Characterizing the Drug-injecting Networks of Cocaine and Heroin Injectors in Montreal

Prithwish De, MHSc[1]
Ann Jolly, PhD[2,3]
Joseph Cox, MD, MSc[1,4]
Jean-François Boivin, MD, ScD[1,4]

ABSTRACT

Background: There is little understanding about how the social networks of cocaine injectors are different from those of heroin users and about how such differences are associated with injection risk behaviours. Therefore, the objective of this study was to compare drug-injecting network characteristics of cocaine and heroin injectors believed to be associated with a risk of bloodborne infections.

Methods: Active injection drug users (IDUs) were recruited between April 2004 and January 2005 from three syringe exchange and two methadone treatment programs in Montreal, Canada. Characteristics of each participant and of up to 10 social network members (IDU and non-IDU) with whom frequent contact had occurred in the past month were elicited using a structured, interviewer-administered questionnaire. The current analysis focussed on the drug-injecting network members. Logistic regression was used to examine network characteristics in relation to cocaine and heroin injection.

Results: Of 282 study subjects, 81% used cocaine and 19% used heroin as their primary injected drug in the past 6 months. Compared to heroin injectors, participants who injected cocaine had lower odds of knowing their network members for a longer time (OR=0.92, 0.85-0.99), were more likely to report a larger IDU network (OR=1.64, 1.18-2.29) and have IDU partners who had a history of attending shooting galleries (OR=2.42, 1.05-5.56).

Interpretation: This study identified high-risk network-related factors associated with bloodborne infections in cocaine injectors. Prevention efforts may benefit from tailoring interventions according to type of drug used, with particular attention to the drug injecting-network of IDUs.

MeSH terms: HIV; hepatitis C virus; injection drug use; social network; cocaine; heroin

La traduction du résumé se trouve à la fin de l'article.

1. Department of Epidemiology and Biostatistics, McGill University, Montreal, QC
2. Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, Ottawa, ON
3. Department of Epidemiology and Community Medicine, University of Ottawa
4. Montreal Public Health Department, Montreal

Correspondence and reprint requests: Prithwish De, Dept. of Epidemiology and Biostatistics, McGill University, 1020 Pine Avenue West, Montreal, QC H3A 1A2, Tel: 514-528-2400, ext. 3955, Fax: 514-528-2452, E-mail: Prithwish.De@mail.mcgill.ca

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In Canada, it is estimated that there are between 75,000 and 125,000 injection drug users (IDUs) using a wide range of illicit substances, with cocaine and heroin comprising the most commonly injected drugs.[1] For example, data from the Canadian SurvUDI surveillance network covering the province of Quebec and the city of Ottawa indicate a distribution of 80% cocaine and 20% heroin among participants.[2]

The drug of choice is associated with specific patterns of use and may, as a result, be differentially related to the risk of bloodborne infections. Studies comparing cocaine injectors with other drug injectors have found that HIV risk factors such as frequent injecting and drug bingeing are strongly associated with cocaine use.[3,4] Evidence of higher HIV risk among cocaine-using IDUs compared to heroin injectors has also been described among IDUs in Vancouver.[5]

In addition to personal behaviours, an IDU's social network may play a role in drug use practices. The influence on an IDU of social network members, and particularly of drug-injecting members, is believed to occur through both direct and indirect processes such as social comparison and perceived norms that promote or reduce risk behaviours.[6,7] Network structure, such as the size of drug-injecting networks, and network dynamics, such as the rate of change of network members, have been previously associated with HIV risk.[8,9] However, little is known about how these and other network characteristics may be associated with drug type.

The objective of the present study was to identify drug-injecting network characteristics that might differentiate cocaine and heroin injectors. We hypothesized that the higher personal risk factors of cocaine injectors found by other studies would be reflected in the characteristics of the drug-injecting networks of cocaine-using IDUs compared to heroin users.

METHODS

IDUs who injected in the past 6 months were recruited from three syringe exchange and two methadone maintenance programs in Montreal, Canada between April 2004 and January 2005. Participants were at least 18 years of age and provided informed consent. The study protocol and

documents were approved by the McGill University Faculty of Medicine Institutional Review Board for Research on Human Subjects.

Study participants completed a structured, interviewer-administered questionnaire, which consisted of sections on personal demographic and drug use characteristics and on the participant's social network. To construct the personal social network, participants were asked to name up to 10 individuals with whom the most frequent contact had occurred in the past month. The current analysis focusses on drug-injecting network members, defined as those persons who shared drugs, shared injection equipment, or injected together with the study participant (i.e., index).

