

Hepatitis C and Social Covariates Among Prisoners and Drug and Alcohol Rehabilitation Clients in Western Pennsylvania

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Abstract

A convenience sample collected over four years from prison half-way houses and drug and alcohol maintenance and rehabilitation sites in Allegheny County PA shows associations between positive immune response for Hepatitis C (HCV) and several covariates, including race, a history of intravenous drug usage, a history of snorting street drugs, blood exposure by other pathways, and having had a sex partner who is Hepatitis C positive. Several other variables show no association with HCV. Analysis of the sample data finds that only a history of injected drug use and other blood exposures directly influence HCV; other associated variables influence or are associated with these causes. Even allowing for sample selection bias, the frequency of HCV positives in this population appears to be extraordinarily high.

1. Introduction

Social risk factors and social pathways to infection among prisoners re-entering society and among those in maintenance programs for drug and alcohol rehabilitation are of special interest because these groups would appear to be at high risk for infection. Prevalence, spread and social risk factors for Hepatitis C infection (HCV) have been studied in a number of other groups^{1,2,3}, as has the association of HCV with drug practices among intravenous drug users⁴. We describe the results of a study of a four year convenience sample of clients of ten drug and alcohol treatment and methadone maintenance facilities and a large work- release center for prisoners in Allegheny County, Pennsylvania. The sample differs from other studies in some factors found to be associated with HCV, in other factors independent of HCV, and in the high frequency of HCV positive cases⁵. Analysis of the conditional independence structure of the data argues that only a history of intravenous drug use, or other blood exposure, directly influence Hepatitis C status, while other associated variables are risk factors for these causes.

2. Method

Data were collected on 631 subjects between May, 2001 and January, 2005 from 10 alcohol or drug treatment (AOD) centers, including 3 methadone maintenance clinics and a large work-release center for prisoners, in Allegheny County, Pennsylvania in conjunction with HIV counseling and testing. With the exception of 10 low risk staff members, all subjects were in AOD treatment. With the exception of 10 low risk staff members, all subjects were in AOD treatment. All clients (numbering more than two thousand) were offered HIV and HCV testing; those tested were volunteers.

Records were taken on the following variables: HCV status (positive/negative); sex (male/female); age (years); race (1 = African-American, 0 = caucasian [Data also include 1 Hispanic, 1 Asian and 2 “Other”]); blood transfusion before 1992 (yes, no); blood transfusion 1992 or later (yes, no); other blood exposure—as by accidental needle stick or blood splash (yes/no); history of intravenous drug use (yes, no); history of snorting street drugs (yes, no); cohabitation with an HCV positive person (yes/no); veteran (yes/no); number of sexual partners during life (#); current HCV positive sexual partner (yes/no); history of infection with a sexually transmitted disease (yes/no).

With the exception of HCV status, sex and age, all other records were self-reported. Approximately 2/3 of subjects gave responses to all questions. Response rates were above 90% for all variables except std history and number of sex partners. Consent forms were obtained from all subjects. Previous studies have found an association of HCV with age > 26; almost all subjects in this study fell in the upper partition of this cut-off. Presumably, some variables (e.g., cohabitation with an HCV positive person) were underreported.

3. Data Summary

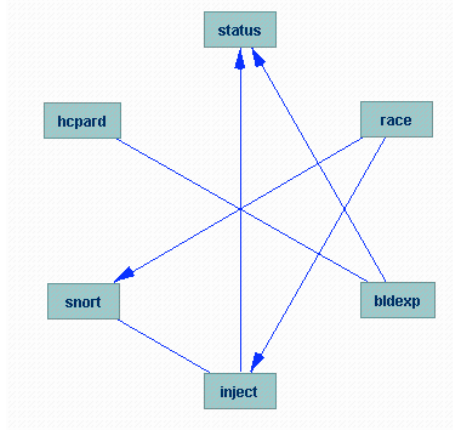
HCV Positive	279 (38.8%)
Male:	409 (65%)
Female	221 (35%)
Median Age	37

Mean Age	36
Median number of sexual partners	15
Ethnicity (African-American/Caucasian)	121/421
Transfusion before 92	57 (9.1%)
Transfusion 92 or later	27 (5.4%)
Other Blood Exposure	152 (25%)
Inject Street Drugs	65 (58%)
Snort Street Drugs	511 (81%)
HCV Positive Household	141(22.7%)
Veteran	69 (13.7%)
Number of sex partners (median)	15
Number of sex partners (min-max)	0 - 1,000
HCV Positive sex partner	93 (18.8%)
STD	104 (20.9%)

4. Data Analysis

Significant associations ($p < .01$ by Pearson chi square) with HCV status were found for the following variables: race, other blood exposure, snorting drugs, HCV positive sexual partner, and injecting intravenous drugs. Previous studies⁴ have found no association of HCV with race, and there appears to be no previous study recording associations of HCV status with HCV positive sexual partners. These associations therefore require some explanation.

If a covariate, such as an HCV positive sex partner, has no direct influence on HCV status but instead influences or is associated with intravenous drug use, we should expect the covariate to be independent of HCV status conditional on each of the two values of intravenous drug use. The same is true for blood exposure. All pairs of variables were tested for conditional independence conditional on each set of other variables (except HCV status). Associations that are not removed by conditioning on other covariates (i.e., for which the null hypothesis of conditional independence is rejected at $\alpha = .01$ or smaller) include: HCV positive sex partner with blood exposure; race with snorting drugs and with injecting drugs; and snorting with injecting drugs. Blood exposure is not independent of HCV status conditional on values of injected drug use ($p < .01$). For all other covariates, the null hypothesis of independence of HCV status and the covariate, conditional on intravenous drug use and blood exposure, cannot be rejected at any alpha value below 0.4. The data thus suggest the following pathways



where undirected edges represent associations whose direction or confounding is uncertain.

5. Discussion

Analysis of the data suggests that this population shows a pattern of HCV mechanisms similar to that found for other populations. The data show a lower risk for HCV among African American clients than among Caucasians, but this is probably a sampling artifact. The astonishingly high rate of Hepatitis C infection in this sample is likely in part due to a selection effect, since only volunteers were tested. The observed HCV rate does, however, strongly suggest that HCV testing should be systematic among those in alcohol and drug rehabilitation and those reentering society from prison populations.

References

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