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Improving treatment enrollment and re-enrollment rates of syringe exchangers: 12-month outcomes

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Abstract

Background—Developing bridges between community syringe exchange programs (SEPs) and substance abuse treatment could benefit syringe exchangers and the public health. Kidorf et al. (2009) showed that motivational approaches employed at an SEP site improved rates of treatment enrollment and reduced drug use over a 4-month observation window. The present study extends this report by evaluating rates of treatment enrollment and re-enrollment over a 12-month period.

Methods—Opioid dependent individuals (n = 281) newly registered at an SEP were randomly assigned to one of three referral interventions: 1) 8 individual motivational enhancement sessions and 16 treatment readiness group sessions designed to improve treatment interest and readiness (Motivated Referral Condition; MRC-only); 2) MRC-only with monetary incentives for attending sessions and enrolling in treatment (MRC+I); or 3) standard referral (SRC). MRC-only and MRC +I participants discharged from treatment could attend a treatment re-engagement group designed to facilitate return to treatment (MRC+I participants received incentives for attending sessions and re-enrolling in treatment).

Results—The 4-month outcomes generally extended over 12-months. MRC+I participants were more likely to enroll in methadone maintenance than MRC-only or SRC participants, and to re-enroll in treatment following discharge. MRC+I participants also reported more days of treatment and less heroin and injection use.

Conclusions—The good harm reduction outcomes for many SEP participants can be enhanced through strategies designed to facilitate treatment enrollment and re-enrollment.

Keywords

syringe exchange; methadone maintenance; injection drug use; harm reduction

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Contributors
Drs. Kidorf and Brooner designed the study and wrote the protocol. Dr. Kidorf managed the study protocol and wrote the first draft of the manuscript. Drs. King and Gandotra provided assistance in developing the protocol, running the study, and editing the final manuscript. Dr. Kolodner completed the statistical analyses. All authors contributed to and have approved the final manuscript.

Conflict of Interest
All authors declare that they have no conflicts of interest.

1.0 Introduction

Participation in syringe exchange programs (SEPs) is associated with increased use of sterile syringes, reduction in injection equipment sharing, and in some studies, lower incidence of HIV seroconversion (Bluthenthal et al., 2000; Des Jarlais et al., 1996; Gibson et al., 2002; see Wodak and Cooney, 2006 for a review). Because these programs do not fully extinguish drug injection and equipment sharing (Des Jarlais et al., 2007; Wood et al., 2002), the health-related benefits of SEPs can be enhanced via interventions that further suppress drug use in syringe exchangers. Opioid-agonist treatment is a well-documented pathway to reduced drug use and HIV-risk related behaviors in opioid injectors (Gowing et al., 2007). While SEPs typically offer treatment referrals for people expressing an interest in reducing drug use (Des Jarlais et al., 2009), rates of enrollment in this population are remarkably low (Heimer, 1998; Kidorf et al., 2005), and those who enroll in treatment often leave before achieving stable reductions in use (e.g., Neufeld et al., 2008). Both motivating and sustaining treatment participation are critical outcomes for extending the good harm reduction benefits of SEPs (Kidorf and King, 2008; Van Den Berg et al., 2007).

Efforts to improve treatment enrollment rates in syringe exchangers can draw from interventions that have shown effectiveness in facilitating behavior change in other populations of substance users. Contingency management is a behavioral approach that uses external incentives to reinforce behavior change. A growing literature supports its effectiveness in improving adherence to recommended and often undesirable treatments (Higgins et al., 2004; Sorensen et al., 2007). Motivational enhancement therapy, directed toward helping individuals resolve ambivalence and develop motivation to change (Miller and Rollnick, 2002), is also associated with improved treatment engagement, and it is more effective when integrated with other interventions (Burke et al., 2003).

Kidorf et al. (2009) evaluated the efficacy of combining these two interventions at an SEP site to improve rates of treatment enrollment. New SEP registrants were scheduled to attend 8 individual motivational enhancement sessions and 16 treatment readiness groups designed to improve treatment motivation, and could earn monetary incentives for attending these sessions and enrolling in treatment. Participants discharged from treatment were eligible to attend a treatment re-engagement group designed to renew interest in treatment, and could earn monetary incentives for attending re-engagement sessions and for re-enrolling in treatment. The results showed that after 4-months this strategy was strongly associated with higher rates of treatment enrollment and less drug use than two comparison conditions. The present study extends the observation window to 12-months to evaluate whether the combined enrollment and re-engagement intervention could sustain these condition differences over time.

