performed systematically and no random surveys have been done, but available data indicate that sero-prevalence is higher in the prison settings than in the general population. This survey was carried out to collect information on HIV prevalence in prisons in Pakistan.

METHODOLOGY

Study Design and Duration: A cross-sectional survey was carried out in the jail population of Lahore from May 2009 to November 2009. This survey was a part of screening of prisoners of two jails of Lahore for HIV and hepatitis markers as per direction of Government of the Punjab.

Study Population: Random blood samples were collected from prisoners of District and Central jails

of Lahore, Pakistan and were tested for serologic markers of HIV and other infections.

A total of 4,915 inmates were tested including 4,498 males and 417 females. [Table-I]

Age grouping: Inmates were distributed according to age as follows: Group I- <15 years; Group II- 16 – 30 years of age, Group III was 31– 45 years old and Group 4 consisted of inmates >46 years of age. The mean age of participants was 28 years (range 12-85 years). [Table-II]

Ethnic distribution: Ninety eight Percent (4817) were Citizen of Pakistan and 2% (98) belonged to Afghanistan, Africa, India, Iran, Nepal and China.

Inclusion/exclusion Criteria: All inmates who were incarcerated for any duration during the time of the survey were eligible to participate. The only exception was those in maximum security and those who were condemned were not allowed to participate because of security reasons.

Site of Laboratory testing: Three teams collected blood samples from inmates. Each team comprised of a Pathologist, a laboratory technician and a phlebotomist. Laboratory testing was performed in the clinical laboratories of Government Hospitals (Services, Jinnah and Mian Munshi Hospitals), Lahore.

Serological assays: All collected samples were screened for HIV antibodies, HBsAg and anti-HCV with rapid testing immunochromatographic (ICT) kits available in the local market. All positive test results were confirmed by using the ELISA technique. Financial constraints did not permit confirmation of reactive blood samples by Western blot or PCR system.

Statistical analysis: All data were analyzed by using SPSS version 15 (SPSS Inc., Chicago, IL). Study variables included age, sex, and nationality. Categorical variables were presented in frequency and percentages while continuous variables were expressed as mean and standard deviations (\pm SD). For statistical comparisons on the basis of gender and age groups, chi-square test was applied. Statistical differences between various groups were considered significant when $P < 0.05$.

RESULTS

Final analysis was performed on 4915 blood samples. Ninety nine inmates tested positive for HIV antibodies, giving a prevalence rate of 2.01%. (Table I & II) Male inmates had very high rates of HIV infection (94/99) as compared to females (5/99) – $P < 0.001$. [Table-I] Among women prisoners, one Pakistani and four Africans were found HIV positive.

Table-I: Showing sex wise distribution and prevalence of HIV infection and HBV/HCV co-infections among inmates of Lahore Jails.

| Sex | Total | | HIV +ve | | HBV/HCV co-infections | |
|--------|--------|------------|---------|------------|-----------------------|------------|
| | n=4915 | Percentage | n=4915 | Percentage | n=99 | Percentage |
| Male | 4498 | 91.52 | 94 | 1.91 | 77 | 77.78 |
| Female | 417 | 8.48 | 05 | 0.10 | 00 | 00 |
| Total | 4915 | 100 | 99 | 2.01 | 77 | 77.78 |

Seventy seven of HIV positive participants had serologic evidence of co-infections; 73 of them were anti-HCV positive, one was HBsAg positive and 3 demonstrated triple infection. (Table-III)

Among the HIV positive inmates, all were aged less than 67 years, with the mean age being 27 years (median age 27 ± 8.60 years). Youngest HIV positive inmate was 18 years old and the oldest one aged 67 years. Both were male. 69 of them were in the 16-30 years age group, 23 were in 31-45 years age group, and 7 were in the >46 years age group. A significant relationship between age and HIV infection was observed and 69.70% (69/99) belonged to the 16-30 years age group as compared to other groups- $P < 0.001$ (Table-II).

