

Elicitation of Salient Beliefs Related to Drug Preparation Practices Among Injection Drug Users in Puerto Rico

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Even when IDUs use their own syringes, the common use of drug preparation materials can expose them to blood-borne pathogens. Notwithstanding the accumulated evidence about the riskiness of drug preparation practices (DPPs), the factors that lead IDUs to engage in DPPs have remained understudied. We conducted 80 semi-structured interviews to elicit salient beliefs about engaging in low-risk DPPs. Data were content analyzed for consequences, normative influences, and barriers. For the most part respondents described positive consequences of engaging in low-risk DPPs. The majority of respondents mentioned IDU peers as a major source of pressure to engage in high-risk DPPs. Lack of access to clean materials and the need to carry materials on oneself were the most salient barriers elicited. The results suggest that preventive interventions need to address the preference for re-using filters, help develop skills to fend off pressures from peers, and increase the accessibility of materials in ways that do not require IDUs to carry additional items.

KEY WORDS: Elicitation interviews; drug preparation practices; injection drug users; Puerto Rican Hispanics.

INTRODUCTION

In the process of preparing drug solutions, injection drug users (IDUs) engage in a number of behaviors that can result in exposure to HIV and other blood-borne pathogens. These risk behaviors can take place even when IDUs are injecting with their own syringe. High-risk drug preparation practices (DPPs) consist of the common use of drug preparation materials such as water and drug mixing containers and cotton filters. These behaviors have been observed and described in many communities in the United States as well as in other countries (Colón *et al.*, 2001a; Grund *et al.*, 1991; Inciardi and Page,

1991; Koester *et al.*, 1990; Zule, 1992). The shared use of drug preparation materials can take place sequentially as one person prepares his drug solution with materials previously used by others, such as is commonly observed in “shooting galleries.” It can also take place simultaneously as two or more IDUs jointly prepare a drug solution to be shared. Joint preparation often includes the additional DPP of using a single syringe to measure the amount of water to be used in dissolving the drug and to divide and distribute the drug solution. Joint preparation has been found to be particularly common among IDUs preparing ‘speedballs’ (i.e., cocaine and heroin solutions) and has been linked to the practice of pooling money to procure drugs among two or more IDUs (Colón *et al.*, 2001a; Grund *et al.*, 1991; Koester and Hoffer, 1994; Needle *et al.*, 1998).

Several studies have found that DPPs are practiced more often than needle sharing (Colón *et al.*, 2001a; Koester *et al.*, 1996). Laboratory assays of the preparation materials have confirmed that their shared use can transmit blood borne pathogens

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(Clatts *et al.*, 1999; Shah *et al.*, 1996). Epidemiological studies have found DPPs to be associated with HIV and HCV infection among IDUs (Jose *et al.*, 1993; Thorpe *et al.*, 2002; Vlahov *et al.*, 1995). Hagan and colleagues (2001) found that DPPs accounted for 50% or more of the attributable risk of HCV seroconversion among participants of the Seattle syringe exchange program who reported no needle sharing. These researchers have suggested that the failure to observe reduced HIV and HCV seroconversion rates in some syringe exchange programs might be due to the continued practice of DPPs (Hagan *et al.*, 1999). Other researchers have argued that as the practice of needle sharing decreases with increased access to legal sterile syringes, DPPs may become a main route of transmission of blood borne pathogens among IDUs (Grund *et al.*, 1991). Without meaningful reductions in the practice of DPPs, the results achieved in reducing the risk of infection through the shared use of syringes may prove insufficient to reduce overall infection rates among IDUs.

Notwithstanding the accumulated evidence about the role of DPPs in the transmission of HIV and other blood-borne pathogens, the factors that lead IDUs to engage in DPPs have remained understudied (Clatts, 1999; Koester *et al.*, 1999). Anthropologists and ethnographers have made critical contributions to the understanding of DPPs by describing in detail episodes of drug preparation and showing the multiple ways in which materials can be used and viral transmission can occur (Clatts *et al.*, 1999; Needle *et al.*, 1998). These studies have also identified several contextual factors that influence DPPs: insufficient money to procure whole units of drugs as sold on the street, the pooling of money by two or more IDUs, differential power relationships among IDUs, properties of the drug that facilitate or make difficult its division in dry form (e.g., tar versus powder), access to new materials, and the properties of the injection settings (e.g., presence of water taps in shooting galleries) (Bluthenthal *et al.*, 1999; Finlinson *et al.*, 2000; Koester and Hoffer, 1994; Latkin *et al.*, 1992; Page, 1990; Page *et al.*, 1990). Yet, needle sharing has remained the focus of most prevention efforts (Burrows, 1998; Hankins, 1998) and few prevention strategies have been specifically designed to modify DPPs.

