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Injection drug use is associated with HIV risk perception among Mexican Americans in the Rio Grande Valley of South Texas, USA

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Abstract

Objectives—Injection drug use (IDU) remains an actual risk variable in HIV infection in most ethnic populations and the association between actual risk and individual perception of HIV risk varies across studies and samples. This study aimed to examine the relationship between IDU and HIV risk perception among Mexican Americans residing in Rio Grande Valley, South Texas.

Study Design—A cross-sectional study of IDU as a predictor of HIV risk perception.

Methods—We assessed 275 participants (IDU = 11.9%, non-IDU = 88.1%) for the association between IDU and individual risk perception for HIV infections, as well as history of drug use and HIV risk perception using chi square statistic for independence and logistic regression model for the prevalence odds ratio.

Results—There was no statistically significant difference between IDU and non-IDU with respect to the socio-demographic variables except for income and gender, $P < 0.05$. The results further indicated a statistically significant decreased HIV risk perception among injection drug users (IDUs) compared with non-IDUs, after adjustment for age, gender, sexual preference, history of drug use and marital status, prevalence odds ratio (POR), 0.26, 95% Confidence Interval (CI), 0.11-0.65. Likewise, history of drug use was associated with decreased HIV risk perception, POR, 0.44, 95% CI, 0.22-0.98.

Conclusions—These results suggest an inverse correlation between actual risk for HIV infection such as IDU and HIV risk perception. Therefore, assessing HIV risk perception, which is a significant determinant of behavior change, is essential in reducing HIV infection prevalence in the targeted population.

Keywords

injection drug use; Mexican Americans; Hispanics; drug use; HIV risk perception

INTRODUCTION

Although men having sex with men remains the most prominent mode of HIV transmission, (42.9%), injection drug use accounts for an estimated 20.3%, of all HIV/AIDS cases diagnosed in the United States during 2005.^{1,2} During the same period, among women and men, IDU

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accounted for 19% and 13% of all HIV/AIDS cases, respectively.² Injection drug use is a significant risk factor for HIV transmission among minority populations, especially Hispanics. During 2001 – 2004, IDU accounted for 19% of all HIV/AIDS cases among Hispanic adults/adolescent males and 23% among Hispanics adults/adolescent females.³ Among Hispanics adults/adolescent females and males, IDU represented 29% and 24% of the cumulative HIV/AIDS cases respectively at the end of 2005.¹ Besides the potential for needle sharing associated with IDU, which directly increases the chances of HIV infections, casual and chronic IDU predispose individuals to risky sexual behaviors, including unprotected sex due to altered mentation.⁴

Several studies have examined HIV/AIDS risk perception among minority populations, including Hispanics in the United States.^{3, 5-10} Other studies have also focused specifically on Puerto Ricans.^{7, 11-12} In general, these studies have demonstrated that an individual's perception of risk rather than actual risk such as IDU and non-IDU determine HIV infection-related behavior including unsafe sex. Therefore, a comprehensive and reliable methodology to assess risk perception among minority populations is necessary in reducing HIV incidence and prevalence.

Individual level of risk perception based on participants' belief on the chances of contracting HIV and sexually transmitted diseases during the last 30 days, or three to six weeks has been reliably used to measure risk perception. To our knowledge, there are no studies that have examined the association between IDU and HIV risk perception in this population of Mexican Americans, and neither are there consistent data on the actual risk for HIV infection. This present study was proposed to assess IDUs, non-IDUs and/or non-drug users' perception of risk for HIV/AIDS infection (not the actual risk itself) among residents of the Rio Grande Valley, South Texas, which is a predominantly Mexican American ethnic minority population. We hypothesized that individuals with actual risk such as IDUs in our sample are more likely to perceive themselves as being at risk for HIV infection since drug use and IDU in particular are associated with HIV transmission. Our study thus has implications for HIV prevention, since increased perception of risk among IDUs may lead to a reduction in HIV incidence among Mexican Americans in the Rio Grande Valley.

