

## Original Article

# Seropositivity of hepatitis C in prison inmates of Pakistan — A cross sectional study in prisons of Sindh

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### Abstract

**Objective:** To assess the proportion of seropositivity of Hepatitis C amongst the prison inmates in the jails of Sindh.

**Methods:** A cross sectional HCV seroprevalence survey was done at 14 out of 19 prisons in the Sindh province from November 2008 to January 2009. A team of Pathologist, phlebotomist and laboratory technician took the blood sample of the inmates inside the correctional facility; the blood was centrifuged at the spot and brought back to the pathology laboratory on same day in cold chain i.e. a temperature-controlled supply chain. Serum was analyzed on 3rd generation ELISA for HCV antibodies. Standard ethical considerations were properly followed.

**Results:** A total of 9508 prison inmates were approached. Refusal rate was 20%. Remaining, 7539 prisoners were screened at 14 out of 19 jails in Sindh. HCV antibody positive were 965 making the proportion of seropositivity 12.8% (95% C.I. 8.92% - 12.92%). Higher seropositivity in the jails of northern Sindh jails was identified.

**Conclusions:** Hepatitis C prevalence in the prison population of Sindh is higher than the national prevalence of 4.9% amongst general population. However it is lower than that reported from correctional facilities of developed countries. Hepatitis prevention and control activities in the correctional facilities of Pakistan need to be institutionalized (JPMA 60:476; 2010).

### Introduction

Hepatitis C virus (HCV) continues to be a major disease burden on the world. In 1999, W.H.O estimated a worldwide prevalence of about 3% with the virus affecting 170 million people worldwide. Hepatitis C Virus, a blood borne pathogen, is most efficiently transmitted by direct percutaneous exposure to infectious blood. Of persons newly infected with HCV, only 20%-30% have symptoms of acute hepatitis. Chronic infection develops among 75%-85% of persons infected at >45 years of age and among 50%-60% of

persons are infected as juveniles or young adults. Few nationwide assessments of risk factors for the spread of Hepatitis B and C have been done. In one such meta-analysis Ali et al implicate contaminated needle use in medical care and drug abuse and unsafe blood and blood product transfusion as the major causal factors.<sup>1</sup> Idrees and Riazuddin in their genotype assessment of 3351 samples from all over Pakistan also suggested the use of syringes as a major cause of the spread of disease.<sup>2</sup>

Other studies identify intravenous drug use, blood

transfusions, repeated therapeutic injections, low level of education, habit of being shaved by a barber and haemodialysis as major risk factors contributing to the seropositivity of Hepatitis C.<sup>3,4</sup>

Studies from developed countries have consistently reported very high HCV antibody prevalence amongst the prison inmates. It varies from 11% to 40% mostly attributing to injecting drug usage.<sup>5,6</sup> However, variations have been reported (5-42%) amongst new entrants in prison.<sup>7,8</sup> When Hepatitis C seropositivity was specifically looked for, as correlates of sexually transmitted infections, it varied from 11-19 %.<sup>9,10</sup>

Recent years have seen Viral Hepatitis emerging as a substantial public health threat in Pakistan. In a review of hepatitis infections in Pakistan submitted to Planning Commission as annexure in the project document of National Programme for Prevention and Control of Hepatitis, Ministry of Health Government of Pakistan; Bosan and Bille estimated that if current status of prevention and control activities prevails, disease prevalence will triple in ten years time.<sup>11</sup> A community based study in Punjab, Pakistan estimated the prevalence of Hepatitis C as 6.5%.<sup>12</sup> While the National Survey on Prevalence of Hepatitis B and C in general population of Pakistan (2008) measured Hepatitis C prevalence in general population as 4.9%.<sup>13</sup>

Viral Hepatitis C prevalence is on a steady rise in rural parts of Sindh province. In voluntary blood donors it has increased significantly from 7.2% in 2004 to 8.9% in 2007.<sup>14</sup> Similar results have been reported showing high frequency of Hepatitis B and C amongst the military recruits in the districts of Central Sindh.<sup>15</sup> There is limited data available on the prevalence of Hepatitis C in the prison inmates of Pakistan. Only one published study in Southern Punjab Pakistan reports it to be 6.3%.<sup>16</sup> However, studies have been conducted in Pakistan which illustrate high number of injecting drug users, who are considered as "high risk" group for HIV and AIDS, including that for Hepatitis B and C; many a times they land up in prisons with consequent dangers of further spread.<sup>17</sup>

This alarming situation calls for assessing the current situation of HCV seropositivity in Pakistani prisons to launch comprehensive hepatitis prevention and control activities. Thus an exploratory study has been conducted in the prisons of Sindh province to assess the proportion of seropositivity of Hepatitis C amongst the prison inmates in the jails of Sindh. The paper is an attempt to present the survey findings as a bench mark for future policy decisions.