To help design interventions that can effectively modify DPPs, the findings of the ethnographic literature need to be augmented to include information on the beliefs and attitudes that IDUs hold about DPPs. Several psychosocial models have been

proposed to help understand HIV risk and protective behaviors (Bandura, 1990; Fishbein *et al.*, 1991). Although these models differ among themselves in several respects, they converge in highlighting the importance of several domains of beliefs, particularly attitudes, perceived norms, perceived barriers and facilitators, and perceptions of self-efficacy (Fishbein *et al.*, 1992). However, these theoretical domains are general in contents and the elements within each domain that exert influence over a given behavior might vary from one population to another, and from one context to another. Thus, the contents of the domains cannot be derived a-priori but need to be elicited from members of the target population (Fishbein, 1995; Middlestadt *et al.*, 1996). We have conducted 80 semi-structured interviews to elicit salient beliefs about the practice of DPPs among IDUs in Puerto Rico.

METHODS

This study is part of a larger formative research project of high-risk DPPs. The larger project combines ethnographic and qualitative methods with quantitative survey methods to investigate high-risk DPPs and help develop preventive strategies. The analyses of the ethnographic observations have been published separately (Finlinson *et al.*, 2002).

Participants and Recruitment

Data for this study were collected in two neighborhoods of the Municipality of Bayamón in the San Juan Metropolitan Area during June and July of 2001. Study participants were screened and recruited by an outreach worker trained in ethnographic data collection. Potential participants were deemed eligible if they were at least 18 years of age and reported drug injection during the 7 days prior to being interviewed. Sampling quotas were developed to ensure that at least 30% of the study sample was female and 20% were HIV positive.

A total of 93 potential participants were approached, 85 were found eligible and 80 agreed to participate. Of these, 53 were male and 27 were female. Participants ranged in age from 18 to 53, having a mean age of 33.7 years. Seventeen participants (21%) reported knowing they were HIV seropositive. The number of years participants had injected drugs ranged from less than 1 year to 36 years, with a mean number of 11.5 years. Participants reported

injecting drugs an average of six times a day, ranging from one injection a day to 18.

Interview Guides and Data Collection

Participants were interviewed using a semi-structured interview guide developed for this study. The interview guide was based on behavioral constructs detailed in the social cognitive model, the transtheoretical model of behavior change, and the theory of reasoned action (Maxwell, 1996; Middlestadt *et al.*, 1996). Areas of inquiry covered three protective practices that could eventually become intervention targets: (1) the use of water from a personal container to prepare drug solutions; (2) the use of new cotton filters to filter the drug solution; and (3) the use of new syringes to measure the water and distribute drug shares. Respondents were asked to mention advantages and disadvantages of each behavior, the types of persons that would approve or disapprove of them always practicing each behavior, and the things that made it easy or difficult to practice each behavior. For example, respondents were queried about relevant personal referents of using water from a personal container by asking them 'who would agree to you always using water from your own container?' Several probes were printed in the interview guide. For example, the former question included alternative phrases such as 'who would care that you always use your own water,' and 'who would disagree with you insisting in always using your own water.' Interviewers were allowed to come up with probes of their own provided that the probes used were written in the response sheets. The statements made by the respondents were written down *verbatim*. Interviews took approximately 30 min and were conducted in private offices in the community. Participants were paid a small gratuity (\$10) for their time and effort.

Content Analyses

All the verbatim statements made by the respondents were entered into an electronic database and classified according to the behavior referred to in the statement. Keywords and phrases were derived from the textual database and used to develop a list of topics. Topics were categorized as expressing consequences, social referents, or barriers/facilitators. A relational database was developed where each verbatim statement was matched to one or more topic. Topics were then grouped into general themes and

variables representing the enunciation of topics by three or more respondents were created in an SPSS data file. Counts and percents for each topic and general theme were calculated.

Responses were compared across gender and HIV status. Chi-square p values were computed using Fisher's exact test. The participants that were interviewed with a modified guide (last 20 participants) were also compared to the participants interviewed with the original guide (first 60). These two groups were compared in their age, gender, and HIV status composition. Chi-square exact p values were also computed for these comparisons. Both groups were also compared in their years of injection and daily injection frequency using t -tests for independent samples.

