

SERO-PREVALENCE OF HCV AND ASSOCIATED INFECTIONS WITH HIV AND HBV AMONG PRISONERS IN LAHORE

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ABSTRACT

Background: Hepatitis C Virus (HCV) infection and its co-infection with HIV or HBV is associated with an accelerated course of the disease and may result in more rapid progression of either or both, but knowledge on these dynamics in the imprisoned is scarce particularly in the developing world. Hence in this study we evaluated the prevalence of HCV infection and its associated co-infections with HBV or HIV in the prison population of Lahore.

Methodology: This was a descriptive cross – sectional study aimed to estimate the prevalence of HCV infection in prisons of Lahore (Pakistan) between May and November 2009. In this study, 4915 prisoners participated; 91.5% of them were males, and 8.5% females. Median age of prisoners was 28 years. Jail inmates were tested for serological markers – HBsAg, HCV antibodies and HIV antibodies – by chromatographic immunoassay. Initially reactive sera were retested for HBV and HCV with ELISA and for HIV with another rapid method.

Results: In total, 783 (15.93%) prisoners were positive for HCV and 105 (2.13%) of all prisoners were registered having co-infection with HIV, HBV or both. Among 783 HCV positive prisoners 72 (9.19 %) had HIV co-infection, HCV / HBV co-infection was observed in 30 cases (3.83%) and triple co-infection (HCV / HBV / HIV) in three cases (0.38%).

Conclusion: The prevalence rate of HCV infection is quite high in the prison population of Pakistan and is mainly complicated with HIV co-infection. It is imperative that HCV, HIV and HBV prevention strategies be intensified in this community.

Keywords: Prisons, HCV, Infection, Co-infections, Prevalence, Pakistan.

INTRODUCTION

Hepatitis C Virus (HCV) is a life threatening human pathogen, not only because of its high prevalence and worldwide burden but also because of the potentially serious complications of persistent HCV infection and its co-infection with HIV / HBV is associated with an accelerated course of the disease and may result in more rapid progression of either or both.¹⁻²

HCV and HIV / HBV co-infections represent a public health problem of growing importance is because of similar modes of spread, many people are co-infected with HCV and HIV or HCV and HBV and in some cases with all three viruses at the same time.¹ In particular, HCV / HIV co-infections are common and are known as “twin epidemics”.²⁻³ Both are blood born RNA viruses that replicate rapidly. Direct ‘blood to blood transmission’ – through needle sharing – is the most efficient means of transmitting both viruses.³⁻⁴

Prison settings host a disproportionately high prevalence of HCV infection and co-infections. The prevalence of HCV among prisoners approaches

57.5%, and far exceeds that of HIV in prison.⁵ Transmission of these infections is believed to be a rare consequence of blood or body fluid exposures in the prison. However, if transmission does occur, the consequences are permanent and potentially fatal.¹⁻³ Co-infection with the two viruses (HCV / HIV) is associated with an accelerated course of hepatitis C disease.¹⁻³

Prison populations constitute a very high risk group, they have high levels of HCV infection and HIV or HBV co-infection.⁶⁻⁷ HCV positive inmates are at exceptional risk for co-infection with HIV because of the association of injectable substance abuse.⁵⁻⁷ Till to date, knowledge and research on the extent of HCV infection and associated HIV / HBV co-infections in the prisoners in Pakistan is scarce. Hence, we evaluated the prevalence of HCV and HIV or HBV co-infections in the prison population of Lahore jails, to appraise the current situation in Pakistan.

METHODOLOGY

Study Design and Period: Descriptive / cross – sec-

tional study aimed to estimate the prevalence of HCV infection in the prisons of Lahore (Punjab, Pakistan) between May and November 2009, as per direction of Government of the Punjab.

Study Population: Study participants included 4915 prisoners from 'Central and District Jails' of Lahore, Pakistan. Predominant majority of them were males (4498) and 417 were females (Table 1). Study population was distributed into six age groups (Table 2). Median age was 28 ± 10.88 years. Teenagers represented the youngest age group among prisoners of both jails (252/4915).

Nationality: Most of the prisoners (4817) belonged to Pakistan and 2% (98) were foreign national.

