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“It’s Not What You Know but Who You Know”: Role of Social Capital in Predicting Risky Injection Drug Use Behavior in a Sample of People who Inject Drugs in Baltimore City

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Abstract

Background—Injection drug use is the third highest risk factor for HIV transmission. Injection drug users, marginalized population, continue to be at threat for several health problems, including HIV, Hepatitis B & C and drug overdose. The area of social capital and risk behaviors is understudied. The current study aims to prospectively assess the relationship between social capital and the risk behaviors associated with injection drug use.

Methods—The sample of the present study is a subset of 130 drug users who reported injection drug use (IDU) at both baseline and first follow-up wave for assessing the relationship between social capital and needle sharing in the city of Baltimore, MD. Factor analysis, structural equation modeling and multivariate logistic regression were conducted to explore these relationships.

Results—A single-factor model fit well with factor loadings ranging from .20 to .95. Social capital is shown to be significantly and inversely associated ($p < .05$) with 35% decreased odds of the risk of sharing needles with every unit increase in social capital (AOR: 0.65, 95% CI: 0.06, 0.84).

Conclusion—The result from this study can be used to inform and fill gaps in the field of harm reduction. The interplay between social support, social participation and norms of trust, reciprocity generated from the index’s social network and its relationship with behavior of needle sharing demonstrates that these leverage points should be emphasized in future harm reduction interventions.

Keywords

Social capital; social networks; harm-reduction; injecting drug use (IDU); HIV; risky behaviors

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Authors’ contributions

Pritika C. Kumar conducted the analysis and wrote the introduction, methods, results, discussion, conclusions and the references. The data used is from Dr. Carl Latkin’s SHIELD study. Dr. Jennifer McNeely provided extensive feedback on the paper. All the authors read and approved the final version of this paper.

Competing Interests

The authors declare that they have no competing interests.

Background

Globally there are approximately twelve million people who inject drugs (PWID) 11% (approx. 1.3 million) of which are in North America [IHRA, 2008]. According to the results from the 2007 National Survey on Drug Use and Health [Aldworth, 2009], 425,000 persons above the age of 12 years used a needle to inject heroin, cocaine, methamphetamine or other stimulants in the past year. Extant studies show that 35–65% of current PWID report risky injection behaviors such as needle sharing [CDC, 2009; Golub et al., 2007; Bailey et al., 2007; Booth et al., 1998]. Tempalski et al. (2013) in their study on trends in PWID in U.S. metropolitan areas reported that even though PWID rates remained constant since 2002, it increased for non-Hispanic Black and young PWID and this trend held true for Baltimore, which experienced increased rates in PWID prevalence. Another major public health concern is the transmission risk of hepatitis C (HCV) primarily through sharing IDU paraphernalia. Sixty percent of HCV transmission is related to IDU and roughly 50%–90% of PWID are reported to have been diagnosed with HCV [Roy, 2003].

Social Capital and Injection Drug Use Behaviors

Social capital is a relatively new way of conceptualizing health behaviors and outcomes, and has only recently been studied relative to drug use and addiction. It has now been demonstrated in a few studies, that network relationships can be harnessed to generate social capital in the form of knowledge, information, solidarity and norms [Friedman, 1999; Cheung & Cheung, 2003].

Drug use is a social behavior, involving interactions such as buying and selling drugs, needles and paraphernalia, sharing injection equipment, and using in places where other drug users gather for injecting drugs such as shooting galleries. Despite the growing number of studies on individual attributes contributing to risky IDU behavior, there are only a few studies on the group or social network-level characteristics that influence risky IDU behaviors. Link and Phelan [Friedman, 1987] emphasize the “contextualization of individually-based risk factors” wherein the context in which the health behavior is taking place is as important as the individual factors affecting the behavior. Resources generated from social networks such as social support have been found to be important mechanisms for the prevention of substance use behavior in many racial/ethnic groups [Neaigus, 1996]. The focus on social network or group characteristics of IDU behavior came about recently. These studies have found a number of social network characteristics to be associated with the individual’s drug use behavior. Characteristics identified have included having a high-frequency injector in one’s network [Trotter, Baldwin & Bowen, 1995], perceptions of needle sharing among peers [Neaigus, 1996], closed networks and networks with kinship ties [Latkin, 1995], larger network size and density of drug using network [Suh, et al., 1997; Schröder, 2001; Latkin, 1996], injecting at friends’ residences [Hoffman, 1999], having a current steady sexual relationship with a partner who is a PWID and high network turnover [Van Ameijden, 1994].