METHODS

After appropriate approval was received from the relevant Institutional Review Board, we utilized a cross sectional design to assess the association between injection drug use as an actual risk for HIV infection and an individuals' risk perception for HIV infection.

Study Design and Participants

The overall study sample included 316 participants recruited among recipients of social services from a community-based organization in the Rio Grande Valley, if they met the inclusion criteria for the survey. The inclusion criteria were : 1.) male or female, 2.) age 18 years and older, 3.) residence of the Rio Grande Valley, South Texas during the past 24 months prior to the survey and 4.) Hispanic ethnicity. The participants were sampled using systematic sampling method from the sampling frame of the social services agency (list of recipients of social services). This sampling approach is feasible given access to the complete list of all adults utilizing services from the community center. For a random start, we drew a number from a box containing 2, 4, 6, 8 and 10, and selected every *k*th (even) number. Specifically, to obtain the total number of participants, we selected from the list all records from the social services database, subjects with even numbers until the desired sample size was reached (n=316). The study population comprised 275, indicating 87% response rate. The study participants were asked to complete a questionnaire that assessed socio-demographic characteristics, history of drug use, injection drug use, HIV risk perception, knowledge of HIV

transmission through IDU, and sexual assertiveness and self-efficacy for risk behaviors. The questionnaire was administered in either English or Spanish depending on the participant's language of preference. The study used a cross sectional design to assess whether or not IDU is associated with HIV risk perception. In addition, we assessed the relationship between a history of drug use and HIV risk perception. There was a sufficient power (87.7%) to detect the difference between IDUs from non-IDUs with respect to the outcome variable.

Measures

Independent variable—Injection drug use was assessed with two items: whether the participants ever injected drugs with a needle, and whether the participants had injected drugs with a needle during the last thirty days. A binary scale was used for these items: “yes” or “no”.

Dependent/outcome variable—Risk perception was assessed with two items: the chances or risk of contracting STDs based on the participant's behavior during the past three months, and the chances of the participants contracting HIV based on their behavior during the past three months. The choices were “not at risk”, “somewhat at risk”, or “extremely at risk”.

Covariates—The measures of the covariates were derived from similar scales used for the dependent and independent variables.

History of drug use: participants were asked if they ever used drugs, with this item measured in a binary scale.

Knowledge of HIV modes of transmission via IDU: participants were asked if a person with HIV uses injection drug, could he/she transmit the virus to other people by having sex. The choices were: “yes”, “no” and “don't know”

Socio-demographic characteristics: ethnicity, age group, marital status, sex, sexual orientation and religion were self-reported.

Statistical Analysis

Data transformation was performed prior to analysis. Where necessary, items were recoded to ensure that lower categories remain a reference group for logistic regression modeling. The frequency distribution was performed for all categorical variables in order to obtain the prevalence proportion. Pearson Chi square statistic and Fisher's exact to compensate for small cells count were used to test for differences in the distribution of study characteristics by IDU and non-IDU.

Univariable unconditional logistic regression was performed for the prevalence odds ratio in the association between the independent variable (IDU) and the dependent variable (HIV risk perception). The association between other study covariates and HIV risk perception was assessed for possible confounding effect prior to entry into the multivariable logistic regression model. To determine the factual or non-confounding association between actual risk for HIV infection (IDU) and individual's perception of being at risk, we entered each covariate into the univariable model covariate separately. To enter into the multivariable logistic regression model, covariates needed to be significant at $P < 0.25$. All covariates that met this criterion or that were clinically or biologically relevant, such as age and gender, were entered into the multivariable unconditional logistic regression model. We also tested for interaction using the product term, and entered the interaction variable into the univariable model, in order to assess this variable for appropriate inclusion into the multivariable model. To qualify for entry into the multivariable model, the interaction needed to be significant at $P < 0.10$. Finally, we tested

for the fitness of the model using Hosmer-Lemeshow goodness of fit statistic and reported the prevalence odds ratio for the association between HIV risk perception and IDU, adjusting for sex, age, marital status, and history of drug use. The adjusted prevalence odds ratio (APOR) is an adequate measure of the association between the dependent and independent variables given the cross sectional nature of our data. All statistical tests were two tailed, at $P < 0.05$ significance level. STATA statistical package version 9.0 was used to perform all the analyses.