RESULTS

Use of Water from Personal Containers

Water to prepare drug solutions and rinse syringes can be obtained from several sources. Water provided in shooting galleries is frequently found in either wide-mouth receptacles such as a drinking glass, or in narrow-mouth plastic soda bottles. Water from the common receptacle is poured into a smaller container, usually a bottle cap or cooker, from where IDUs pull it up by inserting the tip of their syringes. IDUs can also be observed using water from their own container, most frequently small plastic bottles distributed by HIV prevention programs. Occasionally, IDUs with their own containers of water will share the water with other IDUs by pouring water into the container's top and allowing others to pull water with the tip of their syringes. Since IDUs in Puerto Rico only rarely inject at their homes, tap water from the respondents' home was rarely mentioned as a source. Table I shows the beliefs elicited about always using water from a personal container.

Consequences

Positive consequences fell under three general themes: avoiding infections, improving the efficiency of the preparation and injection process, and reducing the chances of pain or discomfort while injecting. No negative consequences about always using a personal container of water were elicited. All respondents mentioned that using water from a personal container reduced the chances of getting infections and increased their confidence that the water was

Table I. Beliefs Elicited Among 60 IDUs About Always Using Water from a Personal Container

Consequences	%	Social referents	%	Barriers	%
1. Avoids infections/diseases	100.0	Would approve		1. Accessibility/availability, scarcity	100.0
Avoids diseases, infections	83.3	1. Sex partner/family	80.0	More services in the community	98.3
I am sure it is clean, uncontaminated	41.7	My mother, my father	38.3	Clean water in the shooting gallery	33.3
Nobody else has inserted a syringe	18.3	My partner, my spouse	35.0	They do not let me use their tap	28.3
Avoids infecting somebody else	8.3	My brothers, my sister	31.7	Not having clean water at hand	25.0
Avoids reinfection	6.7	Family, my cousin	30.0	More hours of the NEP	15.0
I am more aware of my health	6.7	My children	26.7	Need to have money	10.0
2. Preparation and injection process	23.3	2. Friends	53.3	Others ask for it	10.0
Do not have to ask for water	16.7	Friends	28.3	No running water close by	6.7
The process is faster	11.7	Close friends	15.0	Stuff gets stolen	6.7
3. Reduces pain/discomfort	11.7	Friends who do not use drugs	15.0	I run out of it	5.0
Avoids the chills, 'escalofríos'	11.7	Neighbors	6.7	2. Having to carry on oneself	75.0
		3. Friend drug users	18.3	Police finds it and harasses us	58.3
		Friends who use drugs	10.0	Do not feel comfortable with it on me	26.7
		Friends with whom I share drugs	8.3	It lets other people know I am a user	20.0
		4. Community prevention personnel	28.3	3. Carelessness/hurry	23.3
		Outreach workers	28.3	I am careless, I forget	15.0
		Would disapprove		The rush to get a fix	10.0
		5. Other drug users	71.7	4. Distrust of/from others	25.0
		Shooting gallery managers	31.7	Distrust that my water is clean	18.3
		Those with whom I pool drugs	30.0	Others believe I distrust them	6.7
		The other drug users	28.3		

clean and not contaminated. In addition to the concerns about avoiding infections with HIV, respondents frequently expressed concerns about hepatitis (37 mentions of HIV versus 36 mentions of hepatitis).

Close to one-fourth (23%) of the respondents also believed that having a personal container with water helped the preparation and injection process by making it faster and simpler. Several respondents, for example, considered it an advantage not to have to pay for the gallery service, which includes water. Not having to wait until other IDUs pulled up water was another advantage mentioned. Respondents also considered it an advantage to reduce the chances of the intense pain and chills ('escalofríos') that result from injecting solid particles ('pajas'). HIV positive participants were more likely than HIV-participants to report that a personal water container helped the preparation and injection process (46 and 15%, respectively, $p = .030$). Using water from a personal container was believed by 11% of the respondents to imply that the water did not contain any solid particles.

Relevant Social Referents

The majority of referents mentioned as approving the behavior consisted of sexual partners, family members, non drug-using friends, and the personnel of community HIV prevention programs. Respondents made a clear distinction between drug-using friends and the 'other' drug users. The former (mentioned by 18% of respondents) were seen as encouraging the use of a personal container to protect oneself against infections, while the latter (mentioned by 71% of respondents) were mentioned as opposing the use of personal containers. Other drug users, especially those preparing shared drugs, were described as insisting that their own water be used. Operators of shooting galleries were also mentioned as opposing the use of personal containers, the rationale being that provision of water is part of the service for which they get paid.