Putnam (2001) defined social capital as “the features of social organizations, such as networks, norms and trust that facilitate action and cooperation for mutual benefit”. Social capital is a fairly recent mode of understanding health outcomes, for example, obesity

(Holtgrave & Crosby 2003; Kim et al. 2006), heart disease (Lochner et al. 2003; Sundquist et al. 2006), mental illness (Cattell 2001; Whiteford & Cullen 2001) and substance use (Lovell 2002; Weitzman & Chen 2005).

Researchers have used different definitions and measurement tools to study the relationship between social capital and drug use outcomes. Although there is not an agreed upon definition of social capital, some indicators of this construct that have been consistently used in research are those of support, social participation and norms of trust and reciprocity. Traditional measures of social capital are not likely appropriate for measuring this aspect among marginalized groups. These groups do not have access to the same types of privileged resources such as stable networks, access to resources to help meet needs of day to day living such as health insurance, etc. as do more conventional social groups [Lindstrom, 2004]. There is a lack of theory-based and validated instruments for assessing personally owned social capital [Snoxell, 2006; De Silva, 2005; Harpham, Grant & Thomas., 2002; Kreuter & Lezin, 2002; Campbell]. There are a few studies that have used measures designed for research with other marginalized groups [Holtgrave & Crosby, 2003; Gregson, 2004; Bhattacharya, 2005; Treloar & Abelson, 2004]. Most of these studies focus on outcomes such as HIV and poverty and/or have used one or only a few indicators of civic participation and trust to measure social capital. These studies can provide us with some insight in to the network dynamics of these groups and about the resources embedded in the networks of these groups that are also marginalized. However, only a few studies have applied the concept of social capital to the study of the health of criminalized populations like illicit drug users [Choi, Cheung & Chen., 2006; Erickson & Cheung, 1999; McCarthy, Hagan & Martin, 2002; Coleman, 1988]. Moreover, these studies have been either qualitative, focused on negative social capital as related to drug use, studying impact of non-drug using social networks of the drug users, have viewed the drug using network as lacking social capital, or have used one or only a few indicators to represent the complex construct of social capital [Cheung & Cheung, 2003; Bourdieu, 1986; Flores, 2013]. These studies have not studied social capital at the network level and have taken a simplistic approach to the measurement of social capital.

Using a sample of inner-city, primarily African-American injection drug users recruited from community setting in Baltimore, MD this study prospectively examines the association between social capital with injection drug use risk behavior needle sharing.

Methods

Sample

Data for this study came from a cross-sectional survey administered from June 1997 through October 2002 as part of a follow-up of the Self-Help in Eliminating Life-Threatening Diseases (SHIELD) study, an experimental human immunodeficiency virus (HIV) prevention intervention targeting current and former drug users and engaging their social networks. Details of this study are described elsewhere [Latkin, et al., 2005]. At baseline, there were 479 primary participants who were current injectors, i.e. who reported IDU in the past six months. Since the outcomes of interest for the present study were injection behaviors, the sample was restricted to primary participants (n=130) who reported injecting

drugs at both baseline and follow-up assessments. Consent for participation was obtained from eligible individuals (approved by the Johns Hopkins Schools of Public Health's Institutional Review Board).

Measures

Injection risk behavior—Syringe sharing was measured by asking respondents about their frequency of using a needle after someone else without cleaning it first, measured at baseline and first follow-up. Responses ranged from “Never” to “More than once a day,” and any response other than Never was coded as “Sharing syringes”.

Social capital—The SHIELD survey consisted of a network inventory based on the Personal Network Inventory, a modification of the Arizona Social Support Inventory [Barrera, M., 1980] for both the primary and index participants. This inventory has been shown to have good concurrent and predictive validity and internal consistency [Hoffman, et al., 1999].

Table 2 shows the questions on emotional support, physical assistance, material aid, informational support, social participation and multiplexity of support that tapped into the latent construct of network resources from the network inventory.

Other covariates—Based on the evidence provided in the literature several potential confounders were identified. We included the following potential confounders in our analyses: age (using a median cut-point of 38 years v >38 years of age); ethnicity (African-American vs. non-African-American); education (less than high school education or high school education and greater); gender, network density, visiting a shooting gallery, homelessness (past 6 months), incarceration in the past six months, monthly income (more or less than \$500), self-rated health (measured by the question, “*would you say your health in general is – ‘excellent’ / ‘very good’ / ‘good’ / ‘fair’ / ‘poor’*”), knowledge of HIV status (measured by questions, “*have you ever been told you have AIDS Virus or HIV?*”), unemployment (past 6 months), visited needle exchange program (past 6 months) and risk behaviors of needle sharing and non-syringe paraphernalia sharing at baseline.

