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Problem recognition, intention to stop use, and treatment use among regular heroin injectors

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Abstract

This study investigated frequency of recent use as an explanatory variable in problem recognition and intention to stop use among regular injection heroin users. Data from the NEURO-HIV Epidemiologic Study, an investigation of neuropsychological and social-behavioral risk factors for HIV and hepatitis A, B, and C among injection and noninjection drug users, were used in the analyses. Participants ($N = 337$) consisted of those who reported injecting heroin daily or nearly daily for a period of 3 months. Multiple linear regression analysis revealed that frequency of recent injection drug use predicted problem recognition ($\beta = .17$), but not intention to stop use; although marginal, being female ($\beta = .15$), and homeless ($\beta = .14$) contributed to intention to stop use. Past 6-month treatment participation was 48%, and current treatment enrollment was 26% among study participants. This study highlights the importance of capitalizing on injection drug users' recent use as a mechanism for treatment interventions.

Keywords

Heroin; Problem recognition; Frequency of illicit drug use; Treatment utilization

1. Introduction

Injection drug use (IDU)—specifically heroin injection—continues to be a public health concern in inner-city neighborhoods such as Baltimore, MD, particularly with regard to HIV risk (Mitchell & Latimer, 2009) and infection (Carneiro, Fuller, Doherty, & Vlahov, 1999; Fuller et al., 2005; Sherman et al., 2005), as well as violence and homelessness (Wechsberg et al., 2003). The National Institute on Drug Abuse (NIDA) named injection heroin as the primary mode of drug use among addicted individuals seeking treatment and noted increases in heroin initiates 12 years and older in 2008 (NIDA, 2005, 2010). In addition, IDU has a strong link to HIV infection in the United States, where it is estimated that 12% of new HIV-positive diagnoses are attributable to IDU, and injection drug users (IDUs) represent 19% of those living with HIV (Centers for Disease Control and Prevention, 2010). A variety of demographic and psychosocial factors have been considered when investigating the use of injection heroin and its initiation, continuation, treatment, and cessation. However, this study contributes to and extends previous literature by looking beyond initiation into heroin injection and investigating regular injectors who have been injecting for longer periods. Specifically, this study will focus on sociodemographic characteristics and frequency of

recent use as explanatory variables in problem recognition and intention to stop use among IDUs as a mechanism for behavior change. An investigation of treatment use among the study sample was also conducted.

Studies have outlined the importance of frequency of recent use as a factor worth considering when assessing problem recognition among heroin-using individuals and treatment outcomes. In a study that used needle exchange programs (NEPs) as a referral source for drug treatment, it was found that NEP participants had greater severity of drug use at baseline compared with referrals from standard sources. More specifically, frequency of use has been found to be associated with problem recognition (Gossop, Stewart, & Marsden, 2007), but not with taking steps for change (Henderson, Saules, & Galan, 2004). Gossop et al. (2007) also found that frequency of heroin use was the best predictor of treatment outcomes among drug abusing individuals seeking treatment. Taken together, these findings suggest that motivation to change may not translate into less posttreatment drug use or relapse; instead, pretreatment problem recognition, as indicated by frequency of use, may be a better predictor of behavior change (DiClemente, Nidecker, & Bellack, 2008).

Various sociodemographic and psychosocial variables have been investigated as factors contributing to one's intention to stop substance use. For example, research has shown that being female is associated with greater readiness to change among marijuana users (Chen & Kandel, 1998) and among African American cigarette users (Woods, Harris, Ahluwalia, Schmelzle, & Mayo, 2001). In addition, having a high school education has been associated with greater intention to stop use among heroin and cocaine users (Severtson, von Thomsen, Hedden, & Latimer, 2010), whereas social support (Daniulaityte, Carlson, & Siegal, 2007; Riehm, Wechsberg, Zule, Lam, & Levine, 2008) and social networks and norms (Abelson et al., 2006; Latkin et al., 1995) have been shown to contribute to drug use and its continuation. Still unknown, however, is the relationships among these variables with frequency of recent use as an explanatory factor describing intention to stop use. Identifying these explanatory variables is an important first step in tailoring interventions to meet the treatment needs of regular users of injection drugs.