Barriers

All respondents referred to problems of access and availability to clean water as a barrier. Respondents mentioned the need for community prevention programs to increase the number of water bottles distributed, increase their hours of operation, and increase the sites from which they distributed injection

materials. Respondents also expressed the opinion that the local NEP should distribute personal water bottles. Some respondents (28%) claimed that community residents and businesses did not let them obtain clean water from outdoor water taps. Scarcity of clean water was also implied in respondents' accounts of having bottles stolen and having other IDUs asking respondents to share their water.

Three quarters of respondents believed having to carry water bottles on oneself to be a barrier. Police searching them and finding water bottles and relatives finding out about their injection behaviors were the two major concerns with carrying water bottles. Males were significantly more likely than females to mention having to carry water on oneself as a barrier (85 and 70%, respectively, $p = .03$). Carelessness and the hurry and anxiety to get a 'fix' were also mentioned as barriers by 23% of respondents. Several respondents (10%) argued that whenever they were feeling 'drug sick' all they could think of was preparing the injection solution with whatever was readily available. At such times, other concerns were secondary. Fifteen percent said they sometimes forgot to carry their own bottles and used water from whatever source was available. Distrust among IDUs was also mentioned as a barrier by 25% of respondents. Several respondents described how when preparing a drug solution, the sharing partner would not trust the respondent's water was clean and would insist that their water be used.

Use of New Cottons to Filter Drug Solutions

After mixing the drug with water, a small piece of cotton or a cigarette filter is placed in the cooker. The tip of the syringe needle is then placed on the cotton and the solution is pulled into the syringe. The cotton or cigarette filter is intended to filter any solid particles and allow only dissolved solution to enter the syringe barrel. Used cotton filters are commonly observed in shooting galleries inside cookers lying on tables and available for IDUs to use them. After using them, IDUs seldom discard the filters. They are either returned to the shooting gallery operator or, if owned by the IDUs, saved together with the cooker, presumably to be used later. Sometimes the payment made to the shooting gallery operator is in the form of a small amount of drug solution left in the cooker and filter. Table II shows the beliefs elicited about always using new, previously unused, cotton filters.

Table II. Beliefs Elicited Among 60 IDUs About Always Filtering Drug with a New Cotton Filter

Consequences	%	Social referents	%	Barriers	%
1. Avoids infections/diseases	90.0	Would approve		1. Accessibility/availability, scarcity	100.0
Avoids diseases, infections	83.3	1. Sex partner/family	78.3	More services in the community	83.3
It is clean	13.3	My partner, my spouse	33.3	More service in the shooting gallery	45.0
It is not contaminated	6.7	My mother, my father	33.3	Not having cigarettes	38.3
I take better care of myself	6.7	Family, a close uncle	30.0	Not at hand when needed	30.0
I take better care of my health	6.7	My brothers	26.7	Hard to find when needed	28.3
It is more hygienic	5.0	My children	26.7	Need money	25.0
2. Preparation and injection process	53.3	2. Friends	45.0	More services in the coping area	25.0
Prevents the syringe from clogging	38.3	Friends	25.0	NEPs should distribute cotton filters	11.7
Drug pulling works better	15.0	Friends who do not use drugs	15.0	Hospitals should give out cottons	8.3
The cotton filters the drug better	8.3	Close friends	5.0	Drug stores should give out cottons	6.7
It collects all the dirt in the cooker	5.0	Neighbors	5.0	People steal them	6.7
3. Avoids pain/discomfort	41.7	3. Friend drug users	26.7	Hygienic kits with all the materials	5.0
Prevents pulling up fibers, 'pajas'	25.0	Friends who use drugs	15.0	A shirt to pull off a thread	5.0
Avoids the chills, 'escalofríos'	23.3	Friends whom I share drugs with	11.7	2. Having to carry on oneself	30.0
		4. Community prevention personnel	23.3	Police find it and harass us	21.7
		Outreach workers	23.3	Do not like to carry cottons on me	5.0
		Would disapprove		Cottons get dirty while carrying them	5.0
		5: Other drug users		3. Carelessness/hurry	21.7
		Those with whom I pool drugs with	83.3	Carelessness, losing my materials	15.0
		The other drug users	35.0	The rush and anxiety of getting a fix	8.3
		Shooting gallery managers	30.0	4. Distrust of/from others	6.7
		The user who loans the cooker	26.7	Others think I distrust them	6.7
			8.3	5. Others prefer theirs/used	70.0
				Sharing partner prefers to prepare	45.0
				with a used cotton	
				Sharing partner wants to prepare with	28.3
				his own cotton, even it is used	

Consequences

As was the case with the source of water, no salient negative consequences were elicited. Only one respondent expressed the belief that used filters worked better than new filters. Helping to avoid infections was the most frequently (90%) mentioned positive consequence of using a new filter. As was also the case with the source of water, risks of infection with hepatitis viruses were mentioned almost as frequently as the risks related to HIV. There were 35 mentions of the risks of infection with hepatitis and 44 mentions of the risks of HIV.