Analysis

Chi-square tests for categorical variables and t-tests for continuous variables were used to compare sharers and non-sharers of needles on background and social capital variables using the statistical software Stata version 11 [Stata Corp., 2009]. Then structural equation modeling (SEM) was used to examine the relationship between this social capital latent variable and needle sharing at follow-up.

SEM was conducted with Mplus Version 6 [Muthén & Muthén, 2007], which allows fitting of models that contain categorical variables. A chi-square goodness-of-fit test and three fit indices were used to assess model fit, including the Tucker-Lewis Index (TLI) [Tucker & Lewis, 1973], the comparative fit index (CFI) [Hu & Bentler, 1998] and the root mean square error of approximation (RMSEA) [Steiger & Lind, 1980]. Guidelines proposed by

Hu and Bentler (1998) suggest that models with TLI and CFI close to 0.95 or higher and RMSEA close to 0.06 or lower represent good fit.

After testing several models, the hypothesized measurement model reported in this paper had the best fit and is the only model reported here. The final structural model was constructed with directional paths leading from the predictor (latent construct) to the outcome of interest. In the structural model, the outcome of interest, (i.e. needle sharing) were dichotomous. The default estimator was the weighted least squares estimation (WLSMV) method that implements a multivariate probit model (MPLUS version 6). The model originally was run with all potential confounders identified through IDU literature. For parsimony, the final model presented in this paper consists of the significant confounders only.

Results

Demographic characteristics of the 130 study participants are presented in Table 1.

1. Social Capital Scale Development

The measurement model relates observed responses or indicators of social support and norms of trust and reciprocity to the latent variable of social capital. Table 2 presents factor loadings for the hypothesized latent factor of social capital. All measured variables loaded significantly ($p < .05$) on the hypothesized first-order latent factor. Psychometric analyses of the measurement model of social capital showed that the scale represents one factor which explains 41% of the variance (eigenvalues= 3.57) and had good internal consistency (Cronbach's $\alpha = 0.82$). The fit indices indicated a good fit for the model: chi-square p-value greater than 0.05, TLI=0.96, CFI=0.98 and RMSEA=0.04. The standardized loadings of the indicators ranged from 0.20 to 0.96, with the lowest loading on reciprocity. However, this indicator was retained in the CFA to maintain the theoretical integrity of the construct of social capital.

2. Examining the relationship between social capital and needle sharing

Exploratory analyses were conducted to compare the needle sharers vs. non-sharers and social capital variables (Table 3). The needle sharers and non-sharers significantly differed on baseline characteristics such as sharing unclean needles, visiting shooting gallery, enrolment in Needle Exchange Program or NEP, injecting cocaine and self-rated health as poor. There were significant differences between needle sharers and non-sharers on some social capital variables. Non-sharers were more likely to report having physical assistance, material aid, emotional support and social participation.

The association between social capital and the outcome of needle sharing at T2 was examined using structural equation models (SEM). The structural model specifies regressions of social capital variables on the outcome of needle sharing at follow-up.. The model was made more parsimonious by retaining covariates significant at the $p < 0.05$ in the exploratory analyses and those variables that have been associated with risk behaviors and social capital variables in previously published literature. Covariates such as needle sharing at baseline gender, education, network size, network density, race, visiting a shooting

gallery, self-rated health, enrolment in NEP, income and age were added to this model to adjust for potential confounding. Figure 1 shows the structural model with the path coefficients. This figure also shows the regression model in which social capital is regressed on needle sharing at follow-up wave. The social capital factor was significantly associated with needle sharing at T2 wave ($p=0.018$), controlling for significant confounders such as needle sharing at baseline, self-rated health and enrolment in NEP. Table 4 shows that with every standardized unit increase in social capital there is a 35% decreased odds of sharing unclean needles at follow-up (AOR: 0.65, 95% CI: 0.04, 0.74), after adjusting for sharing unclean needles at baseline (AOR: 2.17, 95% CI: 2.43, 30.05), self-rated health (AOR: 0.59, 95% CI: 0.29, 0.95) and enrolment in NEP (AOR: 1.85, 95% CI: 1.23, 20.29).

Discussion

The present study uses elements of theories of social put forth by Bourdieu (1986), Coleman (1988, 1990) and Putnam (1995), and elements of *network resources* that comprise of positive emotions such as social support, social participation, overlap of support from network members and *norms* of trust and reciprocity to examine association with risky injection drug use.