Variables describing characteristics of IDU network members were mean age, gender, duration of relationship with the index, other relationship with index (sex and/or support), frequency of injecting with the index, polydrug use, drug treatment or syringe exchange attendance, HIV and HCV status, and history of shooting gallery attendance. Variables describing the structure of the IDU network included the size of the network and network turnover rate. The latter was calculated as the number of new IDUs in a network relative to the number of IDUs during the past 6 months.

The comparison of drug types was restricted to cocaine and heroin as these were the drugs most commonly injected (i.e., injected "half the time or more") during the past 6 months in this sample. Variables were considered to be statistically significant at $p<0.05$ (two-tailed). Logistic regression was used to calculate unadjusted and adjusted odds ratios with 95% confidence intervals for the association between network factors and cocaine injection.

TABLE I

Drug-injecting Network Characteristics of a Sample of Cocaine and Heroin Injectors in Montreal, Canada

Variable	Cocaine (n=305)		Heroin (n=59)	
	n	(%)	n	(%)
Network Structure				
Size of IDU network† [mean, SD]	2.7	(1.7)	2.0	(1.5)
Turnover rate of network* [(percent), mean, SD]	35	(33)	26	(31)
Shared injections† [(percent), mean, SD]	36	(29)	30	(32)
Network Composition				
Gender [male]	209	(71)	34	(58)
Age [(years) mean, SD]	31.9	(8.8)	26.4	(6.7)
Duration of relationship with index [(years) mean, SD]	3.5	(3.9)	6.4	(6.6)
Years injecting [mean, SD]	6.9	(5.6)	5.7	(4.2)
HCV-positive	141	(71)	12	(27)
Network Behaviour				
Provided social support to index	113	(37)	41	(70)
Daily injecting†	142	(54)	28	(58)
Public injecting with index†	148	(61)	25	(60)
Ever attended shooting gallery	110	(60)	11	(29)
Syringe borrowed from index†	69	(25)	3	(6)
Syringe lent to index†	58	(21)	3	(6)
Provided index with sterile syringes†	140	(52)	27	(55)

SD=standard deviation
* New IDU network members in past month as proportion of IDUs in past 6 months
† refers to past month

TABLE II

Results of Regression Analysis of Drug-injecting Network Factors in Relation to Cocaine Injection Among Study Participants

	Crude OR (95% CI)	Adjusted OR† (95% CI)
Network Structure		
Size of IDU network* [per member]	2.20 (1.75-2.76)	1.64 (1.18-2.29)
Turnover rate of network [per member]	1.03 (1.02-1.04)	
Shared injections*	1.48 (1.35-1.62)	
Network Composition		
Gender [male]	1.81 (1.02-3.21)	
Age [per year]	1.05 (1.04-1.07)	
Duration of relationship with index [per year]	0.88 (0.84-0.92)	0.92 (0.85-0.99)
Years injecting [per year]	1.24 (1.18-1.32)	
HCV-positive	6.67 (1.72-13.9)	
Network Behaviour		
Provided social support to index	0.27 (0.12-0.59)	
Daily injecting*	0.83 (0.44-1.54)	
Public injecting with index*	1.06 (0.54-2.07)	
Ever attended shooting gallery	3.70 (1.72-7.69)	2.42 (1.05-5.56)
Syringe borrowed from index*	4.85 (1.46-16.13)	
Syringe lent to index*	3.86 (1.16-12.99)	
Provided index with sterile syringes*	0.89 (0.48-1.64)	

OR=odds ratio, CI=confidence interval
NOTE: heroin injection is referent category; network composed of 364 drug-injecting members named by 282 study participants (indexes).
* refers to past month
† adjusted for age and gender

RESULTS

There were 282 participants (of 321 recruited) eligible for this analysis as being primarily cocaine (81%) or heroin (19%) injectors. Non-eligible subjects included those who primarily injected drugs other than cocaine and heroin, or who did not report any social network members. The response rate could not be calculated as information was not collected regarding the number of IDUs approached. Study participants identified 364 other IDUs as part of their personal social networks.

Study participants

The majority of subjects (83%) were recruited from needle exchange programs. The mean age of the study sample was 33 years and participants were predominantly male (73%), Caucasian (90%), single (88%), and many lived in unstable housing conditions (42%). Based on self-report, 19% were HIV-positive, 64% were HCV-positive, and 19% were co-infected with both. Compared to heroin injectors, cocaine users were more likely to be younger, male, less educated, and live in unstable housing ($p<0.001$).

Network members

Overall, the mean (and range) social network sizes of cocaine injectors and heroin injectors were 2.53 members (1-10) and 2.56 members (1-8), respectively. Approximately 88% of network members were reported to inject cocaine while 12% injected heroin as their primary drug in the past 6 months. The mean age of members was 31 years and they were mostly male (69%) and Caucasian (90%). Among network members, 42% also provided some

form of social support and 27% were sexual partners. On average, indexes had known their network members for 5.6 years. Table I shows the profile of network members according to drug of choice of the participant.