Research aimed at identifying explanatory variables predicting treatment attendance, adherence, or retention among regular IDUs is of vital importance given the heightened risk of infectious disease among this population of drug users. Because of public health concern with regard to the negative outcomes associated IDU generally, and heroin injection specifically, an assessment of treatment history and utilization among this population of illicit drug users is warranted. Arria, Fuller, Strathdee, Latkin, and Vlahov (2002) found a high proportion of young IDU initiates that met *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria for dependence, yet had low utilization rates of substance abuse treatment. Specifically, although 90% of IDUs were found to meet the dependence criteria necessary to qualify for drug treatment, only 9.7% reported being currently enrolled in any drug treatment program. These researchers stressed the need for IDUs, especially new initiates, to become engaged in treatment before heavy and frequent use resulted in negative health outcomes and dependence. This study adds to this line of research by investigating problem recognition, intention to stop use, and treatment utilization among a population of older, regular injectors to highlight the need for substance use interventions for those who have been injecting for longer periods. This group of substance users is at a heightened risk for infectious disease such as HIV and hepatitis C as a result of the duration of and exposure to the use of injection drugs.

Extant literature has explored the two concepts of problem recognition and intention to stop use separately, but to our knowledge, none have used frequency of recent use to simultaneously address these issues in conjunction with treatment use among a population of

regular heroin-injecting individuals. Because these concepts are likely closely related to one another, this appears to be an oversight in the current body of literature. The primary aim of this study is to test the relationship of sociodemographic factors and frequency of recent use with problem recognition and intention to stop use among regular heroin injectors. Secondly, this study explores treatment utilization among this population, and lastly, implications for intervention and treatment are discussed.

2. Method

2.1. Participants

This study used baseline data from the NEURO-HIV Epidemiologic Study. This study was designed to examine neuropsychological and social-behavioral risk factors of HIV, hepatitis A, hepatitis B, and hepatitis C among both IDUs and non-IDUs in Baltimore, MD. This study was approved by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health in 2001 and has received annual renewals. The design of this study is cross-sectional. To be eligible for participation in the parent study, participants had to be between the ages of 15 and 50 years and had to report use of noninjection and/or injection drugs in the past 6 months. Recruitment strategies for participation included advertisements in local papers, street outreach, and referrals from local service agencies. Participants provided written informed consent and completed a face-to-face HIV-risk behavior interview, a detailed behavioral assessment of drug use and sexual practices. In addition, participants completed a battery of neuropsychological tests that measured executive functioning and estimated general intelligence. Blood and urine samples were obtained to test for the presence of drugs and STDs. Participants were remunerated \$45 for the baseline assessment. Participants in this study were 337 injection heroin users who self-identified as having experienced an episode of regular injection heroin use indicated by using daily or nearly daily for a period of 3 months. This population was selected because previous research has suggested that heroin addiction may be a lifelong condition (Hser, Hoffman, Grella, & Anglin, 2001) and is indicated in this study by older, regular injectors who initiated injection in their early 20s but have continued regular use into their 30s.

2.2. Measures

2.2.1. Demographic variables—Participant demographic information included age, gender, race, education level, homelessness, and having received public assistance. Dichotomous variables were created for gender (female, coded as 1), race (Black, coded as 1), homelessness (homeless in the past 6 months, coded as 1), public assistance (receiving public assistance in the past 6 months, coded as 1), and education (high school degree/GED or greater, coded as 1).

2.2.2. Frequency of recent injection heroin use—One item from the HIV-Risk Behavior Inventory was used to assess frequency of recent injection heroin use. Participants are asked, “How many days did you inject heroin in the past 30 days.” Participant responses were recorded as a continuous variable ranging from 0 to 30 days. IDU status specifically relates to the use of injection heroin in this sample.

2.2.3. Problem recognition—Problem recognition is defined as an understanding that current drug use causes difficulty that the user cannot control (Severtson et al., 2010). Three items from the HIV-Risk Behavior Inventory addressed participant’s problem recognition: “Your drug use is a problem for you,” “Your drug use is more trouble than it is worth,” and “Your drug use is under control.” The Cronbach’s alpha for these three items was .74 and was considered acceptable for inclusion in the multiple regression analysis (Pallant, 2007).