RESULTS

Table 1 presents the comparison of injection drug use (IDU) with non-injection drug use by study characteristics, namely socio-demographic factors. There was a non-statistically significant difference in the distribution of socio-demographic factors between those who reported using injection drugs and those who did not, except for gender and income, $p < 0.05$. The IDUs were not different from non-IDUs with respect to race, age group, sexual orientation, religion, employment, and marital status, $p > 0.05$.

Table 2 shows the comparison between IDUs and non-IDUs stratified by HIV risk perception. There was no statistically significant difference in self-reported HIV risk perception between IDUs and non-IDUs, except for income. Compared with subjects with low-income level, those with high-income level were more likely to perceive themselves at risk for HIV infection, $\chi^2 = 5.2$ (1), $p = 0.02$. Though not statistically significant, those with higher education who were non-IDUs were slightly more likely to report of being at risk for HIV, 93.2% versus 90.9%, $p > 0.05$. In addition, female IDUs were more likely to perceive themselves as being at risk for HIV compared with their male counterparts, 58.3% versus 41.7%, $p > 0.05$. Likewise, heterosexual IDUs were more likely to perceive themselves as being at risk for HIV infection compared with their homosexual counterparts, 90% versus 10%, $p > 0.05$. Furthermore, injection drug users who were married were more likely to perceive themselves at risk for HIV infection compared with their unmarried counterparts, 6.6% versus 8.5%, $p > 0.05$.

Though not shown on table, compared with non-injection drug users, injection drug users were 67% less likely to perceive themselves as being at risk for HIV infection, crude Prevalence Odds Ratio (POR) = 0.33, 95% confidence interval (CI) = 0.15-0.73. Though statistically non-significant, those with positive history of drug use were 38% less likely to perceive themselves as being at risk for HIV infection, POR = 0.62, CI = 0.34-1.14. In addition, compared with those with less than high school education, those with educational attainment greater than high school were 26% more likely to perceive themselves as being at risk for HIV infection, POR = 1.26, CI = 0.75-2.12.

Table 3 presents the association between HIV risk perception and injection drug use after adjustment for age, sex, sexual orientation, history of drug use, and marital status. There was a statistically significant decreased risk perception for HIV infection among injection drug users. Therefore, compared with those not using IDU during the last 30 days, those who reported of using injection drugs were 74% less likely to perceive themselves at risk for HIV infection, APOR = 0.26, 95% CI = 0.11–0.65. History of drug use was statistically significantly associated with HIV risk perception. Compared with participants without history of drug use, participants with a history of drug use were 64% less likely to perceive themselves as being at risk for HIV infection, APOR = 0.44, 95% CI = 0.22–0.98. An interesting finding was shown in the relationship between marital status and HIV risk perception in the model. Compared with married participants, the unmarried were 50% less likely to perceive themselves at risk for HIV infection, APOR = 0.50, 95% CI = 0.25-0.98.

DISCUSSION

There are three main findings from this study. First, injection drug use is associated with a reduction in an individual's risk perception for HIV infection. Second, history of drug use significantly decreases an individual's risk perception for HIV infection. Third, being unmarried is associated with decreased individual risk perception for HIV infection. In general, drug use decreases an individual's risk perception for HIV infection regardless of sex, age, or sexual orientation in this sample of Mexican Americans.