2.0 Methods

2.1 Participants

New Baltimore Needle Exchange Program (BNEP) registrants were referred to a nearby research van from 5/03-3/07, where they were informed of the requirements, benefits, and risks of study participation. Three hundred eighty-seven individuals signed informed consent and 281 qualified for randomization. The primary reason for exclusion from randomization was failure to complete baseline assessments (n = 76); other reasons for exclusion are detailed in Kidorf et al. (2009). Kidorf et al. (2009) also showed that the randomized sample reported more days of heroin and injection drug use than non-randomized participants (n = 106). Table 1 shows the demographic variables, self-report drug use, and opioid treatment history across all study conditions. The Western Institutional Review Board (WIRB) and the Baltimore City Health Department approved the study.

2.2 Measures

Research staff completed a two-step didactic and experiential training procedure for administering each measure (e.g., Kidorf et al., 2009). The substance use section of The Structured Clinical Interview for DSM-IV (SCID; First et al., 1995) was used to confirm opioid dependence. At monthly intervals, participants reported acquisition, modality, and days of substance abuse treatment (i.e., independent of modality), and the number of days they engaged in heroin use, cocaine use, injection drug use, and syringe sharing. Participants were paid $10.00/hr for completing the intake assessment battery and $15.00/hr for completing each monthly assessment. Most participants (n = 240; 85%) completed at least one follow-up (M = 11 of 12 follow-ups); no condition differences were observed (χ^2 = 2.86, df = 2, p = .24). Those completing follow-ups were less likely male (χ^2 = 4.71; df = 1, p < .05) and reported more baseline heroin use (M = 28.2; SE = .28 vs. M = 25.9; SE =1.1; t (279) = 2.79, p < .01) than those completing no follow-ups.

2.3 Procedures

Participants were stratified on past methadone treatment history and randomly assigned to one of three substance abuse treatment referral interventions: 1) Motivated Referral Condition (MRC-only), 2) Motivated Referral Condition plus incentives (MRC+I), or 3) Standard Referral Condition (SRC). Participants were explained all aspects of their condition at the time of random assignment, and received a fact sheet summarizing the protocol.

MRC-only—MRC-only participants were offered: 1) 8 one-hour individual motivational enhancement sessions scheduled over the first 2-months, and 2) 16 one-hour treatment readiness groups scheduled over the first 4-months. Individual motivational enhancement sessions were conducted at a BNEP site in our research van, and followed the Motivational Enhancement Therapy (MET) manual developed for project MATCH (Miller et al., 1995). The number of sessions was increased from four to eight based on the study population, which had considerably more drug use severity than those participating in the MATCH study. The target behavior was enrollment in substance abuse treatment. Kidorf et al. (2009) provides information on therapist training, ongoing supervision, and treatment fidelity for this intervention, based on guidelines developed by Miller and Rollnick (2002). Treatment readiness group sessions followed a manual-guided protocol and were conducted at the Johns Hopkins Bayview Medical Center. The primary goal of these sessions was to help participants make more informed decisions about participating in substance abuse treatment, with an emphasis on matching treatment modality to problem severity (Kidorf et al., 2009). Participants were encouraged to continue or return to these sessions if discharged from treatment for any reason, and they could receive up to 12 additional sessions. Any additional sessions retained the same structure as the treatment readiness groups; those returning to the group after discharge were allotted time to discuss their treatment experiences.

MRC+I—MRC+I participants received the services described above and modest monetary incentives for attending each motivational enhancement session ($10.00 cash, $10.00 McDonalds gift certificate, $3.00 day bus pass) and treatment readiness group ($10.00 cash, $3.00 day bus pass). Those enrolling in treatment earned a $50.00 voucher to help pay for intake and admission charges that was mailed directly to the treatment program, on behalf of the participant. Participants discharged from treatment were eligible to earn $10.00 cash and a $3.00 bus pass for each treatment re-engagement group attended, and another $50.00 voucher mailed directly to the treatment program contingent on re-enrollment.