2.2.4. Intention to stop use—Intention to stop use is defined as one's willingness to stop using drugs (Severtson et al., 2010). Three items from the HIV-Risk Behavior Inventory measure addressed participant's intention to stop use: "You plan to quit using in the next six months," "You are ready to quit using right now," and "You plan to quit using in the next 30 days." The Cronbach's alpha for these three items was .73 and was considered acceptable for inclusion in the multiple regression analysis (Pallant, 2007).

2.2.5. Treatment utilization—Treatment use was assessed by two questions in the HIV-Risk Behavior Inventory: "Have you been in drug detox, drug treatment, or narcotics anonymous in the last 6 months?" and "Are you currently in a drug treatment program?" Participants responded "yes" or "no" to these questions.

2.2.6. Data analysis—Data analyses were performed using SPSS Statistics 17 (SPSS, 2009). Frequencies and descriptive statistics were used in the calculation of participant demographics. Bivariate correlations were conducted to examine the intercorrelations between independent and dependent variables and to check for multicollinearity. None of the variables exceeded $r = .9$ and did not violate the assumption of multicollinearity (Pallant, 2007). Variables significant at $p < .05$ were entered into the regression analyses as covariates along with the explanatory variable. These variables included age, gender, race, homelessness, public assistance, and high school graduate/GED or greater. In addition to preliminary bivariate correlations, the use of these covariates is also supported in the literature indicating differences in treatment use and motivation for change by demographic characteristics (Compton, Thomas, Stinson, & Grant, 2007; Cottrell et al., 2007; Elwy, Ranganathan, & Eisen, 2008; Kadushin, Reber, Saxe, & Livert, 1998; Keyes et al., 2008; Velasquez, Crouch, von Sternberg, & Grosdanis, 2000). Assumptions of normality, linearity, and homoscedasticity were met in variables included in the multiple linear regression analysis. Standard multiple linear regression analyses were then performed using frequency of recent injection heroin use as the predictor variable and problem recognition and intention to stop use as the outcome variables. Independent variables were entered simultaneously, and two separate linear regression analyses were conducted.

3. Results

3.1. Participant characteristics

A summary of participant characteristics can be found in Table 1. The majority of the sample was male (60.5%) and White (65.6%). One fifth of participants experienced homelessness (20.5%), and 39.2% had received public assistance in the past 6 months, whereas just under one half had obtained a high school education or GED (48.1%). Seven and a half percent ($n = 22$) of participants tested positive for HIV. The average age of participants was 32.46 years ($SD = 7.84$ years). Participants self-reported injecting heroin an average of 2.25 ($SD = 2.06$) times per day over 19.09 days ($SD = 13.10$) in the past month. More than one half (51.0%) of participants reported not engaging in drug detoxification, drug treatment, or narcotics anonymous in the past 6 months, and almost three quarters (72.4%) reported not currently being enrolled in a drug treatment program.

3.2. Standard multiple linear regression analysis

Multiple linear regression analyses were used to assess the ability of the demographic variables along with frequency of recent injection heroin use to predict problem recognition and intention to stop use. The first regression analysis accounted for 9% of the total variance in problem recognition, $F(7, 321) = 4.583$, $p < .001$, where frequency of recent heroin use was the only significant independent variable that contributed to the model ($\beta = .17$, $p < .050$). The multiple linear regression analysis with regard to intention to stop use was

marginal, accounting for 5% of the total variance in intention to stop use, $F(7, 287) = 1.492$, $p = .063$. Significant contributors to this model were gender ($\beta = .15$, $p < .050$) and homelessness ($\beta = .14$, $p < .050$), where being female and being homeless were associated with greater intention to stop use. For a complete summary of the multiple regression analysis, see Table 2.

4. Discussion

The findings reported here modestly enhance and extend earlier findings on drug use behaviors and treatment use of IDUs. Specifically, this study provides additional support for the idea that frequency of recent heroin injection is a potentially valid explanatory measure of problem recognition among this population of illicit drug users. Although the total variance explained in the regression analysis is relatively small, it was found that greater frequency of recent injection heroin use was the best, and only, potential explanatory measure of problem recognition among this population of IDUs even when considering sociodemographic variables. The lack of significant sociodemographic factors in this study is consistent with Arria et al. (2002), who found that these factors may have a more important impact on the development of drug use rather than the severity of drug use among illicit drug users. In addition, given the high frequency of recent use among study participants, rates of treatment utilization in this population are relatively low.