We have shown in our sample of Mexican Americans in the Rio Grande Valley that injection drug use is associated with decreased HIV risk perception. Our finding supports previous studies in this direction but in different Hispanic population settings.^{3, 5, 7} In this cohort, actual risk for HIV infection correlates inversely with individual risk perception. Hence, this result is indicative of the need to increase HIV risk perception among IDUs in this targeted population in order to decrease HIV risk behaviors such as reduced condom use, multiple sexual partners, and needle sharing. The risk of HIV infection has been shown to increase in individuals with decreased risk perception due to IDU.⁴

Unmarried participants in this cohort perceived themselves to be at decreased risk for HIV infection compared with married participants. Being single has been associated with a predisposition towards having multiple sex partners, which is an actual risk for HIV infection.^{13, 14} In this cohort, actual risk, which is being unmarried correlates inversely with HIV risk perception. The implication of this finding in our sample population is suggestive of the need to increase HIV risk awareness among unmarried individuals in the Rio Grande Valley.

Drug use in general in our sample was shown to be associated with decreased HIV risk perception. This finding confirms results from previous studies, which state that drug use among Hispanic Americans leads to decreased HIV risk perception and increased chances of HIV transmission.^{5, 8, 10, 12} Drug use (crack smoking, speedball, crank, and heroin snorting) is an actual risk for HIV transmission. This finding, therefore, indicates an inverse correlation of actual risk with HIV risk perception. This result is expected since drug use increases altered mentation and therefore results in a reduction in an individual's risk perception for HIV infection.^{15, 16}

Our study is not without limitations. First, we used a cross-sectional design, which hinders temporal sequence in general in the association between the dependent and independent variables. Second, the small proportion of those who reported using injection drugs in our sample, might have influenced the precision in our findings. Third, our point estimate might have been influenced by the mixing effects of other external variables in the association between IDU, history of drug use, and HIV risk perception. However, this is unlikely since we adjusted for the confounding effects of these variables (sex, sexual orientation, and age). In spite of this adjustment, we cannot rule out the possibility of residual confounding. Finally, we used a cross-sectional design with self-reporting of drug use, which might have introduced selection and ascertainment bias into the study. Therefore, using laboratory confirmed STDs, HIV, and IDU will minimize both selection and misclassification biases in future studies in this population.

In summary, we have shown that IDU, history of drug use in general, and being unmarried are three covariates that are statistically significantly associated with decreased risk perception for HIV infection. It is apparent from these results that actual risk for HIV infection does not correlate directly with HIV risk perception. Further studies in similar populations may be necessary in examining whether or not our findings may be applicable to other settings such as African Americans or Caucasians.