SRC—SRC participants received standard care BNEP referral services, which usually included referral to available treatment programs or discussion of treatment options.

2.4 Data Analysis

Analyses of variance (ANOVAs) and chi-square tests were used to compare the three study conditions on baseline demographics, drug use, and treatment history. Gender differed across conditions (see Table 1) and was used as a covariate in subsequent analyses. Analyses of co-variance (ANCOVAs) were used to compare the MRC-only and MRC+I conditions on attendance to scheduled motivational enhancement and treatment readiness group sessions, and logistic regression (with adjusted odds ratios and 95% confidence intervals) was used to compare these conditions on attendance to at least one treatment re-engagement session. Logistic regression was also used to compare study conditions on rates of any treatment (including methadone) and methadone treatment, followed by between-group comparisons using adjusted odds ratios and 95% confidence intervals. Participants missing a follow-up were classified as not enrolled in treatment for that month. Survival analyses evaluated condition differences in time to first treatment episode (including methadone) and methadone treatment episode, using chi square tests and adjusted hazard ratios (SRC was the reference group). Multilevel analyses (e.g., Singer and Willett, 1991) were used to compare study conditions on days in treatment (across all modalities), days of drug use (days of heroin and days of cocaine use) and days of HIV risk behavior (days injecting and days sharing needles) across each 30-day assessment period over 12-months. Values were averaged across each month using only available data. Significant p-values derived from F tests were followed by between-group contrasts with Tukey's correction for multiple comparisons. To evaluate if effects diminished over time, paired t-tests were used to compare mean treatment days and drug use outcomes over two 6-month time-blocks. To evaluate if changes over time were related to condition, we used ANCOVAs to compare mean change scores (i.e., Months 1–6 outcomes minus Months 7–12 outcomes) between conditions, controlling for gender.

3.0 Results

3.1 Attendance to motivational, treatment readiness and re-engagement session

MRC+I participants attended more motivational enhancement (M = 4.64; SE = 0.22 vs. M = 0.53; SE = .24; $F(2, 185) = 174.34$; $p < .001$) and treatment readiness group sessions (M = 4.12; SE = .38 vs. M = .57; SE = .40; $F(1, 184) = 43.82$; $p < .001$) than MRC-only participants. MRC+I participants were more likely to attend at least one treatment re-engagement group than MRC-only participants (27.2% vs. 3.5%, $\chi^2 = 13.38$, df = 1; AOR = 15.78 (3.60–69.21); $p < .001$).

3.2 Substance abuse treatment enrollment

Overall, 55% (n = 155) of participants enrolled in some modality of substance abuse treatment over the 12-month evaluation. Over half of these individuals (59%; 92/155) enrolled in methadone maintenance and more than half of them (65.2%; n = 60/92) left treatment within 12-months. Those enrolled in other (shorter-term) modalities (n = 63) attended residential treatment (n = 36), outpatient detoxification (n = 10), drug-free treatment (n = 6), or some combination of these (n = 11).

MRC+I participants were more likely to enroll in methadone maintenance over 12-months compared to participants assigned to other referral conditions (see Table 2); no between-group differences were observed for enrollment in any category of treatment (i.e., with and without methadone). Across all participants, most new methadone maintenance enrollment (85%; 72/85) and any category of treatment enrollment (72%; 112/154) occurred during the first 4-months of participation (i.e., intervention phase). Table 2 also shows that MRC+I participants averaged more days of any substance abuse treatment (across modalities) per 30-day period than MRC-only or SRC participants. A comparison of mean treatment days

from Months 1–6 to Months 7–12 yielded no time effect (t = .66, df = 1, ns). Similarly, mean change scores (Months 1–6 minus Months 7–12) did not differ by condition (F(3, 277) = 2.70, p = .069). Survival analyses showed effects for time to first methadone treatment (χ^2 = 12.77, df = 2, p < .01), but not to any treatment (χ^2 = 3.35, df = 2, ns). MRC+I participants enrolled in methadone treatment more quickly than SRC participants (AHR = 2.17; CI = 1.30 – 3.62); MRC-only and SRC participants did not differ (AHR = 1.14; CI = 0.65 – 2.02).