The results of this study as in extant studies highlight the importance of social networks [Suh, 1997; Costenbader, Astone & Latkin, 2006; Carrieri, 2003]. A majority of interventions to reduce HIV risk behavior among IDUs have been focused on individuals.

The current study results find that enrolment in NEP is positively associated with needle sharing. It is possible that needle sharing is perceived as harmful, and thus more subject to the influence of social capital. It may also be that injection drug use in the current sample is among long-term drug users who may be insulated to the effects of social capital compared to younger PWID and/or PWIDs who have been injecting for a relatively shorter period. As seen in the table 3, most of the primary participants who shared needles at follow-up are over the age of 38 years (82%) compared with 32% of non-sharers.

Future studies could incorporate negative social capital elements from drug using networks which could be a factor in explaining continued drug use and related risky behaviors. In our comprehensive literature review, it was found that only one study [Choi, Cheung & Chen, 2006] used an indicator of negative social capital, association with deviant peers, when studying the outcome of drug relapse. Other indicators of negative social capital could include measures of degree of homogeneity within networks, density of drug users within networks, size of drug using network, human capital such as skills, education and full-time employment of network members and rate of network turnover for each participant (Suh et al., 1997).

Limitations

These data are subject to the limitation of self-report and selection bias. However research has shown that self-reported risk behaviors are valid and not influenced by social desirability bias [Latkin, Vlahov & Anthony, 1993]. This study did not have a randomly selected sample and consisted mostly of males, although females were oversampled. Including more waves

of the study in could help further establish the causal relationship between social capital and both injection use and non-syringe paraphernalia (cotton, cookers, and rinse water) sharing behavior. Inclusion of other waves for the longitudinal analysis of the outcome of IDU behavior could also more accurately characterize the relationships between the predictors and outcomes over time. Most studies that investigate risk factors for human immunodeficiency virus (HIV) infection among injection drug users are based on retrospective self-reporting of drug injection and sexual behaviors [Booth, 1994]. Although retrospective self-reports stand the risk of recall bias, studies have shown that self-reports of risk behaviors are consistent and reliable [McElrath, et al., 1994]. Lastly, the focus of the SHIELD study is harm reduction for HIV-related behaviors, not latent constructs such as social capital, which may have resulted in the social capital scale items not tapping into the factors completely. This study is a secondary data analysis which restricts the analysis to pre-existing items that most closely captured the constructs of network resources and norms.

Conclusions

Understanding dynamics of social behavior that may influence needle and drug paraphernalia use is critical for risk reduction [Valente & Vlahov, 2001]. Our primary finding, that a significant relationship between social capital and risky injection use is encouraging for further social capital research in the area of drug use.

While there continues to be a rise in the number of studies exploring the association of contextual and structural factors and illicit drug use, an insight into cultural factors, as to why illicit substance use is concentrated among people of ethnic minorities, is also much needed. The present study focuses on *bonding social capital* generated from the social networks of the drug users, future studies should incorporate elements of *bridging social capital* where the relationship of access to diverse resources from people in the larger community and consequential drug use could be examined. Exploratory analyses in the present study showed that the injectors who did not share unclean needles at follow-up had a higher number of professionals in their network versus the injectors who reported sharing unclean needles at follow-up. With more studies on different types of social capital and drug use, future studies could focus on which kinds of networks, homogenous or heterogeneous, strong or weak ties are most effective in generating and sustaining social capital for beneficial influence on people with drug problems.

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List of Abbreviations

IDU	Injection drug use
PWID	People who inject drugs
HCV	Hepatitis C Virus

HIV Human Immunodeficiency Syndrome

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Fig 1. Structural Equation Model Depicting the Relationship between Network Resources at Wave 1 and Needle Sharing Among the Sample of IDUs. Model and estimated parameters for network resources: All displayed coefficients are standardized probit coefficients. $N=138$; $\chi^2=6.39$; $df=10$; $p\text{-value}=.78$; $RMSEA=0.028$; $CFI=0.99$; $TLI=0.99$

Table 1

Demographic Characteristics of PWIDs who also Reported IDU at Follow-up, SHIELD Study (N=130)

Characteristic	n (%)
Age	
>38 years	80 (61.5)
Gender (male)	91(70.0)
Education (11 years)	66 (50.8)
Race/ethnicity (African-American)	124 (95.4)
Marital Status (married)	14 (10.8)
Current main partner status	80 (61.5)
Homelessness in past six months (yes)	24 (18.5)
Incarceration in past six months	19(14.6)
Monthly income <\$500	89 (68.5)
Received public assistance or welfare	68 (52.3)
Inject Cocaine	105 (81.4)
Inject heroin	126 (96.9)
Inject Speed	110 (84.6)
Attended shooting gallery in the past 6 months	35 (27.1)
Enrolled in the needle exchange program (NEP)	75 (58.6)
Network size (>5)	122 (94.6)