Study Centers for Laboratory Analysis: Selected teams collected blood samples from the inmates of both jails. Laboratory testing was performed by each team in the clinical laboratories of 1- SIMS / Services Hospital, Lahore, 2- Jinnah Hospital, Lahore and 3- Mian Munshi Hospital, Lahore.

Study Procedure: Blood specimens from participating prisoners were collected and tested for anti-HCV and HIV antibodies and HBsAg. Rapid testing immunochromatographic (ICT) devices were used for screening. Initially reactive samples were retested and final diagnosis of sero-positivity for HCV and HBV was made using ELISA system whereas HIV reactive sera were rechecked with chromatographic immunoassay of another manufacturer. Only repeatedly positive sera for HCV, HBV and HIV were included in the analysis.

Bio-statistical analysis: Data analysis was performed using SPSS version 15. Quantitative data was presented in frequency, percentage, mean and standard deviations. The qualitative data was analysed using Chi square test. Statistical differences between the groups were considered significant when 'p' value was < 0.05 .

RESULTS

A total of 4915 inmates were evaluated; 783 of them were anti-HCV positive, making the proportion of sero-positivity as 15.93% (Table 1).

Table 1: Shows gender distribution of all participating and HCV positive prisoners.

Gender	Subjects		Positive for HCV	
	No.	Proportion (%)	No.	Frequency (%)
Male	4498	91.51	736	16.36
Female	417	8.48	47	11.27
Total	4915	99.99	783	15.93

Among 4498 male prisoners, 736 (16.36%) were anti-HCV positive as compared with the female population of prisoners (11.27%) (Table 1). Male and female prisoners were predominantly between 21 – 40 years of age (72.83%). The anti-HCV positivity rate was highest among prisoners of 41 – 50 years age group (19.62%) (Table 2).

Table 2: Shows age wise distribution of all participating and HCV positive prisoners.

Age (years)	No. of subjects		Positive for HCV	
	No.	Rate (%)	No.	Frequency (%)
Upto 20	499	10.15	54	10.82
21 – 30	2432	49.48	368	15.13
31 – 40	1148	23.35	207	18.03
41 – 50	525	10.68	103	19.62
51 – 60	210	4.27	33	15.71
≥ 61	101	2.05	18	17.82
Total	4915	99.99	783	15.93

Overall sero-prevalence of HCV co-infections with HIV or HBV or both was 2.13% (105 / 4915) (Table 3). Among the total HCV positive prisoners, 13.4% (105 / 783) registered evidence of co-infection; HCV – HIV co-infection prevalence rate was 9.19% (72 / 783) and HCV – HBV co-infection was 3.83% (30 / 783). Frequency of HCV – HIV co-infection was significantly higher than HCV – HBV co-infection ($p < 0.001$), whereas triple co-infection (HCV – HIV – HBV) was very uncommon (0.38%). The proportion of HCV-HIV co-infection among co-infected prisoners was 68.57% (72/105) [Table 3].

Table 3: Shows distribution of HCV co-infection with HIV / HBV among prisoners.

Positivity status	Proportion (% age)			
	Subjects +ve	n = 4915	n = 783	n = 105
HCV+HIV	72	1.46	9.19	68.57
HCV+HBV	30	0.61	3.83	28.57
HCV+HIV+HBV	03	0.06	0.38	2.85
Total	105	2.13	13.40	99.99

Among HCV positive prisoners, a higher percentage of males was co-infected (9.19 % were positive for HIV and 3.19% for HBsAg) as compared

with female prisoners (0.0 % and 0.63 % for HIV antibodies and HBsAg respectively). Similarly, co-infection prevalence rate among HCV positive prisoners was much higher in the 21 – 30 years age group as compared with other age groups (Table 4).

Table 4: Shows gender and age wise status of HIV/ HBV co-infection in HCV positive prisoners.

