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Alcohol use and HIV risk behaviors among HIV-infected hospitalized patients in St. Petersburg, Russia

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Abstract

Purpose: Russia has high per capita alcohol consumption and an injection-drug-use-driven HIV epidemic. However, the role of alcohol in the spread of HIV infection in Russia is largely unexplored. Thus, we assessed recent alcohol use and associated HIV risk behaviors among HIV-infected persons in St. Petersburg, Russia.

Methods: We recruited HIV-infected hospitalized patients from the Botkin Infectious Disease Hospital between June 2001 and March 2002. Interviewers assessed alcohol and drug use with the addiction severity index (ASI) and sex- and drug-risk behaviors with the risk assessment battery (RAB). Lifetime abuse or dependence diagnoses for alcohol and drugs were established by a physician with addiction medicine training.

Results: Among 201 subjects, diagnoses of abuse or dependence (AB/DEP) were common: 9% (19/201) had only alcohol AB/DEP; 39% (78/201) had alcohol and drug AB/DEP; 47% (95/201) had only drug AB/DEP; and 4% (9/201) had no diagnosis of alcohol or drug AB/DEP. Sex- and drug-risk behaviors varied significantly by substance use diagnosis. Subjects with any alcohol AB/DEP had higher sex-risk RAB scores than those with drug only AB/DEP (6.1 versus 3.9, $p < .0001$). Among subjects with any diagnosis of drug AB/DEP, having in addition an alcohol diagnosis was associated with unclean needle use in the last six months (33% (26/78) versus 21% (20/95), $p = 0.08$).

Conclusions: Lifetime alcohol diagnoses of abuse or dependence were present in nearly one-half of hospitalized HIV-infected patients in St. Petersburg, Russia and were associated with significantly higher sex-risk behaviors and borderline significantly higher drug-risk behaviors. As HIV infection spreads rapidly in Russia and Eastern Europe, these data support the need for HIV risk-reduction interventions in alcohol abusing populations and raise the potential of benefit by addressing alcohol use in HIV-infected populations.

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Keywords

HIV risk; Alcohol abuse; Russia

1. Introduction

Over the past five years, reports of HIV infection in Russia have increased dramatically, with an estimated one million people already infected (Hamers and Downs, 2003). This represents an approximate 10-fold increase from 130,000 infections reported in 1999 (Grisin and Wallander, 2002; Stephenson, 2000). According to forecasts, there may be approximately five million HIV-infected individuals in the Russian Federation by 2007 (Anonymous, 2002). The majority of HIV infection in Russia is currently among injection drug users (IDUs) (Dehne et al., 2000; Krupitsky et al., 2004).

Injection drug use is increasingly common in Russia. The number of drug-dependent persons rose 10-fold from 1986 to 1998 and exceeded two million people (Koshkina, 2000). However, even more common than drug use in Russia is alcohol consumption. In fact, in Russia, alcohol consumption per capita is among the highest in the world, particularly for men (Nemtsov, 2000). Average alcohol consumption for Russian men has increased from 29 g per day in 1992 to 45 g per day in 2002 (Zohoori et al., 2003). Estimates of lifetime prevalence of alcohol dependence in the former Soviet Union may be as high as 69% in men (Pakriev et al., 1998) versus 18% (Grant, 1997) in US men.

Alcohol use has been shown to impact HIV infection with increased transmission risk and possible disease progression. Several studies have demonstrated that people with heavy alcohol use tend to engage in riskier behaviors, such as sex with multiple partners, unprotected vaginal and anal intercourse, and injection drug use (Bagnall et al., 1990; Fenaughty and Fisher, 1998; Halpern-Felsher et al., 1996). In Asia, drinking alcohol is often associated with the high-risk behavior of engaging in sex, usually unprotected, with a commercial sex worker (Fordham, 1995; Gibney et al., 2003; Kim et al., 1998; MacQueen et al., 1996; Poudel et al., 2004; Wee et al., 2004).