Table II shows results of the regression analyses of network factors associated with cocaine injectors. Compared to heroin use, cocaine injection was associated with shorter duration of relationships between a network member and an index, and with having an IDU network member who had a history of attending a shooting gallery. In addition, while IDUs were equally likely to be reported in the social networks of cocaine and heroin users, cocaine injectors were significantly more likely to have larger IDU networks.

DISCUSSION

This study suggests that drug type may help differentiate injection-related risk for bloodborne infections based on IDU social network characteristics. The analysis of network factors in this study showed that IDU networks of cocaine injectors were characterized by higher risk traits than those for heroin users. First, the shorter relationships of cocaine injectors with their IDU network members suggests the instability of cocaine networks. Frequent change in IDU partnerships is associated with greater opportunities for exposure to HIV- or HCV-infected individuals in a drug-injecting network.[8] Second, cocaine injectors were more likely than heroin users to have larger IDU networks through which injection risk behaviours may be more likely to be sustained as a result of reinforcement from a greater number of drug-using peers.[8,9] Finally, network members of cocaine users were more likely to have a history of attending shooting galleries, which have been associated with risk of HIV.[10] In sum, the higher network-related risk may serve as a proxy measure for the elevated HIV and HCV risk of the index.

These results must be considered in light of several limitations. The cross-sectional nature of the study does not account for changing social network structure over time, whereby membership of current social networks might not reflect past networks. Second, drug use patterns, including co-use of drugs, may be more complex than described here.[11] Third, the validity of reported characteristics by IDUs about their social network members has previously been questioned but shown to have acceptable reliability.[12,13] Finally, this sample of IDUs recruited predominantly from needle exchange programs may not be representative of the IDU population at large. However, participants who injected cocaine were more likely to be HCV-positive compared to heroin injectors, as shown in other study samples.

If our findings are confirmed by future studies, interventions could be tailored according to network risk. Prevention programs could strive to reduce IDU network size while promoting risk reduction support within social networks. Raising awareness among IDUs of the characteristics of their social and IDU networks that increase the chance of harm could help them to restructure their personal networks to reduce the number of risky individuals with whom they have contact. Finally, the findings highlight the importance of taking into account drug of choice when investigating risk factors for bloodborne infection in study subjects recruited from heterogeneous injecting populations.

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RÉSUMÉ

Contexte : On comprend mal la différence entre les réseaux sociaux des personnes qui s'injectent de la cocaïne et ceux des utilisateurs d'héroïne et l'influence que ces différences peuvent avoir sur les comportements d'injection à risque, qui à leur tour peuvent influencer le risque d'infections transmises par le sang. La présente étude a pour objectif de recenser les caractéristiques des réseaux sociaux associées à l'injection de cocaïne et d'héroïne.

Méthodologie : Des utilisateurs de drogues injectables (UDI) actifs ont été recrutés entre avril 2004 et janvier 2005 au sein de programmes d'échange de seringues et de traitement à la méthadone à Montréal, au Canada. Les caractéristiques des participants et d'un maximum de dix membres de leur réseau social (UDI et non-UDI) avec qui les participants avaient eu des contacts fréquents au cours du mois précédent ont été recensées au moyen d'un questionnaire structuré. Cette analyse met l'accent sur les participants à l'étude qui sont des utilisateurs de drogues injectables. La régression logistique a été utilisée pour l'examen des caractéristiques des personnes et du réseau en relation avec l'injection de cocaïne et d'héroïne.

Résultats : Sur 282 UDI, 81 % avaient consommé de la cocaïne et 19 % de l'héroïne comme principale drogue injectable au cours des six mois précédents. Les analyses de régression logistiques ont permis de constater que les utilisateurs de cocaïne étaient plus susceptibles que les utilisateurs d'héroïne de connaître les membres de leur réseau depuis peu de temps (OR=0,92[0,85-0,99]), de signaler un réseau UDI plus étendu (OR=1,64[1,18-2,29]) et d'avoir des partenaires UDI qui s'étaient injecté des drogues dans une piquerie (OR=2,42[1,05-5,56]).

Interprétation : Cette étude a permis de recenser les facteurs liés au réseau et associés à un risque accru d'infection transmissible par le sang chez les utilisateurs de cocaïne, en comparaison aux utilisateurs d'héroïne. Les efforts de prévention pourraient bénéficier d'une personnalisation des interventions selon le type de drogue utilisée, en portant une attention particulière aux réseaux sociaux des UDI.