Table 2

Factor loadings, response ranges, means and standard deviations (SD) of variables in the confirmatory factor analysis (N=130)

Latent variables	Range	Mean	SD	Factor Loading
I. Emotional support				
Number of network members who participant can talk with about personal matters	0–6	2.09	1.21	0.70
II. Physical assistance				
Number of network members who can help participant with grocery shopping or other physical chores	0–10	2.69	1.68	0.80
III. Material aid				
Number of network members who can help participant with \$25 or something valuable when in need	0–10	2.57	1.58	0.64
IV. Informational support				
Number of network members on whom participant can rely on for health advice	0–12	2.94	1.99	0.57
V. Social participation				
Number of network members with whom participant regularly hangs out with	0–9	3.24	1.96	0.65
VI. Multiplexity of support				
Overlap of two or more types of support from network member	0–10	3.59	1.89	0.96
VII. Trust				
Number of network members who can be trusted with a check by participant	0–10	3.04	1.81	0.75
VIII. Reciprocity				
Number of network members supported by the participant	0–10	1.19	1.75	0.20

Table 3

Background characteristics by sharers and non-sharers of needle and non-syringe paraphernalia

Variables	Needle sharing at wave 2		Chi-sq p-value
	No (n=102)	Yes (n=28)	
	N (%)	N (%)	
Gender: male	71 (69.61)	20 (71.43)	p=0.852
Race: African-American	98 (96.08)	26 (92.86)	p=0.472
Age (>38 years)	64 (72.75)	16 (57.14)	p=0.589
Education: >12 th grade	50 (49.02)	16 (57.14)	p=0.446
Currently unemployed (Yes)	93 (91.18)	28 (100)	p=0.103
Total income (>\$500)	33 (32.35)	8 (28.57)	p=0.119
Arrested in the past 6 months	15 (14.71)	4 (14.29)	p=0.956
Public Assistance in the past 6 months (yes)	53 (51.96)	15 (53.57)	p=0.880
Sharing at baseline	69 (67.65)	27 (96.43)	p=0.002*
Marital Status (married)	13 (12.75)	1 (3.57)	p=0.503
Living with main partner (Yes)	66 (64.71)	14 (50.00)	p=0.157
Homelessness in the past 6 months (Yes)	16 (15.69)	8 (28.57)	p=0.120
Shooting gallery in the past 6 months (Yes)	23 (22.77)	12 (42.86)	p=0.034*
Enrolled in the NEP (Yes)	54 (54.00)	21 (75.00)	p=0.046*
Inject heroin (Yes)	99 (97.06)	27 (96.43)	p=0.864
Inject speed (Yes)	50 (49.02)	16 (57.14)	p=0.446
Inject cocaine	78 (77.23)	27 (96.43)	p=0.021*
Smoke crack	34 (33.33)	14 (50.00)	0.106
HIV status (positive)	16 (15.69)	3 (11.11)	p=0.551
Self-rated health (poor)	5 (4.95)	6 (21.43)	p=0.023*
Network size (>5)	95 (94.06)	27 (96.43)	p=0.624
Physical assistance	54 (53.47)	9 (32.14)	p=0.046*
Emotional support	34 (33.66)	2 (7.14)	p=0.006**
Informational support	55 (54.46)	14 (50.00)	p=0.676
Material aid	54 (53.47)	7 (25.00)	p=0.008
Social participation	64 (63.27)	11 (39.29)	p=0.022*
Trust	59 (58.42)	12 (42.86)	p=0.143
Reciprocity	14 (13.86)	6 (21.43)	p=0.328
Multiplexity of support (None)	0.00	2 (7.14)	p=0.382

Multivariate logistic regression model of the association between social capital and sharing syringe at follow-up

Table 4

Outcome of needle sharing regressed on	Odds Ratio	Std. Error	z	p>z	[95% Conf. Interval]	
Social capital	0.648	0.793	-2.23	0.06	0.040	0.74
Needle sharing at baseline	2.17	4.132	3.77	0.000	2.43	30.05
Self-rated health	0.59	0.144	-2.42	0.015	0.29	0.95
Enrolment in NEP	1.85	2.083	2.26	0.024	1.23	20.29