In the United States, HIV infection has been examined in substance abuse treatment settings where its prevalence is increased among alcohol-dependent persons (Avins et al., 1994; Mahler et al., 1994). Alcohol abuse in combination with other drug use may lead to even more frequent occurrences of risky sex- and drug-use behaviors. Increased alcohol consumption is associated with sexual HIV risk-taking behavior among female drug users (Rees et al., 2001). Among IDUs, alcohol use is associated with increased sex-risk behavior (Stein et al., 2001). Specifically, among HIV-infected individuals with a history of alcohol problems, at-risk drinking was associated with inconsistent condom use among active IDUs (Ehrenstein et al., 2004). There are mixed results concerning the impact of alcohol use on risky injection drug behavior (Rees et al., 2001; Stein et al., 2000). Reasons underlying the association between alcohol use and high-risk behaviors for HIV have been described and include decreased inhibitions and risk perception (Cooper, 2002; Fromme et al., 1999), belief that alcohol enhances sexual arousal (George et al., 2000), deliberate use of alcohol to excuse high-risk behavior (Dermen et al., 1998), and the indirect association that bars are common places to meet potential sexual partners (Purcell et al., 2001).

Further, recent reports in animals raise the possibility that alcohol consumption plays a permissive role for HIV replication, possibly resulting in higher HIV viral loads which would be associated with higher transmission risk (Stoltz et al., 2002). Finally, among HIV-infected patients with a history of alcohol problems who are receiving antiretroviral treatment, alcohol

consumption was associated with higher HIV viral loads and lower CD4 cell counts, markers of HIV disease progression (Samet et al., 2003).

In light of Russia's epidemic spread of HIV, high alcohol consumption, and ongoing injection drug use, we sought to clarify if alcohol use among HIV-infected Russians exacerbated unsafe sex- and drug-use behaviors. Thus, we examined HIV risk behaviors and alcohol and drug use among hospitalized HIV-infected persons in St. Petersburg, Russia.

2. Methods

2.1. Study design

For 201 HIV-infected inpatients at an infectious disease hospital in St. Petersburg, Russia, researchers administered a survey and abstracted data from medical records in order to assess drug and alcohol use and severity, HIV risk behaviors, lifetime substance abuse, and dependence diagnoses. This study was approved by the Institutional Review Boards of Boston Medical Center and St. Petersburg Pavlov State Medical University.

2.2. Data collection

Data were collected between June 2001 and March 2002 at the Botkin Infectious Disease (ID) Hospital, an inpatient facility founded in 1882 for adult patients with infectious diseases in St. Petersburg, Russia. The 1200-bed hospital, staffed primarily by ID specialists, is the largest inpatient facility of its kind in Northwest Russia and is divided into departments (e.g. HIV/AIDS, hepatitis, and food-borne diseases) consisting of 40–50 beds each. It also has a surgery and maternity ward serving infected persons. In the 1990s and early 2000s, Botkin Hospital was the only inpatient site for HIV-infected individuals in St. Petersburg. All individuals admitted to the three departments that care for HIV-infected patients were eligible and asked to join the study. Most of the patients from these departments were admitted for initial presentation or exacerbations of viral hepatitis; 84% (201/240) of the approached patients agreed to participate. Study participants provided written informed consent prior to data collection. An interviewer assessed subjects in person using a standardized instrument to ascertain information including the following: demographics, HIV risk behaviors, alcohol consumption, and addiction severity. Diagnoses of lifetime alcohol or drug abuse or dependence were made through clinical assessment. Laboratory tests performed as part of clinical care were recorded. We obtained available serology results, liver function tests, and history of disease from medical records. All other data collected on subjects were obtained specifically for research purposes.

2.3. Measures of substance use and substance abuse and dependence

Within the first week of inpatient stay, subjects were evaluated for lifetime alcohol or drug abuse or dependence. Clinical diagnoses were made via assessment by an infectious disease specialist with training in addiction medicine (Maria Kuznetsova, MD) using criteria from the diagnostic and statistical manual of mental disorders—fourth edition (DSM-IV) (American Psychiatric Association, 1994). Additionally, interviewer assessment included standardized questions on alcohol and heroin use including the Michigan alcohol screening test (MAST) (Selzer, 1971), the time line follow back (TLFB) assessment (Sobell and Sobell, 1992), the addiction severity index (ASI) (McLellan et al., 1992), and the risk assessment battery (RAB) (Navaline et al., 1994), instruments with well-documented reliability and validity. For purposes of analysis, substance use diagnoses of abuse and dependence were combined resulting in four groups: alcohol only, alcohol and drug, drug only, and no diagnosis.