More than half of respondents (53%) believe that new filters improved the preparation process. The majority of these beliefs (38%) were concerned with a new filter helping to avoid the clogging of the syringe. Consistent with this belief, 25 (41%) respondents argued that new filters helped to avoid the chills and pain of injecting solid particles.

Relevant Social Referents

The types and distribution of social referents listed on Table II are very similar to that of Table I. Respondents believed family relatives, non-drug using friends, and the personnel of the HIV prevention programs were the main types of persons approving of them always using a new cotton filter. The belief that other non-friend drug users disapprove of the use of a new cotton filter was mentioned by 83% of the respondents. Respondents' accounts included frequent mentions of the person preparing the drug not willing to use any other cotton filter but his/her own as a way of keeping control of the preparation process.

Barriers

Problems with lack of access and availability were mentioned by all respondents. Problems associated with carrying cotton filters on oneself was frequently mentioned (30%), but it was less frequently mentioned than problems with having to carry water containers (75%). A small number of respondents ($n=3$, 5%) claimed that cotton filters can be dirtied while carrying them in pockets. Carelessness, losing one's own materials (21%) and distrust of others that one's own filter is new (6%) were also mentioned as barriers against the use of new cotton filters.

A large number of respondents (70%) expressed the belief that other IDUs prefer to use their own filters. Two different versions of this belief were elicited. The most frequent expression (45%) was that other IDUs preferred used filters *because* the filters had been already cured ('curados') through repetitive use. A less frequent version of this belief argued that other IDUs preferred to use their own cotton filter *even* if it had already been used (28%). The first version seemed to contradict the fact that only one respondent had expressed a personal preference for used filters.

We asked the last 20 respondents about the advantages of using *used* cotton filters. Table III lists the responses obtained from the 20 respondents. In contrast to the responses of the initial 60 respondents who were asked about the advantages of using *new* filters and only one respondent expressed a preference for used filters, 13 of the 20 IDUs (65%) asked about the advantages of using *used* filters expressed some preference for them. The remaining seven respondents (35%) explicitly said there was no advantage to filtering with a used filter. The salient rationale for using a used filter was that the filter retained drug from previous uses and rendered a higher potency solution when re-used. Consistent with the responses of the initial 60 respondents, 95% of the last 20 respondents expressed the belief that used filters can cause infections, and 55% believed used filters

Table III. Beliefs Elicited Among 20 IDUs About Consequences of Filtering Drug Solution with a Used Cotton

Consequences	%
Positive	
1. Retains drug from previous use	65.0
Retains drug from previous use	45.0
The solution is stronger	30.0
More drug is pulled	10.0
I can prepare another shot	10.0
2. Preparation and injection process	10.0
Drug pulling works better	10.0
Does not clog the syringe	5.0
Negative	
1. May cause infections/diseases	95.0
May cause diseases, infections	85.0
There may be blood in the filter	15.0
I can infect somebody else	5.0
2. Preparation and injection process	20.0
Drug pulling does not work well	10.0
Can clog the syringe	10.0
3. Increases pain/discomfort	55.0
Can pull up fibers, 'pajas'	35.0
Can cause the chills, 'escalofríos'	30.0
Nicotine in used cigarette filters can cause harm, give a headache	10.0

fail to remove solid particles which cause chills and pain.

Tests to detect differences in the composition of the last 20 respondents and the initial 60 respondents failed to show statistically significant differences at $p < .05$ in terms of age, gender, HIV status, years of injection and daily injection frequency. Although not statistically significant, the last 20 participants were somewhat less likely to be female than the first 60 (25 and 36%, respectively), and slightly younger (mean age 29 years and 34 years, respectively).

Use of New Syringes to Measure and Distribute Drug Shares

Drug solutions are frequently prepared for two or more IDUs. In these cases, it is common to observe the use of a single syringe to measure the amount of water and measure the resulting solution using the calibrations printed on the syringe barrel. Distribution of dry cocaine powder is frequently observed. Distribution of dry heroin is only rarely observed, except when one of the sharing partners wishes to use the drug without injecting it, e.g., by snorting it. Table IV shows the beliefs elicited about always using a new syringe to measure and distribute drug shares.