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References

- Centers for Disease Control and Prevention. HIV/AIDS surveillance report: Cases of HIV/AIDS in the United States and Dependent areas. 2005 [accessed 5/1/2007]. <http://www.cdc.gov/hiv/topics/surveillance/resources/reports/2005report/pdf/2005SurveillanceReport.pdf>
- Glynn, M.; Rhodes, P. Estimated HIV prevalence in the United States at the end of 2003. National HIV prevention conference; June 2005; Atlanta. Abstract T1-B1101
- Centers for Diseases Control and Prevention. HIV/AIDS among Hispanics fact sheet, June 2006. [accessed 4/18/2007]. <http://www.cdc.gov/hiv/resources/factsheets/hispanic.htm>
- Leigh BC, Stall R. Substance use and risky sexual behavior for exposure to HIV: Issues in methodology, interpretation and prevention. *American Psychologist* 1993;48:1035–1045. [PubMed: 8256876]
- Cancel LI, Robles RR, Colon HM, Matos TD, Freeman DH. HIV/AIDS risk perception, HIV risk behaviors, and HIV seropositivity among injection drug users in Puerto Rico. *P R Health Sci J* 1994;13:153–8. [PubMed: 7938402]
- Cooper H, Friedman SR, Tempalski B, Friedman R, Keem M. Racial/ethnic disparities in injection drug use in large US metropolitan areas. *Ann Epidemiol* 2005;15:326–34. [PubMed: 15840545]
- Corby NH, Wolitski RJ, Thornton-Johnson S, Tanner WM. AIDS knowledge, perception of risk, and behaviors among female sex partners of injection drug users. *AIDS Educ Prev* 1991;3:353–66. [PubMed: 1777343]
- Estrada AL. Epidemiology of HIV/AIDS, hepatitis C, and tuberculosis among minority injection drug users. *Public Health Rep* 2002;117(Suppl 1):S126–34. [PubMed: 12435836]
- Friedman SR, Young PA, Snyder FR, Shorty V, Jones A, Estrada AL. Racial differences in sexual behaviors related to AIDS in a nineteen-city sample of street-recruited drug injectors NADR Consortium. *AIDS Educ Prev* 1993;5:196–211. [PubMed: 8217472]
- Strader DB. Co-infection with HIV and hepatitis C virus in injection drug users and minority populations. *Clin Infect Dis* 2005;41(Suppl 1):S7–13. [PubMed: 16265618]
- Deren S, Kang SY, Colon HM, Andia JF, Robles RR. HIV incidence among high risk Puerto Rican drug users: A comparison of East Harlem, New York, and Bayamon, Puerto Rico. *J Acquir Immune Defic Syndr* 2004;36:1067–74. [PubMed: 15247560]
- Friedman SR, Kang SY, Deren S, Robles R, Colon HM, Andia J, Oliver-Velez D, Finlinson A. Drug-scene roles and HIV risk among Puerto Rican injection drug users in East Harlem, New York and Bayamon, Puerto Rico. *J Psychoactive Drug* 2002;34:363–9.
- Stratford D, Ellerbrock TV, Chamblee S. Social organization of sexual-economic networks and the persistence of HIV in a rural area in the USA. *Cult Health Sex* 2007;2:121–35. [PubMed: 17364721]
- Becker ML, Ramesh BM, Washington RG, Halli S, Blanchard JF, Moses S. Prevalence and determinants of HIV infection in South India: a heterogeneous, rural epidemic. *AIDS* 2007;21:739–47. [PubMed: 17413695]
- Mateu-Gelabert P, Maslow C, Flom PL, Sandoval M, Bolyard M, Friedman SR. Keeping it together: stigma, response, and perception of risk in relationships between drug injectors and crack smokers, and other community residents. *AIDS Care* 2005;17:802–13. [PubMed: 16120497]
- Kral AH, Lorvick J, Bluthenthal RN, Watters JK. HIV risk profile of drug-using women who have sex with women in 19 United States cities. *J Acquir Immune Defic Syndr Hum Retrovirol* 1997;16:211–7. [PubMed: 9390574]

Table 1
Study Characteristics comparing Injection Drug Users with Non-Injection Drug Users

Covariates	Injection Drug Use		Non-Injection Drug Use		χ^2 (df)	P-value
	Number	Percentage	Number	Percentage		
Race/ethnicity						
Hispanics	25	11.6	191	88.4	0.21 (1)	0.65
Non-Hispanics	5	14.3	30	85.7		
Age group						
<30	17	11.3	134	88.7	0.13 (1)	0.72
≥30	13	12.8	89	87.2		
Education						
<High School	16	16.3	82	83.7	2.92 (1)	0.09
≥High School	14	9.2	139	90.8		
Sex						
Male	11	7.4	137	92.6	6.68 (1)	0.01
Female	19	18.1	86	81.9		
Sexual Orientation						
Homosexual	4	12.1	29	87.9	0.07 (2)	1.00
Heterosexual	21	11.9	156	88.1		
Bisexual	2	10.0	18	90.0		
Religion						
Jewish	0	0.0	3	100.0	3.40 (4)	0.63
Catholic	23	14.3	138	85.7		
Protestant	2	6.1	31	93.9		
Other	2	10.5	17	89.5		
Unknown	2	6.2	30	93.8		
Employment						
Unemployed	14	10.7	117	89.3	0.52 (1)	0.47
Employed	101	86.3	16	13.7		
Marital Status						
Single	18	11.1	144	88.9	0.43 (1)	0.51
Married	12	13.9	74	86.5		
Income						
<\$10,000.00	26	15.2	145	84.8	4.90 (1)	0.03
≥\$10,000.00	3	4.6	62	95.4		