2.4. Primary outcome measure: HIV sex- and drug-risk behaviors

Estimates of sex- and drug-risk behaviors were derived from the risk assessment battery (RAB) (Navaline et al., 1994). This instrument sums the scores for individual items, for totals of 35 (sex-risk) and 25 (drug-risk). Scores are derived for both sex- and drug-risk behaviors via a series of questions including inquiries about numbers of sexual partners, usage of condoms, and sharing of needles.

Interviews were conducted in Russian. Standard survey elements already translated into Russian were used (i.e., MAST, ASI, TLFB, RAB). Other questions were translated from English to Russian, back-translated into English to check for accuracy, and then corrected.

2.5. Analysis

Fisher's exact (for categorical outcomes) and Kruskal–Wallis tests (for continuous outcomes) were used to compare subject substance use diagnosis with subject characteristics including risk behaviors for HIV infection. Reported p -values are two-tailed, and a p -value less than 0.05 was considered statistically significant. A multivariable linear regression was fit to predict RAB sex-risk subscale scores, as a function of diagnosis group, gender, and age. A logistic regression model, also controlling for gender and age, was fit to predict any needle sharing, for subjects with any drug diagnosis and injection use in the past six months. All analyses were carried out using SAS/STAT version 8.2 (SAS Institute, 2001).

3. Results

3.1. Subject characteristics

The characteristics of the 201 HIV-infected subjects are outlined in Table 1. Three-fifths (62%) were male, with a mean age of 27 years. The most common lifetime substance use diagnosis of abuse or dependence was drug only (47%), alcohol and drug (39%), and alcohol only (9%). Nine subjects (4%) had no substance use diagnosis. Assessments of past 30-day use of alcohol among those with any alcohol diagnosis ($n = 97$) revealed a mean of 28 g/day, the equivalent of approximately 2.5 standard drinks/day.

3.2. Risk behaviors

Risk assessments yielded a sex-risk subscale mean score of 5.0 and a drug-risk subscale score of 4.3. More than half (103/201) of all subjects reported greater than two sexual partners in the past six months, and 66% (132/201) reported inconsistent condom use, with 23% (47/201) of all subjects reporting condom use none of the time. Forty-seven percent (94/201) of all subjects reported injecting drugs in the last six months with 23% (46/201) reporting using others' needles and 35% (71/201) reporting sharing their own needles.

Results from data stratified by lifetime substance use diagnosis are displayed in Table 2. Notable among the results are significant differences among substance abuse diagnostic groups for age ($p < 0.0001$), current work ($p = 0.002$) and antibodies to the hepatitis C virus ($p < 0.0001$).

An unadjusted comparison between subjects with any diagnosis of alcohol abuse or dependence (i.e., alcohol only combined with alcohol and drug subjects) and those with only drug diagnoses reveals significantly higher sex-risk subscale scores (6.1 versus 3.9, $p < 0.0001$).

In multivariable linear regression, females had borderline significantly higher sex-risk scores (predicted scores 0.76 units higher than men, $p = 0.07$), while age was not a significant predictor ($p = 0.78$). Diagnosis group was a significant predictor of RAB sex-risk scores ($F(3,195) = 11.36$, $p < 0.0001$). There was a significant difference between the predicted RAB sex-risk

subscale score for subjects with any alcohol diagnosis compared to those with drug-only diagnoses ($F(1,195) = 22.1, p < .0001$).

Additionally, in an assessment of use of unclean needles, a comparison between drug users with alcohol diagnoses (26/78, 33%) and drug users without (20/95, 21%) indicated that more subjects with alcohol diagnoses used unclean needles in the last six months ($p = 0.08$). While controlling for sex, age, and diagnosis (drug and alcohol diagnosis versus drug-only diagnosis, 1 df), multivariate logistic regression indicated that younger age was a significant predictor of needle sharing (OR = 1.07, 95% CI = 1.01–1.15 per year, $p = 0.03$); gender was not a significant predictor (OR for females relative to males = 0.9, 95% CI = 0.4–1.9). Diagnosis of drug and alcohol versus drug-only diagnosis was associated with increased odds of any sharing (OR = 2.5, 95% CI = 1.2–5.1, $p = 0.02$).