Collapsing across conditions, over one-third of the participants (35.5%; n = 55/155) that enrolled in some type of treatment had more than one treatment episode over the 12-month evaluation; the average number of episodes in this group was 1.6 (range = 1–7). MRC+I participants were considerably more likely to have another treatment episode (52.5%) compared to participants in the MRC-only (28.6%) or SRC (21.3%) conditions (χ2 = 12.67, df = 2, p = .002). Nearly half of the MRC+I participants (44%) that left treatment but attended the re-engagement sessions had at least two admissions.

3.3 Drug use and risk behavior variables

MRC+I participants reported fewer days of heroin and injection drug use than MRC-only or SRC participants (see Table 2). Significant time effects indicating reduction in heroin and injection drug use were observed from Months 1–6 to Months 7–12 (heroin mean change = 4.56 days; t = 7.11, df = 1, p < .001; injection drug use change = 4.67 days: t = 7.60, df = 1, p < .001), with no condition differences in mean change scores (heroin use change: F(3, 206) = 1.04, ns; injection drug use change: F(3, 206) = .47, ns). No condition differences in cocaine use or syringe sharing were observed.

4.0 Discussion

Results from this study extend our earlier findings reporting 4-month outcomes (Kidorf et al., 2009). While the three referral conditions produced comparable rates of admission to any substance abuse treatment over 12-months, MRC+I participants were more likely to initiate methadone maintenance, a long-term modality that is highly effective for people with severe opioid dependence disorder (Gowling et al., 2007; Sorensen and Copeland, 2000). Most treatment enrollment occurred during the active phase of the intervention. That more MRC+I participants enrolled in methadone maintenance may be attributed to higher rates of attendance to counseling sessions designed to facilitate interest in this modality, and likely accounts for the finding that they participated in more overall days of treatment over the study. MRC+I participants also reported less heroin and injection drug use, supporting the individual and public health benefits of motivating syringe exchangers to participate in methadone maintenance (Kidorf et al., 2011; Van Den Berg et al., 2007).

The present study also suggests two pathways for using behavioral reinforcement to improve treatment engagement in syringe exchangers. The first is to facilitate adherence to psychosocial interventions designed to enhance and sustain treatment interest and readiness. The benefits of reinforcement are magnified by the low attendance rates of MRC-only participants, supporting previous studies showing that substance users are often poorly adherent to psychosocial interventions (Kidorf et al., 2006). The second pathway is direct reinforcement of treatment enrollment. That MRC+I participants had higher rates of methadone maintenance enrollment is consistent with outcomes from other studies using incentives to reinforce treatment entry (e.g., Sorensen et al., 2005). The design used in the present study does not inform our understanding of the relative importance of each pathway to treatment enrollment and re-engagement.

The large percent of participants in the present study leaving methadone and other treatment in the context of ongoing drug use provides support for the use of a treatment re-engagement intervention. While developing more effective strategies to improve treatment retention remains a challenge (McCarty et al., 2007), an alternative approach is to facilitate rapid returns to treatment following discharge. This approach may be more reasonable than expecting patients with chronic health problems to routinely have an uninterrupted episode of treatment lasting for many years.

One study limitation is recruitment of a randomized sample from one quadrant of Baltimore City that reported higher drug use severity than those not randomized to a treatment referral condition. Another limitation is that the MRC+I condition combined several different motivational elements in a study design that makes it impossible to determine the relative effectiveness of them. Finally, the costs associated with an MRC+I type of intervention should be balanced with the considerable individual and public heath benefits of enrolling and re-enrolling injection drug users into treatment (Ettner et al., 2006; Gowing et al., 2007).

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Table 1

Comparison of baseline variables across study conditions (n=281)