The co-infection rate with HCV or HBV or both in HIV-reactive inmates in the age group 16-30 was clearly more than those in other age groups ($P < 0.001$), and 73.74% of them were co-infected with HCV, a figure highly significant as compared to co-infections with HBV or HBV/HCV ($P < 0.001$). [Table-III] No female inmate demonstrated co-infection. (Table-I)

DISCUSSION

The prevalence rate of HIV infection (2.01%) in inmates was higher than the general healthy population (0.0074%)¹², blood donors (0.007%)¹³ and inmates of other jails of Pakistan (0.75-1%)¹⁴⁻¹⁵ but lower than those of the IDUs (23%)¹⁶⁻¹⁷. However, this infection was significantly lower than that reported from other incarceration centers of the world including US 6.6%, Italy 7.5%, Ghana 19.2% and South Africa 41.4%.¹⁸⁻²¹

HIV is an emerging health issue in Pakistan. In our study, HIV-antibody positivity was significantly associated with young age (16-45 years) and male sex. This survey also provided estimations of HCV and HBV prevalence among HIV positive inmates. HIV prevalence rate of 0.75% and 1% was observed in jails of Balochistan and Sind provinces of Pakistan.¹⁴⁻¹⁵ HCV co-infection was noted in > 90% of the HIV-positive inmates of Sind.¹⁵

Reported studies indicate that inmates had high levels of HIV infection and co-infections with HCV or HBV. Among HIV-infected inmates in our study, 73.74% were co-infected with HCV. The present study also showed resemblance in the prevalence rates of HCV co-infection in HIV-positive inmates in comparison to the other studies carried out in Pakistan and in many developing and developed countries.^{15,18} However, the prevalence rates of co-infection with HCV or HBV in HIV-positive individuals has varied widely depending upon the geographic regions and the type of exposure. In Italy and USA, HCV co-infection was observed in about 90% and 65% of the tested HIV-infected inmates, respectively.^{6,8} These data indicate that HIV is an important health concern among inmates and IDUs and is complicated with co-infections that need to be addressed for effective treatment.²¹⁻²³

This study has established the presence of HIV infection among jail inmates of Lahore. It further necessitates detailed epidemiological and behavioral study for risk assessment in this sub-population. Those testing positive need support to prevent transmission of this infection to others both during their

Table-II: Showing age wise grouping, distribution and prevalence of HIV infection and HBV/HCV co-infections among inmates of Lahore Jails.

| Age group (yr) | Total | | HIV +ve | | HBV/HCV co-infections | |
|----------------|--------|------------|---------|------------|-----------------------|------------|
| | n=4915 | Percentage | n=4915 | Percentage | n=99 | Percentage |
| < 15 | 16 | 0.33 | 00 | 00 | 00 | 00 |
| 16-30 | 2920 | 59.41 | 69 | 1.40 | 53 | 53.54 |
| 31-45 | 1443 | 29.36 | 23 | 0.47 | 20 | 20.20 |
| > 46 | 536 | 10.91 | 07 | 0.14 | 04 | 4.04 |
| Total | 4915 | 100 | 99 | 2.01 | 77 | 77.78 |

Table-III: Demonstrating prevalence of HIV mono-infection, HIV/HCV, HIV/HBV co-infections and HIV/HBV/HCV triple infection among inmates of Lahore Jails.

| Test Reactive for | Subjects +ve | Percentage (n=4915) | Percentage (n=99) |
|-------------------|--------------|---------------------|-------------------|
| HIV Ab only | 22 | 0.44 | 22.22 |
| HIV & HCV | 73 | 1.48 | 73.74 |
| HIV & HBV | 01 | 0.02 | 1.01 |
| HIV, HCV & HBV | 03 | 0.06 | 3.03 |
| Total | 99 | 2.01 | 100 |

incarceration and once they return to the community. How jail health services deal with the HIV-infected person has important implications to the overall care of HIV-infected people in the community.^{3,5} Anyhow, specific health care measures are needed to ensure that HIV-infected persons have optimal care both inside prison and after release.^{3,5,22,23}