3.3. Laboratory data

Among 123 subjects with recorded serology test results, 47% (58) were hepatitis B surface antigen positive. When stratified by lifetime substance use diagnoses of abuse or dependence, positive results for hepatitis B antigens were detected in 41% (7/17), 60% (29/48), 40% (20/50) and 29% (2/7) of the alcohol only, alcohol and drug, drug-only and no-diagnosis groups, respectively.

Among 200 subjects with available data, hepatitis C antibodies were detected in 93% (186). When stratified by substance use diagnoses, hepatitis C antibodies were detected in 74% (14/19), 95% (73/77), 97% (92/95) and 67% (6/9) of the alcohol-only, alcohol and drug, drug-only and no-diagnosis groups, respectively.

4. Discussion

Among hospitalized HIV-infected patients in Russia, reports of alcohol use and high-risk behaviors for HIV transmission are common. While a majority of subjects were diagnosed with drug abuse or dependence, almost half (48%) of all subjects had lifetime diagnoses of alcohol abuse or dependence. Further, a majority of the total population reported inconsistent condom use and/or having two or more sexual partners in the last six months. This extent of risky sex is particularly disturbing in that for women, sex-risk behavior may be more significant to HIV seroconversion than drug-risk behavior (Strathdee et al., 2001). Strathdee et al. (2001) also found that among female IDUs sex risks (e.g., recent STD and sex trade) were more commonly associated with HIV seroconversion than drug-related risk behaviors. Forty-seven percent of all subjects reported injecting drugs in the last six months, and almost half of these reported using others' needles. The marked substance abuse and risk behaviors in this population of HIV-infected individuals are alarming.

The finding of an association between HIV risk behaviors and an alcohol abuse or dependence diagnosis is notable in that Russia's HIV epidemic has been nearly totally attributed to injection drug use (Dehne et al., 2000). We found that sex-risk was greater, as reflected in the RAB sex-risk subscores, with diagnoses of alcohol abuse or dependence. Also, an alcohol diagnosis was associated with increased odds of needle sharing. These findings are of particular importance given the fact that in Russia alcohol use is widespread, alcohol dependence is common, and HIV infection is epidemic. The small number of subjects diagnosed with "alcohol only" lifetime abuse or dependence is unique in two ways. First, these subjects were significantly older than the subjects with other substance use diagnoses. Second, co-infection with hepatitis C was common among a surprising number (74%) of alcohol-only subjects. In fact, co-infection with hepatitis B and, particularly C, was common in the entire cohort. This abnormal prevalence is likely a result of selection bias as reasons for hospitalization included acute hepatitis. Because the interview did not assess whether or not subjects ever used injection drugs, we cannot

speculate on the means of transmission of hepatitis C to those with alcohol-only diagnoses. This may be a limitation of these data and implicate the need for further study of this population.

Our study has other noteworthy limitations. These data represent a cross-sectional perspective of the substance abuse and risk behaviors of a population of HIV-infected inpatients with substantial co-morbidity. Thus, inferences that may be drawn regarding the influence of alcohol on HIV risk behaviors in general populations are limited. However, as illness severity is typically greater in hospitalized patients, and sicker patients have been shown to have less drug- and sex-risk behaviors (Collins et al., 2001) use of such patients is likely to provide a conservative estimate of HIV risk. Additionally, because our population has already been infected with HIV, our data cannot address the relationship between HIV infection and use of alcohol or drugs. Further, the risk behaviors of those already infected with HIV may differ from those among non-infected individuals in Russia.

Despite these limitations, our data show that lifetime diagnoses of alcohol abuse or dependence were present in nearly one-half of hospitalized HIV-infected patients in St. Petersburg, Russia and were associated with significantly higher sex-risk behaviors and a trend toward higher drug-risk behaviors. As HIV spreads rapidly in Russia and Eastern Europe, addressing alcohol use in HIV-infected persons holds potential to decrease the transmission of HIV by lowering the prevalence of high sex- and drug-risk behaviors.