Characteristic	Overall (n=281)	MRC[1-] (n=94)	MRC+I[1] (n=94)	SRC[1] (n=93)	χ^2 or F-Test	p-value	Multiple comparisons
	M (SE) or %	M (SE) or %	M (SE) or %	M (SE) or %			
Gender (%)							
Male	71.2%	76.6%	61.7%	75.3%	$\chi^2 = 6.21$, df=2	0.045	MRC+I<MRC, SRC
Female	28.8%	23.4%	38.3%	24.7%			
Race (%)							
Non-white	75.4%	75.5%	74.5%	76.3%	$\chi^2 = 0.09$, df=2	0.956	--
White	24.6%	24.5%	25.5%	23.7%			
Age (years)	41.0 (0.51)	40.7 (0.94)	39.9 (0.86)	42.4 (0.82)	F(2,278) = 2.25	0.107	--
Education (highest grade completed)							
<12	37.4%	35.1%	36.2%	40.9%	$\chi^2 = 0.75$, df=2	0.688	--
12+	62.6%	64.9%	63.8%	59.1%			
Marital (%)							
Not Married	89.7%	88.3%	86.2%	94.6%	$\chi^2 = 3.90$, df=2	0.142	--
Married	10.3%	11.7%	13.8%	5.4%			
Employment (%)							
Unemployed	81.5%	75.5%	85.1%	83.9%	$\chi^2 = 3.38$, df=2	0.185	--
Employed	18.5%	24.5%	14.9%	16.1%			
Opioid Treatment History (%)							
Yes	73.3%	73.4%	79.8%	66.7%	$\chi^2 = 4.11$, df=2	0.128	--
No	26.7%	26.6%	20.2%	33.3%			
Heroin use (past 30 days)	27.6 (0.29)	27.6 (0.51)	27.0 (0.58)	28.7 (0.39)	F(2,278) = 2.58	0.078	--
Cocaine use (past 30 days)	14.8 (0.71)	15.1 (1.25)	14.3 (1.23)	15.0 (1.21)	F(2,278) = 0.13	0.878	--

[1]MRC=Motivated Referral Condition-only; MRC+I=Motivated Referral Condition + Incentives; SRC=Standard Referral Condition

Table 2

Treatment enrollment, drug use, and risk outcome variables across study conditions[1]

Variable	MRC[2] (n=94) M (SE) or %[3]	MRC+I[2] (n=94) M (SE) or %[3]	SRC[2] (n=93) M (SE) or %[3]	χ^2 or F-test	p-value	Multiple comparisons		
						MRC+I vs. MRC	MRC+I vs. SRC	MRC vs. SRC
Enrolled in any treatment								
Yes	52.1%	62.8%	50.5%	χ^2 = 3.35, df=2	0.187	1.41 (0.78–2.55)[4]	1.52 (0.84–2.75)[4]	1.08 (0.60–1.92)[4]
No	47.9%	37.2%	49.5%					
Enrolled in methadone treatment								
Yes	26.6%	46.8%	24.7%	χ^2 = 12.77, df=2	0.002	2.29 (1.23–4.24)[4]	2.54 (1.36–4.75)[4]	1.11 (0.57–2.15)[4]
No	73.4%	53.2%	75.3%					
Days in treatment (per 30 day period)	3.5 (0.78)	6.9 (0.75)	1.7 (0.75)	F(2, 236) = 12.83	<.001	t=−3.24, df=236 p=0.001	t=5.00, df=236 p<.0001	t=1.70, df=236 p=0.091
Heroin use (per 30 day period)[5]	23.5 (0.88)	18.1 (0.84)	24.1 (0.85)	F(2, 236) = 15.37	<.001	t=4.48, df=236 p<.0001	t=−5.10, df=236 p<.0001	t=−0.53, df=236 p=0.597
Cocaine use (per 30 day period)[5]	8.7 (1.01)	9.3 (0.97)	10.5 (0.97)	F(2, 236) = 0.94	0.393	--	--	--
Injection drug use (per 30 day period)[5]	21.6 (0.96)	17.0 (0.92)	21.6 (0.93)	F(2, 236) = 8.10	<.001	t=3.45, df=236 p=0.0007	t=−3.55, df=236 p=0.0005	t=−0.03, df=236 p=0.973
Equipment sharing (per 30 day period)[5]	1.8 (0.61)	1.7 (0.59)	2.4 (0.59)	F(2, 236) = 0.36	0.684	--	--	--

[1] Adjusted for gender

[2] MRC=Motivated Referral Condition-only; MRC+I=Motivated Referral Condition + Incentives; SRC=Standard Referral Condition

[3] Percentages reported as unadjusted

[4] Adjusted odds ratios and 95% confidence intervals comparing conditions

[5] n = 240 (MRC: n = 77; MRC+I: n = 79; SRC: n = 84)