Consequences

No salient negative consequences were elicited related to the use of new syringes to prepare drug solutions. The major positive consequence elicited was the concern with protection from infections. The vast majority of respondents (93%) mentioned avoidance of infections with either HIV or the hepatitis viruses as a positive consequence of using a new syringe. As was true with the use of water from personal containers and the use of new cotton filters, concerns with hepatitis infections were almost as common as concerns with HIV infections (39 hepatitis mentions and 50 HIV mentions). The responses grouped under improvements to the preparation and injection process suggests that respondents were thinking mainly of the injection step when responding to questions regarding the use of a new syringe. Mentions of the syringe registering the vein more easily (33%) and of the syringe not leaving track marks (25%), refer to the use of the syringe for injection, not for preparation. Similarly, the most frequently mentioned advantage about avoiding pain referred to a new syringe not hurting the veins

(13%). Thus, apart from the reduction in the risks of infection, the use of a new syringe to measure and distribute drug shares did not appear to elicit any other positive consequences.

Relevant Social Referents

The types and distribution of social referents listed in Table IV is very similar to those of Tables I and II. Respondents believed that family relatives, non-drug using friends, and the personnel of the HIV prevention programs were the main types of persons approving of them always using a new syringe to prepare drug solutions. Respondents' main account as to the nature of the opposition by other drug users to the use of a new syringe referred to the person preparing the drug solution not willing to use any other syringe but his/her own as a way of maintaining control of the preparation process.

Barriers

Problems with lack of access and availability were mentioned by all respondents. Problems associated with carrying syringes on oneself were frequently mentioned (63%). The majority of comments about difficulties in carrying syringes referred to problems with police (58%). Carelessness (6%), distrust of others that one's own syringe is new (25%), and the preference of the IDU doing the preparation of shared drugs to use his/her own syringe even if it is a used syringe (30%) were the other barriers mentioned against the use of new syringes for the preparation and distribution of the drug solution.

DISCUSSION

The theoretical models that informed the design of this study posit that behaviors are influenced by beliefs about the positive and negative consequences of each course of action, the normative influences exerted by relevant social referents, and the perception of individuals of their own efficacy to engage in a behavior whenever faced with particular barriers (Fishbein *et al.*, 1992). In this section we discuss the results in terms of these theoretical domains.

Consequences

The results suggest that, except in the case of the use of new cotton filters, IDUs do not perceive

Table IV. Beliefs Elicited Among 60 IDUs About Always Using a New Syringe to Measure and Distribute Drug Shares

Consequences	%	Social referents	%	Barriers	%
1. Avoids infections/diseases	93.3	Would approve		1. Accessibility/availability, scarcity	100.0
Avoids diseases, infections	88.3	1. Sex partner/family		More services in the community	73.3
I am safer	15.0	My mother, my father	86.7	Need money to purchase syringes	68.3
It is not infected	10.0	My partner, my spouse	35.0	Able to purchase them in drugstores	56.7
I can avoid infecting somebody else	6.7	Family, my cousin	35.0	Need more NEPs	43.3
I take better care of myself	5.0	My children	30.0	More services in shooting galleries	21.7
Avoids reinfection	5.0	My brothers	28.3	There is nowhere to buy one	18.3
2. Preparation and injection process	66.7	2. Friends	55.0	Need more selling of syringes	16.7
I can prick a vein more easily	33.3	Friends	38.3	Hard to find new ones	8.3
It does not leave tracks on my skin	25.0	Close friends	8.3	Not having one at time of injection	6.7
One injects faster	18.3	Neighbors	8.3	Hygienic kits should include syringes	5.0
It is new	16.7	Friends who do not use drugs	6.7	2. Having to carry on oneself	63.3
The syringe does not clog	11.7	3. Friend drug users	18.3	Police make us throw it away, break it	58.3
Pulls up the drug better	8.3	Friends who use drugs	11.7	It lets others know I am a drug user	13.3
I do not lose the shot 'tiro'	5.0	A friend with whom I share drugs	6.7	Do not like to carry syringes	11.7
Easier to see the numbers	5.0	4. Community prevention personnel	28.3	3. Carelessness/hurry	6.7
Less risk of the needle breaking	5.0	Outreach workers	28.3	The rush to get a fix	6.7
3. Avoids pain/discomfort	28.3	Would disapprove		4. Distrust of/from others	30.0
Does not hurt the vein	13.3	5. Other drug users	70.0	Other users not trusting that it is new	25.0
The point is not blunt	8.3	Those with whom I pool drugs	58.3	Others believe I want a larger share	5.0
Avoids the chills, 'escalofríos'	8.3	The other drug users	18.3	5. Others prefer theirs/used	30.0
There is no pain	6.7			Sharing partner wants to use his syringe, even if mine is new	30.0

