Improving substance abuse treatment enrollment in community syringe exchangers

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ABSTRACT

Aims The present study evaluated the effectiveness of an intervention combining motivational enhancement and treatment readiness groups, with and without monetary incentives for attendance and treatment enrollment, on enhancing rates of substance abuse treatment entry among new registrants at the Baltimore Needle Exchange Program (BNEP). Design Opioid-dependent study participants (n = 281) referred by the BNEP were assigned randomly to one of three referral interventions: (i) eight individual motivational enhancement sessions and 16 treatment readiness group sessions (motivated referral condition—MRC); (ii) the MRC intervention with monetary incentives for attending sessions and enrolling in treatment—MRC+I; or (iii) a standard referral condition which directed participants back to the BNEP for referral (standard referral—SRC). Participants were followed for 4 months. Findings MRC+I participants were more likely to enroll in any type of treatment than MRC or SRC participants (52.1% versus 31.9% versus 35.5%; χ² = 9.12, P = 0.01), and more likely to enroll in treatment including methadone than MRC or SRC participants (40.4% versus 20.2% versus 16.1%; χ² = 16.65, P < 0.001). MRC+I participants also reported less heroin and injection use than MRC and SRC participants. Conclusions Syringe exchange sites can be effective platforms to motivate opioid users to enroll in substance abuse treatment and ultimately reduce drug use and number of drug injections.

Keywords Harm reduction, injection drug users, syringe exchange, treatment enrollment.

INTRODUCTION

Syringe exchange programs (SEPs) provide injection drug users with sterile syringes in exchange for used equipment, and often provide free human immunodeficiency virus (HIV) and hepatitis C virus (HCV) testing with pre- and post-test medical counseling and referral [1]. SEPs are associated with increased use of sterile syringes, reduced reliance on sharing syringes and other injection equipment and lower incidence of HIV seroconversion, although exceptions have been reported [2–7]. Nevertheless, they have little effect on rates of drug use or drug injections [8,9], and participants who fail to attend the SEP consistently and utilize sterile equipment regularly in all their drug injections remain at risk to transmit HIV and other blood-borne diseases to self or others [10].

Participation in substance abuse treatment can enhance the benefits achieved by SEPs by lowering the ongoing high rates of drug use and drug injection common in this population [11,12]. Most SEPs refer participants to treatment [1], although most of these referrals fail to result in admission. Efforts to strengthen the linkage between SEP and treatment participation are fraught with obstacles, including transportation and financial constraints, child-care issues and the availability of treatment slots in many large cities and rural areas [11,13]. Only 5–10% of exchange participants enroll in treatment, despite high levels of self-reported interest and readiness [14–17].

Strategies for improving rates of treatment enrollment among drug users have included the application of motivational interviewing, a brief therapeutic strategy designed to help substance users resolve ambivalence to change by developing discrepancies between current behavior and larger values and interests [18]. Trials with syringe exchange and other populations of drug users...
have shown that motivational interviewing is no more effective than comparison strategies in motivating enrollment [15,19]. Improving the potency of motivational interviewing by offering it more frequently (motivational enhancement therapy [20]) has often yielded good results [21], and may be appropriate for syringe exchangers who often have chronic and severe forms of opioid dependence [22,23]. A potential ‘dose–response’ effect of motivational interviewing also conforms with the general substance abuse counseling literature showing that higher doses of counseling are sometimes more effective than lower doses in improving treatment response [24,25]. A major limitation of offering more intensive schedules of counseling is poor utilization [26], although contingency management is highly effective in reducing this problem when reinforcement is placed on attendance [24,27]. Behavioral reinforcement can also be used to supplement motivational interventions by reinforcing treatment entry more directly [19,28,29].

The present study reports findings from a randomized controlled evaluation of intensified motivational interventions versus standard treatment referral practices in out-of-treatment opioid-dependent injection drug users newly enrolling in the Baltimore Needle Exchange Program (BNEP). Study participants were assigned randomly to one of three referral conditions. The motivational referral (MRC) and motivational referral plus incentives (MRC+I) conditions offered high doses of motivational enhancement counseling (eight sessions) and a treatment readiness group that provided additional education and skills to support treatment-seeking (16 sessions) over a 4-month period. The MRC+I condition received monetary incentives for attending scheduled sessions and for enrolling in treatment. These conditions were compared to a standard care referral condition (SRC), in which participants were directed back to the BNEP to request referral to treatment.