## Methods

A cross sectional seroprevalence survey for Hepatitis C antibodies was carried out in 14 out of the 19 prisons of

Sindh province in Southern Pakistan. The exercise was undertaken from November 2008 till January 2009. The prisons in Sindh are mainly located in the district headquarter towns, with a District Headquarter (DHQ) Hospital or a tertiary care hospital within 2 kilometers range. Prisoners of two categories were included in the survey; (a) Convicted; those prisoners who have completed their trial and were completing the sentence passed by the court of law (b) Prisoners for prolonged trial periods; those who were currently under trial at a court of law and minimum period of confinement was not less than 1 year. Those prisoners who did not give consent were excluded.

Fourteen teams consisting of a Pathologist, Phlebotomist and a Laboratory Technician working in the nearest District Headquarter (DHQ) or tertiary care hospital were formed. A standard procedure was adopted by teams, which moved out to the prison barracks where blood of the inmate was drawn, centrifuged at the spot and brought back to the pathology laboratory on same day in cold chain. A cold chain is a temperature-controlled supply chain comprising of an uninterrupted series of storage and distribution activities which maintain a given temperature range. It is used to ensure the potency/shelf life of vaccines/biological products and specimens;<sup>18</sup> in this case; serum. Temperature was maintained between 2°C -8°C. Then serum was then analyzed by 3rd Generation ELISA Kits (Medical Biological Services Italy). An exception was Central Prison Hyderabad; the serum samples from there were tested on immunochromatographic kit (Accurate); the reactive cases were then confirmed on 3rd generation ELISA kits.

## Ethical Considerations:

Before going for the screening of prison inmates, permissions were taken from the respective jail authorities and District Session Judge. These permissions were presented to the health department authorities for ratification. All prisoners were approached and offered to be screened with informed consent for each of the subject. It was also decided prior to the initiation of exercise that all infected inmates will be provided diagnosis and treatment on state expense.

## Results

A total of 9508 prison inmates were approached. The refusal rate after taking consent was 20%. Prison inmates screened for Hepatitis C were 7539. Predominant majority of the study subjects were male age between 16 to 65 years. However there were juveniles of age below 15 (n=209) and females (n=89) in one jail. The youngest age group in the prison was between 10-12 years of age. The total number of Hepatitis C positive prisoners was 965 making the proportion of seropositivity as 12.8%. (95% C.I 8.92% - 12.92%). Highest proportion of seropositive prisoners was present at

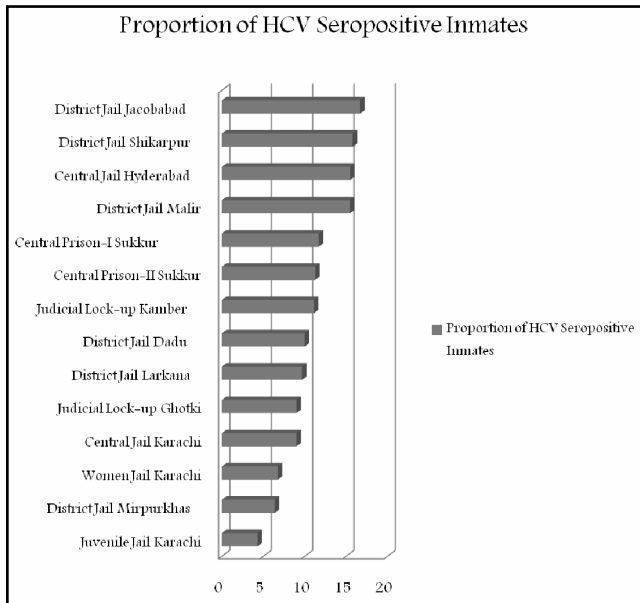


Figure: Bar Graph showing proportion of Hepatitis C positive prisoners at different jails.

District Jail Jacobabad (16.7%) and lowest seropositivity was found in Juvenile Jail Karachi (4.3%). The graphical representation of seropositivity in each of the prisons is given in Figure.

Further analysis was conducted to categorize the prisons according to seroprevalence status and its location. Considering the prevalence of Hepatitis C (4.9%) in the general population, identified by the PMRC survey as national average cutoff point, we have categorized prisons having seroprevalence below 4.9% as "below average", those having 5% to 7% as "above average", while prisons with seroprevalence 7% to 10% is categorized as "high" and prisons having > 10% seroprevalence are "very high". The

Table: Table showing seroprevalence categories of prisons and their location.