Abbreviation and notes: df=degree of freedom, $p < 0.05$, * = Fishers exact

Table 2

The comparison of injection drug use by study covariates, stratified by HIV risk perception among Mexican Americans in Rio Grande Valley

Covariates	Injection drug Users		Non-Injection Drug Users		χ^2 , (df)	p-value
	HIV Risk Perception		HIV Risk Perception			
	Yes (#, %)	No (#, %)	Yes (#, %)	No (#, %)		
Race/ethnicity						
Hispanics	10 (7.5)	14 (18.7)	124 (92.5)	61 (81.3)	0.008 (1)	1.0*
Non-Hispanics	2 (8.7)	3 (27.3)	21 (91.3)	8 (72.7)		
Age group						
< 30	7 (7.4)	10 (18.5)	88 (92.6)	44 (81.5)	0.10 (1)	0.75
≥ 30	5 (7.8)	7 (21.9)	59 (92.2)	25 (78.1)		
Education						
<High School	5 (9.1)	10 (27.8)	50 (90.9)	26 (72.2)	0.47 (1)	0.49
≥High School	7 (6.8)	7 (14.3)	96 (93.2)	42 (85.7)		
Sex/Gender						
Male	5 (41.7)	6 (35.3)	89 (60.5)	43 (62.3)	2.5 (1)	0.11
Female	7 (58.3)	11 (64.7)	58 (39.5)	26 (37.7)		
Sexual Preference						
Homosexual	1 (10.0)	3 (18.7)	15 (11.0)	14 (21.9)	1.01 (2)	1.0*
Heterosexual	9 (90.0)	11 (68.8)	110 (80.9)	43 (67.2)		
Bisexual	0 (0.0)	2 (12.5)	11 (8.1)	7 (10.4)		
Religion						
Jewish	0 (0.0)	0 (0.0)	2 (1.4)	1 (1.5)	1.78 (4)	0.93*
Catholic	9 (75.0)	13 (81.3)	88 (61.5)	44 (63.8)		
Protestant	2 (16.7)	0 (0.0)	24 (16.8)	7 (10.1)		
Other	0 (0.0)	2 (12.5)	11 (7.7)	5 (7.3)		
Unknown	1 (8.3)	1 (6.2)	18 (12.6)	12 (17.4)		
Employment						
Unemployed	7 (8.0)	7 (16.7)	81 (92.0)	35 (83.3)	0.003 (1)	0.95
Employed	5 (7.5)	10 (23.3)	62 (92.5)	33 (76.7)		
Marital Status						
Married	4 (6.6)	7 (31.2)	57 (93.4)	15 (68.2)	0.004 (1)	1.0*
Single	8 (8.5)	10 (15.9)	86 (91.5)	53 (84.1)		
Income						
<\$10,000.00	12 (11.3)	13 (22.8)	94 (88.7)	44 (77.2)	5.2 (1)	0.02*
≥\$10,000.00	0 (0.0)	3 (13.0)	42 (100.0)	20 (87.0)		

Abbreviation and notes: df=degree of freedom, $p < 0.05$, * = Fishers exact

Table 3

Multivariable analysis of the association between HIV Risk Perception and Injection Drug Use in a sample of Mexican Americans in Rio Grande Valley

Covariates	Adjusted Prevalence Odds ratio (POR)	95% Confidence Interval (CI)
Injection drug Use (IDU)		
No	1.0	Reference
Yes	0.26	0.11-0.65
History of drug use		
No	1.0	Reference
Yes	0.44	0.22- 0.98
Sexual preference		
Homosexual	1.0	Reference
Heterosexual	2.21	0.94-5.15
Bisexual	0.91	0.26-3.17
Marital status		
Married	1.0	reference
Unmarried	0.50	0.25-0.98

Notes and abbreviations: adjusted for marital status, age, sex, sexual preference, and history of drug use.