Foremost among inmates was the difficulty in accessing drug users and homosexuals- their activities are illegal and they were afraid of discrimination and punitive action- this was a hindrance for them to respond correctly to questions about injectable drug use and sex. Hence, it was not possible to get an exact picture of the current situation, so we excluded these risk factors from our statistical analysis as it was not part of our study. But the presence of HIV sero-positive inmates suggests that information and education programs for them could be useful to reduce the spread of such infections.

Urgent prevention efforts are needed as sero-prevalence of HIV infection is already 2%. The increasing transmission through injectable drug use and high risk sexual activities should receive proper attention through various educational programs. Inmates constitute an important part of the society in relation to the spread of such infections in the general community. The majority of persons who enter an incarceration center today will return home in the near future. Therefore, intervention programs implemented before their release can decrease HIV transmission.^{19-21,23}

Non-marital sex and homosexuality are prohibited in Islam. Preventive strategies should thus be directed towards these risk factors by the Government and non-government organizations in Pakistan and other Islamic countries. Strategies to control HIV infection in the Islamic perspective- have to abide by the Islamic rules and values, including strengthening of both Islamic and health education, encouraging people to follow and implement the Islamic rules

and values that prohibit adultery, homosexuality and drug use and to practice safe sex only through legal marriage.

Recommendation: Providing HIV testing in jails may help to increase early diagnosis of infection, and isolation of affected persons and their proper treatment can lead to reduction in spread of this infection.

CONCLUSION

The prevalence rate of HIV infection and its HBV/HCV co-infections is much higher in prisons in Pakistan than the general population and from other prisons of Pakistan reported in earlier years. The present prevalence rate suggests that prevention efforts in Pakistani prisoners should be considered as an important priority to minimize the spread of such infections. Intervention programs implemented at this stage would ultimately benefit the inmates, their families and the general community.

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REFERENCES

1. WHO: AIDS epidemic update 2009. UNAIDS/09.36E / JC1700E.
2. Hammett TM. HIV/AIDS and Other Infectious Diseases Among Correctional Inmates: Transmission, Burden, and an Appropriate Response. Am J Public Health 2006;96(6):974-978.
3. Bick JA. Healthcare Epidemiology: Infection Control in Jails and Prisons. J Clin Infect Dis 2007;45(8):1047-1055
4. MacGowan RJ, Margolis AD, Richardson-Moore A. Voluntary rapid HIV testing in jails. Sexually Transmitted Disease 2009;36(Suppl 2):S9-S13.
5. Nolle KC, Marx R, Pendo M, Loughran E, Estes M, Katz M. Highly Active Antiretroviral Therapy Use and HIV Transmission Risk Behaviors Among Individuals Who Are HIV Infected and Were Recently Released From Jail. Am J Public Health 2008;98(4):661-666.