Name of Jail	Geographic Location	Seroprevalence Category
Juvenile Jail Karachi	South Sindh	Below Average
District Jail Mirpurkhas	South Sindh	Above Average
Women Jail Karachi	South Sindh	Above Average
Central Jail Karachi	South Sindh	High
Judicial Lock-up Ghotki	North Sindh	High
District Jail Larkana	North Sindh	High
District Jail Dadu	Central Sindh	High
Judicial Lock-up Kamber	North Sindh	Very High
Central Prison-II Sukkur	North Sindh	Very High
Central Prison-I Sukkur	North Sindh	Very High
District Jail Malir, Karachi	South Sindh	Very High
Central Jail Hyderabad	South Sindh	Very High
District Jail Shikarpur	North Sindh	Very High
District Jail Jacobabad	North Sindh	Very High

Table illustrates these categories.

Half of the prisons (n= 7) which fall under high and very high seroprevalence category are located in the Northern part of Sindh province.

## Discussion

Prison inmates around the world are known high-risk populations for the transmission of, Hepatitis B, C, HIV and other sexually transmitted diseases (STD). The risky behaviour among these marginal segments of the society include injecting the drug, sharing of needles, men having sex with men and homelessness.<sup>9</sup> This exploratory study has revealed that the Hepatitis C seropositivity is significantly higher (12.8%) than measured in the general population through the national survey (4.9%).

A closer look at the categorized data shows the higher prevalence at Jails of North Sindh (Jacobabad, Shikarpur and Sukkur). Highest prevalence was found at District Jail Jacobabad (HCV-Ab prevalence 16.7%) followed by District Jail Shikarpur (HCV-Ab prevalence 15.8%), Central Jail Hyderabad (HCV-Ab prevalence 15.5%) and Central Prisons at Sukkur ((HCV-Ab prevalence 11%). The high (15.4%) prevalence of Hepatitis C antibodies in District Jail Malir can also be explained by the fact that prisoners who are injection drug users are shifted to this specific jail. The same jail has the highest prevalence (2.8%) of HIV positive inmates in the province.<sup>17</sup>

One study on prisoners from Bahawalpur, South Punjab (hepatitis belt) by Fayyaz et al attributes high prevalence of Hepatitis C in prison inmates to drug abuse; prisoners shaved by the prison barber; history of operation and having rural origin.<sup>16</sup> A longer period of stay in the correctional facility (> 10-22 days) has also been attributed to the higher prevalence of HCV in these settings.<sup>19</sup> Due to the limitations of the study the period of stay could not be assessed in the Pakistani prisons.

With all the injection drug users skewed towards one correctional facility i.e. District Jail Malir, factors other than injection drug use may also contribute significantly to the high prevalence. Community based study have shown high rate of per capita injection delivery i.e. 13 injections per person per year in Sindh and out of which 47% are unsafe.<sup>20</sup> Above mentioned factors and unsafe injection delivery by a health care provider either before the incarceration or inside the jail might be the reason of higher prevalence in prisoners when compared to general population. Though it may be consoling to report that seroprevalence is still less than reported in correctional facilities of the developed world, 22% in Ireland,<sup>4</sup> 23% in USA<sup>3</sup> and 42% in Australia<sup>5</sup> compared to 12.8% in Pakistan. However the high figures are alarming in terms of potential of further spread in the community.

It has been argued by using cost utility analysis that screening and treatment for Hepatitis C Virus in prison is not cost-effective,<sup>21</sup> however conflicting evidence from other studies is reported declaring that treating a prison inmate is cost effective. It is too complex an issue to be decided upon by the cost studies only. Factors like state responsibility, public policy also need to be taken in consideration.

The study has its limitations that are; information on detailed demographic features of the inmates and other risk factors were not captured due to limited access provided. Follow-up studies to determine the correlates of high prevalence in this population group are being planned.

### Conclusions

Hepatitis C prevalence amongst prison inmates of Sindh is alarmingly higher than prevalence in the general population of Pakistan. This, therefore necessitates that the seroprevalence surveys be also conducted in prisons throughout Pakistan so as to determine the evidence followed by proper policy interventions. The relatively lower prevalence than reported by the westernized developed world correctional facilities, should not lead to complacency; this fact can be used as a window of opportunity for the initiation of Hepatitis Prevention and Control Programmes in the correctional facilities of Sindh. These programmes should be offered as a package along with HIV/AIDS control programme in prisons. More specifically, a strong health education programme in jails is needed with inclusion of (a) routes of transmission (b) risk factors for infection (c) disease outcomes, need for medical management and treatment options (d) methods to prevent the infection through vaccination and harm reduction (e) sexual precaution including abstinence counseling and condom use (f) risk reduction counseling (g) orientation of medical staff in the jails about infection control and safe injection delivery.

We also propose, screening for hepatitis B and C as mandatory for the new entrants into the prisons.

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