Gender	HIV co-infection		HBV co-infection	
	n = 783	Rate (%)	n = 783	Rate (%)
Total	72	9.19	30	3.83
Male	72	9.19	25	3.19
Female	00	00	05	0.63
Age (years)				
≤ 20	02	1.90	06	5.71
21 – 30	45	42.85	11	10.47
31 – 40	18	17.14	06	5.71
41 – 50	05	4.76	04	3.80
51 – 60	02	1.90	02	1.90
≥ 61	00	0.00	01	0.95

DISCUSSION

Data of our study regarding prevalence of HCV infection in prisoners is variably comparable with the general population but lower than the IDUs and higher than the prison population of Pakistan reported earlier.⁸⁻¹³ Our data about prevalence of HCV co-infections with HIV / HBV among inmates is remarkable, HCV-HIV co-infection was observed in 9.19% of the HCV-positive inmates, and was much higher than HCV – HBV co-infection. The frequency of HCV infection and co-infections with HIV / HBV in our study appears to be high and consistent with the global literature. The reported prevalence rate of HCV mono-infection and co-infections with HIV / HBV among prisoners are very high in many countries of the world.⁵⁻⁷

Current data about HCV-HIV or HCV-HBV co-infections in the developing world is inadequate. A few studies from Pakistan provide some information about HCV mono-infection in the general population, among prisoners or people who abuse drugs.⁸⁻¹³ The prevalence rate of HCV infection has been reported to be 6.3% in Bahawalpur jail and 12.8% from jails of Sind,¹⁰⁻¹¹ but no local data is available on the prevalence of HCV co-infection with HIV / HBV. This sero-survey provides public health officials with important information about HCV in-

fection and associated co-infections among prisoners in Pakistani jails.

HCV prevalence estimates among IDUs range from as low as 17% in Rawalpindi to as high as 88% in Lahore and Quetta.¹²⁻¹³ These figures indicate that HCV infection in IDUs is much higher than the general population and comparable with the international data where prevalence reaches 100% in some regions of the world.¹⁴⁻¹⁶ Due to lack of information on HCV associated co-infections in the general population or IDUs, the impact of HIV and HBV co-infections on the HCV epidemic in Pakistan needs to be monitored closely.

According to an international study, regional estimates of HCV prevalence among IDUs varied widely, from 10% to 96% in Eastern Europe and Central Asia, from 10% to 100% in South and South-East Asia, from 34% to 93% in East – Asia and the Pacific, from 5% to 60% in North Africa and the Middle – East, from 2% to 100% in Latin America, from 8% to 90% in North America, from 25% to 88% in Australia and New Zealand, and from 2% to 93% in Western Europe. But in Colombia and Lebanon, all HCV prevalence estimates were below 20%. In addition, evidence of HIV / HCV co-infection among IDUs reached 90% in China, Poland, Puerto Rico, Russia, Spain, Switzerland, Thailand and Viet Nam.¹⁶

Prisoners do engage in drug – related risk behaviors, and the transmission of HCV, HBV and HIV infection may occur in the prison. However, there is uncertainty about the extent of transmission in the jail among I/V drug abusers but the available studies indicate that prevalence of HCV and co-infections is high in the prison system.^{1,3,14-16} As always, prevention is the key to arrest transmission, there is an urgent need to expand HCV counseling and testing for IDUs present in the jail and other settings, and to implement specific interventions that will decrease HCV / HIV – associated injection risk behaviors in order to prevent a possible surge in the incidence of co-infection in this sub-population.

Data of our study clearly indicate that HCV is an important health concern among prison population and is complicated with co-infections. Keeping in mind the observed high prevalence of HCV and co-infections, screening for HCV, HBV and HIV in all the imprisoned is recommended to identify those in need of specific health care. Harm reduction is crucial to diffuse the spread of these blood born viral infections and sexually transmitted diseases within and outside the prisons. Prison health system needs to be supported to prevent blood borne transmission and to provide treatment for HCV and other infections, regardless of cost.

We **conclude** from this study that HCV infe-

ction is highly prevalent in the studied prison population of Pakistan. It is further observed that prisoners infected with HCV are more frequently co-infected with HIV than HBV. Regular testing is required to identify infected prisoners which otherwise would remain undiagnosed without serological screening. The overall outcome represents the need for prison focused intervention initiatives in Pakistan and all those infected need access to prevention, treatment and care including psychosocial and economic support.

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