negative consequences of using new materials to prepare drugs. The positive consequences elicited covered three sets of issues: (1) prevention of infections, (2) efficiency of the preparation and injection process, and (3) avoidance of the pain of injecting illicit drugs. Prevention messages frequently emphasize the first issue. However, we must be cognizant of the importance to IDUs of the latter two sets of issues. While the consequences of infection with the HIV or hepatitis virus are likely to become evident months or years after infection, the pain of injecting a solid particle is felt immediately and ruins the desired effect of injecting. Large differences in the timing of consequences could result in immediate consequences becoming more salient than delayed consequences, even if the latter are of greater import than the former. This inequality in the timing of the consequences may result in providing a greater prominence to issues related to the efficiency of the preparation process and the avoidance of pain during injection than to issues related to avoiding infections. Strategies aimed at reducing risky DPPs should consider practices that improve the preparation and injection process from the standpoint of the IDUs, in addition to reducing the risks of infection. Safe practices that offer no additional improvement or that further complicate the preparation process, such as heating the drug solution for extended periods of time and risking evaporating part of the liquid (Clatts, 1999), may be less likely to be adopted than practices that make the preparation process a simpler activity or improve upon the current practices in a noticeable way.

The use of a new syringe during the preparation process elicited no negative beliefs but also very few positive consequences. The great majority of the positive consequences elicited were concerned with the use of the syringe to inject, not to prepare. The lack of mention of positive consequences related to the use of a new syringe for the preparation process is suggestive that except for the advantage of avoiding infections, there are few other important motivations to using a new syringe for preparing drug solutions. In fact, when faced with the alternative of several syringes with which to prepare drug solutions, we have observed in the San Juan metropolitan area a preference for saving the newer syringes for injection, and using the older ones for preparation. Thus, distribution of new syringes might be an effective strategy to reduce injections with somebody else's syringe ('needle sharing'), but not necessarily to reduce the

preparation and distribution of drug shares with used syringes.

Some IDUs expressed a preference for re-using cotton filters. This is congruent with our ethnographic observations in that only infrequently have we observed used filters being discarded. The rationale provided by respondents makes sense and fits well with the accounts we have collected during informal street conversations with IDUs. Many of our respondents said that used cotton filters are 'cured' and provide a stronger drug solution. The cotton filters remain soaked after their first use and are less likely to retain more drug solution upon further use. Some IDUs also believed that the undissolved drug retained by the cotton filters can be dissolved in a subsequent preparation. All these are reasonable advantages to the re-use of a cotton filter.

The re-use of the cotton filters must be addressed in the design of prevention interventions. At a minimum, IDUs should be made aware of the high risks of infection incurred by the re-use of the filters. Alternatively, ways could be sought to separate the injection syringes from the rest of the preparation materials. Cotton filters become contaminated by coming in contact with contaminated injection syringes. The use of a separate needleless syringe or a syringe with a disabled needle would reduce the probability of it containing blood-borne pathogens and contaminating the other materials. If cotton filters avoid becoming contaminated, their re-use should not represent an important risk of infection.

Social Referents and Normative Influences

Several studies have found that norms and the composition of social networks are important determinants of HIV-related behaviors (Friedman *et al.*, 1999; Latkin *et al.*, 1995; Neaigus *et al.*, 1996). Eliciting who the relevant social referents are for a particular behavior is important to identify the possible sources of normative influences likely to facilitate or hinder changes in behaviors. The types of referents mentioned for the three practices covered in our study were very similar. Family, non-drug-using friends, and personnel of community prevention programs were considered to approve of safe practices. Drug users and shooting gallery managers were mentioned as not approving of safe practices. Persons mentioned as approving of protective behaviors are, for the most part, far removed from the drug preparation episodes and are not likely to provide enough direct or immediate reinforcing feedback to

activate their potential normative influence over DPPs. Nonetheless, the frequent mention of family members is consistent with studies showing that family relations can have a protective role for drug users, particularly in the cessation of drug injection (Robles *et al.*, 2004). Moreover, familism and respect of parents have been shown to be significantly stronger among Hispanics than among non-Hispanics in the United States (Marin and Marin, 1991). These results suggest that successfully involving close relatives of IDUs might prove an effective strategy in interventions aimed at changing DPPs. The results also suggest that community prevention workers can have a key role in influencing changes in DPPs because their presence in drug using settings do confer them with the possibility of exerting a normative influence.