The current study findings are consistent with other research investigating treatment readiness and treatment outcomes among heroin users and suggest that problem recognition as indicated by frequency of recent use may be a better mechanism by which to initiate change than intention to stop use (Gossop et al., 2007; Henderson et al., 2004). Despite the fact that frequency of recent IDU was associated with problem recognition, it was not associated with intention to stop use. Instead, being female and being homeless provided the best explanation of intention to stop use. These findings are consistent with literature describing factors contributing to marijuana (Chen & Kandel, 1998) and cigarette cessation (Woods et al., 2001) but may be unique to injection heroin use. Contrary to expectations that homeless individuals are less likely to be motivated to engage in treatment, O'Toole, Pollini, Ford, and Bigelow (2008) found that substance-abusing homeless persons who frequent emergency rooms and hospitals were more likely to see homelessness as a motivating factor for seeking substance abuse treatment. Despite these findings, almost half reported delays in seeking care. Contrary to previous research (Severtson et al., 2010), having a high school education did not predict greater intention to stop use in the study sample.

One counterintuitive finding in this study was that receiving public assistance was not associated with greater problem recognition or intention to stop use. Findings on substance use among welfare recipients have shown high prevalence rates, particularly among women (Bride & Humble, 2008; Morgenstern & Blanchard, 2006). However, given these findings, others have suggested that receiving public assistance is a way to identify and make contact with low-income mothers with substance use disorders. In fact, substance-abusing mothers who received public assistance were more likely to receive treatment services than other substance-abusing mothers (Pollack & Reuter, 2006). Participants in this study are drawn from inner-city Baltimore where overall socioeconomic status is low and may be even further marginalized as a result of the high frequency of their IDU. Among the heroin-injecting individuals in this study, those receiving public assistance may have an advantage in that they are able to gain access to several other social support services for which they qualify. This network of support services may assist individuals in ways that help to reduce their drug use. Treatment programs may increase their effectiveness by targeting individuals most in need—in other words, those individuals marginalized by their heavy drug use and are outside the network of social services.

One mode of intervention that has been particularly effective in reaching out of treatment IDUs are syringe exchange sites or NEPs. Specifically, NEPs and safe injection facilities have shown reductions in injection risk behavior (Huo & Ouellet, 2007; Kerr, Tyndall, Li, Montaner, & Wood, 2005), lower risk of acquiring HIV (Bruneau et al., 2011), and reduced sex risk behaviors among IDUs (Huo & Ouellet, 2009). In addition, NEPs offer an opportunity for counseling, access to support services, and health care for high-risk populations (Delgado, 2004). Interventions using NEPs as a mechanism for referral to drug treatment have demonstrated some success in short-term treatment outcomes such as reductions in drug use and criminal activity (Kidorf et al., 2009; Kidorf, King, Peirce, Kolodner, & Brooner, 2011a), as well as good treatment retention (Booner et al., 1998). For example, in a study of enrollment and retention in methadone drug treatment, new users of a NEP were five times more likely than those who never used an NEP to enter drug treatment (Hagan et al., 2000). Contrary to early fears of increased drug use by creating NEPs in the community (Vlahov & Junge, 1998), these programs can help to bridge the gap to specific drug treatment programs and have demonstrated success in reducing drug use and increasing treatment-seeking behavior (Kidorf, King, Peirce, Kolodner, & Brooner, 2011b). Locations that provide access to clean needles and safe injection facilities may also serve to provide comprehensive access to drug treatment, thereby reaching IDUs when use is high and treatment use is low.