6. Centers for Disease Control and Prevention (2009), HIV/AIDS Surveillance Report 2007, (Vol. 19)
7. Rosen DL, Schoenbach VJ, Wohl DA, White BL, Stewart PW, Golin CE. Characteristics and Behaviors Associated With HIV Infection Among Inmates in the North Carolina Prison System. *Am J Public Health* 2009;99(6):1123-1130.
8. Ruan Y, Luo F, Jia Y, Li X, Li Q, Liang H, et al. Risk Factors for Syphilis and Prevalence of HIV, Hepatitis B and C among Men Who Have Sex with Men in Beijing, China: Implications for HIV Prevention. *AIDS Behav* 2009;663-670.
9. Pontali E, Ferrari F. Prevalence of Hepatitis B virus and /or Hepatitis C virus co-infections in prisoners infected with the Human Immunodeficiency Virus. *Int J Prisoner Health* 2008;4(2):77-82.
10. Dolan K, Kite B, Black E, Aceijas C, Stimson GV; Reference Group on HIV/AIDS Prevention and Care among Injecting Drug Users in Developing and Transitional Countries. HIV in prison in low-income and middle-income countries. *Lancet Infect Dis* 2007;7:32-41.
11. Alavi SM. Relative frequency of infections among hospitalized injecting drug user HIV positive patients in Razi hospital, Ahvaz, SW Iran (2001-2003). *Jundishapoor J Microbial* 2008;1(1):6-9.
12. Khokhar O, Malik GJ, Khokhar N. Prevalence of HIV infection in a healthy population in Northern Pakistan. *Rawal Med J* 2003;28(1):12-16.
13. Khattak MF, Salamat N, Bhatti FA, Qureshi TZ. Seroprevalence of Hepatitis B, C and HIV in blood donors in Northern Pakistan. *J Pak Med Assoc* 2002;52(9):398-402.
14. Sheikh NS, Sheikh AS, Shan RU, Sheikh AA, Akhtar J. HIV/AIDS; Knowledge, attitude, behavior and practices in Prisoners. *Prof Med J* 2003;10(4):279-289.
15. Safdar S, Mehmood A, Abbas SA. Prevalence of HIV/AIDS among jail inmates in Sindh. *J Pak Med Assoc* 2009;59(2):111-112.
16. Altaf A, Saleem N, Abbas S, Muzaffar R. High prevalence of HIV infection among injection drug users (IDUs) in Hyderabad and Sukkur, Pakistan. *J Pak Med Assoc* 2009;59(3):136-140.
17. Bokhari A, Nizamani NM, Jackson DJ, Rehan NE, Rahman M, Muzaffar R, et al. HIV risk in Karachi and Lahore, Pakistan: an emerging epidemic in injecting and commercial sex networks. *Int J STD AIDS* 2007;18:486-492.
18. Babudieri S, Longo B, Sarmati L, Starnini G, Dori L, Suligoi B, et al. Correlates of HIV, HBV, and HCV infections in a prison inmate population: Results from a multicentre study in Italy. *J Med Virol* 2005;76:311-317.
19. Macalino GE, Vlahov D, Colby SS, Patel S, Sabin K, Salas C, et al. Prevalence and Incidence of HIV, Hepatitis B Virus, and Hepatitis C Virus Infections among Males in Rhode Island Prisons. *Am J Public Health* 2004;94(7):1218-1223.
20. Adjei AA, Armah HB, Gbagbo F, Ampofo WK, Quaye IKE, Hesse IFA, et al. Prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus and syphilis among prison inmates and officers at Nsawam and Accra, Ghana. *J Med Microbiol* 2006;55:593-597.
21. World Health Organization. 'Effectiveness of interventions to address HIV in prisons'. 2007.
22. Alavi SM, Etemadi A. HIV/HBV, HIV/HCV AND HIV/HTLV-1 co-infection among injection drug user patients hospitalized at the infection ward of a training hospital in Ahvaz, Iran, Pak J Med Sci 2007;23(4):510-513.
23. Romero EG, Teplin LA, McClelland GM, Abram KM, Welty LJ, Washburn JJ. A Longitudinal Study of the Prevalence, Development, and Persistence of HIV/ Sexually Transmitted Infection Risk Behaviors in Delinquent Youth: Implications for Health Care in the Community. *Pediatrics* 2007;119(5):1126-1141.

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Muhammad Nafees led the investigation, synthesized analyses and wrote the first draft of the article. Aqif Qasim was the co-investigator for the fieldwork portion of the study and assisted in analysis. Ghazala Jaffery and Muhammad Saeed Anwar contributed to the writing and review drafts of the article. Muhammad Muazzam provided helpful comments on a prior draft of this article and performed critical revision.

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