The most common account of the negative influence exerted by other drug users concerned attempts to maintain control of the preparation process by using their own equipment. Camaraderie or mutual support were largely lacking in the accounts we elicited, except for infrequent mentions of a drug-using friend. Some researchers have proposed that shooting gallery managers (Robles *et al.*, 1998) could be used as change agents because of their frequent contact with large numbers of IDUs and their control of the preparation and injection equipment. Distrust of them as evidenced in this study, raises doubts about the efficacy of this approach. In focus groups we have conducted, IDUs have generally expressed mistrust about shooting gallery managers claiming that shooting gallery managers are IDUs, and as such, are not to be trusted. The general picture obtained about the normative environment among the IDUs we interviewed, seems to be of a strong norm prescribing each person to impose his or her will to avoid becoming the agent of the other person's will. Interventions that focus on strategies that facilitate each IDU to act independently of each other in their drug using practices (e.g., managing their own equipment) may have a higher probability of success than strategies that necessitate some level of mutual cooperation or trust such as some types of social network interventions that have been proposed (Koester *et al.*, 1999).

Environmental Barriers

All respondents mentioned problems with access to new materials as a barrier to safe DPPs. Specifically, respondents mentioned the need for

community prevention programs, including NEPs, to distribute more materials, more often. At the time of the study, only one NEP operated in the catchment area and visited one of the study neighborhoods twice a week for a period of about 1 hour per visit and only infrequently were water bottles and cotton filters distributed. The respondents in our study reported injecting drugs, on average, six times a day. Such a high frequency of injection has been repeatedly found in studies conducted among IDUs in Puerto Rico (Colon *et al.*, 2001b), and has been found to correlate with the number of times IDUs report re-using the same syringe (Finlinson *et al.*, 2000). It seems clear that this population of IDUs is in need of substantially greater access to new drug preparation materials.

Low access to injection materials and obstacles to carrying them requires of those intending to practice safe DPPs to plan ahead and invest considerable effort in procuring materials prior to the preparation of the drug. Yet, some IDUs mentioned the hurry and anxiety to get a fix as a barrier, suggesting that planning ahead and deferring injection until appropriate materials have been procured should not be expected of many IDUs. While preparing drugs, IDUs need to be concerned with the high chances of unwanted events ruining the injection (e.g., weak drugs, police busts, syringes getting clogged, shooting partners stealing the shot, intense pain of injecting a solid particle). Under these circumstances, prevention strategies that require considerable planning and effort prior to injection until appropriate materials have been procured are not likely to be realistic.

Mutual distrust and the preference of IDUs to use their own materials even if the materials of the sharing partner are new, were the two other barriers mentioned by respondents. We have already discussed these two issues in the context of normative influences above. Nonetheless, these barriers also suggest the importance of distinguishing between the situation in which an IDU is doing the preparation and the situation in which somebody else is in charge of preparing the drug solution. To the extent that the person doing the preparation uses his or her own materials and is able to avoid having the materials come in contact with the syringes of the sharing partners (e.g., by distributing the dissolved drug through back-loading instead of letting the sharing partners pull their shares directly from the cooker), any disease transmission that is likely to occur will go from the one doing the preparation to the other sharing partners, and not in the reverse direction. Thus, it makes

sense from the standpoint of the person doing the preparation to insist in using his or her own materials, even if they are used or contaminated with his or her own blood. The infection risks and the ability to control the situation are inherently unequal between the person doing the preparation and the other participating IDUs. In the same drug preparation episode, the DPPs practiced might be of low risk for the IDU doing the preparation, and of high risk for the other IDUs. It is important to keep in mind this distinction when designing preventive interventions since the motivation and disposition of IDUs toward behavior change are likely to differ in situations where they are doing the preparation as opposed to situations in which they are not.

CONCLUSION

The responses elicited in this study provide rich material about the beliefs and accounts associated with DPPs. The value of this study lies in providing a set of beliefs that can be formally tested in future studies and that can be used to assess the appropriateness and acceptability of prevention strategies. With the results of this study, fixed-item questionnaires can be designed to ascertain the proportion of the IDU population that holds each of the beliefs elicited and quantitative prospective studies can assess the predictive capacity of each belief on DPPs and help identify the most promising targets for preventive interventions. Studies conducted about the beliefs surrounding DPPs in other communities of IDUs will also be needed to examine the variability or consistency of the beliefs elicited in our study.

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