Despite evidence for frequency of recent IDU in this study sample, just over one quarter of participants were currently enrolled in a drug treatment program. Although the percentage of users currently engaged in treatment in this study was low considering the overall high frequency of use, this figure was comparatively higher than current treatment rates among recent IDUs in urban areas. A timely study assessing treatment coverage for IDUs in large metropolitan areas in the United States found that overall treatment levels in 2002 were at a mean level of 8.3%; this is an increase from 6.7% in 1993 (Tempalski, Cleland, Pouget, Chatterjee, & Friedman, 2010), and Arria et al. (2002) found a 9.7% treatment use rate among young IDU initiates in Baltimore. The findings in this study corroborate previous research, which underscore the need for community-based interventions similar to or in conjunction with NEPs. Using the findings presented here, interventionists may improve their ability to make contact with specific populations of drug users, such as women and homeless IDUs, and design programming to meet the needs of these marginalized groups who may recognize that they have a problem, have a treatment center nearby, but are not using treatment services.

4.1. Strengths and limitations

Despite the strengths of this study, there are several limitations in the current research that are inherent in a cross-sectional design. Namely, although cross-sectional research is a vital tool in identifying areas for more in-depth study, the ability to make causal inferences must be reserved for studies of a longitudinal design. Further, these findings may be specific to recent IDUs and possess limited generalizability to larger, nonillicit drug using populations. In addition, in retrospective studies, there is a reliance on the self-report of drug use history. However, self-report of drug use was appropriate for this study because it provides information over longer periods compared with blood tests and urine analysis. In a review of self-report of IDUs, Darke (1998) concludes that using self-report is a reliable and valid method of describing drug use.

4.2. Conclusion

The findings presented here have several valuable public health implications with regard to injection heroin user's problem recognition, intention to stop use, and treatment use. Based on this research, interventions may benefit by capitalizing on an individual's problem

recognition when injection heroin users have high frequencies of recent use. An important obstacle to overcome in the successful treatment of IDUs continues to be the contact between an intervention and the IDU in greatest need. For example, individuals who are currently injecting drugs and have experienced negative consequences for their use may have high problem recognition and thus be more likely to benefit from an intervention designed to prepare the individual for action in changing their substance abuse behavior. Future research should aim to further analyze the coordination of timely intervention services with populations marginalized as a result of their IDU, ideally before their use develops into dependence and greater negative health consequences result.

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Table 1Summary of demographic characteristics ($N = 337$)

Characteristic	<i>n</i>	%/ <i>M</i> ± <i>SD</i>
Age	337	32.46 ± 7.84
Gender		
Male	204	60.5
Female	133	39.5
Race		
White	221	65.6
Black	116	34.4
HIV positive	22	7.5
Homeless past 6 months		
No	267	79.2
Yes	69	20.5
Received public assistance past 6 months		
No	204	60.5
Yes	132	39.2
High school graduate/GED or greater		
No	175	51.9
Yes	162	48.1
Injection heroin use		
Age of first heroin injection	337	22.66 ± 6.30
Age started injecting heroin regularly	337	24.01 ± 6.67
Years of regular injection	337	7.12 ± 5.59
Days used past 30 days	337	19.09 ± 13.10
Treatment enrollment		
Past 6 months		
No	172	51.0
Yes	160	47.7
Current		
No	244	72.4
Yes	90	26.2

Note. Column totals do not always add up to the total number because of missing data (<2%).

Regression analysis summary for variables predicting problem recognition and intention to stop use among injection heroin users

Table 2

Variable	Problem recognition ^a				Intention to stop use ^b			
	B	95% CI	β	t	B	95% CI	β	t
Age	-.02	-.05 to 0.05	-.06	-.96	.339	-.03 to 0.04	0.00	0.12
Gender (female = 1)	0.02	-.44 to 0.48	0.00	0.07	.946	0.09 to 1.14	0.15	2.32
Race (Black = 1)	-.11	-.63 to 0.41	0.03	-.42	.674	-.38 to 0.81	0.05	0.72
Homeless	0.30	-.23 to 0.83	0.06	1.11	.268	0.12 to 1.33	0.14	2.38
Receive public assistance	-.41	-.92 to 0.10	-.10	-1.58	.116	-.82 to 0.33	-.06	-0.83
High school graduate/GED	0.32	-.10 to 0.74	0.08	1.51	.131	-.09 to .83	0.09	1.58
Frequency of recent IDU	0.03	0.01 to 0.45	0.17	2.62	.009	-.03 to .02	-.03	-0.43

Note. CI = confidence interval for B.

^a $R^2 = .09$ ($N = 321$, $p < .001$).

^b $R^2 = .05$ ($N = 287$, $p < .10$).