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Table 1

Demographic and substance abuse characteristics of HIV-infected persons in an infectious disease hospital in St. Petersburg, Russia ($n = 201$)

Characteristic	Total cohort ($n = 201$)
Female	76 (38%)
Age	26.6 (8.17)
Current work	34 (17%)
Hep C ($n = 200$)	186 (93%)
Hep B ($n = 123$)	58 (47%)
Grams ethanol/day ($n = 98$)	28.19 (32.31)
MAST	6.58 (5.00)
Addiction severity index	
Medical status	0.72 (0.34)
Employment	0.71 (0.29)
Alcohol use	0.15 (0.22)
Drug use	0.10 (0.16)
Legal (law)	0.14 (0.27)
Family (social)	0.31 (0.28)
Psychiatric	0.56 (0.24)
Risk assessment battery	
Sex-risk subscale	4.98 (2.96)
Always condom/no sex	69 (34%)
Two or more partners	103 (51%)
Drug-risk subscale	4.31 (5.54)
Injected drugs ^a	94 (47%)
Used others' needles ^a	46 (23%)
Shared their needles	71 (35%)

^aRefers to the 6 months prior to assessment.

Table 2

Demographic and substance abuse characteristics of HIV-infected persons in an infectious disease hospital in St. Petersburg, Russia stratified by alcohol and drug abuse or dependence diagnoses ($n = 201$)

Characteristic	Abuse or dependence diagnosis [n(%) or mean (S.D.)]				p-value
	Alcohol only ($n = 19$)	Alcohol + drug ($n = 78$)	Drug only ($n = 95$)	No diagnosis ($n = 9$)	
Female	7 (37%)	21 (27%)	43 (45%)	5 (56%)	0.05
Age	36 (10.9)	27.3 (6.9)	23.3 (6.0)	35.9 (9.1)	<0.0001
Current work	6 (32%)	15 (19%)	12 (13%)	1 (11%)	0.0016
Hep C ($n = 200$)	14 (74%)	73 (95%)	92 (97%)	6 (67%)	<0.0001
Hep B ($n = 123$)	7 (41%)	29 (60%)	20 (39%)	2 (29%)	0.13
Grams ethanol/day ($n = 98$)	43.85 (54.48)	24.68 (23.26)	2.37 (3.55)	2.92 (5.28)	<0.0001
MAST	11.79 (4.77)	9.54 (4.57)	3.45 (2.71)	3.11 (2.71)	<0.0001
Addiction severity index					
Medical status	0.82 (0.25)	0.71 (0.37)	0.69 (0.33)	0.76 (0.34)	0.29
Employment	0.86 (0.25)	0.68 (0.31)	0.70 (0.28)	0.77 (0.23)	0.07
Alcohol use	0.43 (0.32)	0.23 (0.22)	0.04 (0.06)	0.02 (0.04)	<0.0001
Drug use	0.00 (0.0)	0.09 (0.14)	0.13 (0.17)	0.00 (0.0)	<0.0001
Legal (law)	0.20 (0.34)	0.17 (0.30)	0.12 (0.24)	0.00 (0.0)	0.08
Family (social)	0.37 (0.27)	0.32 (0.30)	0.29 (0.27)	0.25 (0.29)	0.56
Psychiatric	0.68 (0.21)	0.58 (0.23)	0.51 (0.25)	0.59 (0.16)	0.03
Risk assessment battery					
Sex-risk subscale	5.95 (2.63)	6.17 (3.13)	3.86 (2.41)	4.89 (2.76)	<0.0001
Always condom/no sex	4 (21%)	23 (29%)	37 (39%)	4 (44%)	0.31
2 or more partners	13 (68%)	52 (67%)	35 (37%)	3 (33%)	0.0003
Drug-risk subscale	0.00 (0.0)	4.53 (5.68)	5.38 (5.67)	0.22 (0.67)	<0.0001
Injected drugs ^a	0 (0%)	39 (50%)	54 (57%)	1 (11%)	<0.0001
Used others' needles ^a	0 (0%)	26 (33%)	20 (21%)	0 (0%)	0.004
Shared their needles	0 (0%)	29 (37%)	42 (44%)	0(0%)	0.0003

^aRefers to the 6 months prior to assessment.