METHODS

Participants

Participants were drawn from the BNEP, which provides a safe setting for injection drug users to exchange used for sterile syringes, to receive safe injection kits and to receive free HIV and HCV testing with pre-and post-test medical counseling and referral for continuing evaluation and care. These services are delivered in a Baltimore City Health Department (BCHD) mobile medical van. The present study used two sites in east and west Baltimore, which attracted 709 new registrants during the study (5/03–3/07). Data are available only for those enrolling in the study. The study was approved by the Western Institutional Review Board (WIRB) and the Baltimore City Health Department.

Syringe exchangers who expressed interest in the present study were referred by BNEP staff and chain-referral to our adjacent research van, where they were informed of the requirements, benefits and risks of study participation, and asked to provide informed written consent to participate (n = 387). Inclusion criteria included: (i) newly registered at the BNEP; (ii) current opioid dependence; and (iii) age ≤60 years. Exclusion criteria included: (i) currently receiving substance abuse treatment; and (ii) major mental illness or severe cognitive impairment that interfered with understanding and completing study procedures. Figure 1 presents a flowchart for study enrollment, showing that 281 participants were randomized ultimately to study conditions and scheduled to complete follow-up assessments. An analysis of variance (ANOVA) showed that missing data were distributed evenly across conditions [F(2, 278) = 1.12, not significant (NS)]; participants completed about 75% of their four follow-up assessments [overall mean = 3.18, standard error (SE) = 0.09; MRC: mean = 3.09, SE = 0.16; MRC + I: mean = 3.09, SE = 0.16; SRC: mean = 3.38, SE = 0.16].

Enrolled participants randomized (n = 281) versus not randomized (n = 105; one enrollee was removed for lack of data) were compared on demographic, drug use, treatment history and treatment interest variables. Randomized participants engaged in more days of heroin use (mean = 27.1 versus 22.8; t = 3.62; df = 365; P < 0.001) and injection drug use (mean = 26.8 versus 22.8; t = 3.29; df = 365; P < 0.001) and expressed more interest (using a 0–10 Likert scale) in methadone maintenance (mean = 7.7 versus 6.9; t = 2.13; df = 382; P < 0.05); no other differences were observed. All subsequent analyses are limited to those enrolled and randomized (n = 281). The present study reports data from the first 4 months of participation, corresponding to the duration of interventions offered in the MRC+I and MRC conditions. Participants were paid $15.00 per hour for completing monthly assessments.

The demographic characteristics of the randomized sample are shown in Table 1, and are consistent with other studies reporting on large samples of SEP participants in Baltimore city [16,23,30]. The MRC+I condition had a lower proportion of males than the other conditions, while the SRC condition completed fewer years of education. These variables were used as covariates in subsequent analyses. No other significant group differences were identified.

Assessments

Baseline assessment

Participants reported demographic variables and life-time participation in opioid agonist treatment, and
reported days of heroin use, cocaine use, injection use and syringe sharing over the past 30 days. Participants also reported interest in enrolling in methadone maintenance and other treatment modalities using a 1–10 scale.

**Structured Clinical Interview for DSM-IV (SCID-I)** [31]

The SCID is a semi-structured diagnostic interview that utilizes a decision-tree approach for making life-time and current diagnoses of many DSM-IV psychiatric disorders, and was used in the present study to confirm a diagnosis of opioid dependence and to stratify participants with a diagnosis of cocaine dependence. The opioid and cocaine use disorders exhibit excellent re-test reliabilities [32] and good concurrent and predictive validity [33,34]. Participants completed the Mini Mental Status Examination [35] before starting the SCID; those scoring below 27 (out of 30) were rescheduled for another session later that day or the next day.

**Treatment acquisition form**

Acquisition, modality and days of substance abuse treatment were assessed at 1-month intervals during the course of the study. Participants also reported the number of days in the past 30 that they engaged in heroin use, cocaine use, injection drug use and syringe sharing.

**Procedure**

Following completion of baseline assessments, participants were stratified on current cocaine dependence and methadone treatment history and were assigned randomly using a computerized generated program to one of three referral interventions: (i) MRC, (ii) MRC+I or (iii) SRC. All participants were encouraged to contact the BNEP throughout the study to improve access to substance abuse treatment, and were provided with a list of available treatment programs and community resources relevant to individuals with chronic drug use.

**MRC**

Participants were referred to: (i) eight 1-hour individual motivational enhancement sessions (two per week over the first 2 months); and (ii) 16 1-hour treatment readiness groups (two per week over the first 4 months). Motivational enhancement sessions were conducted at the research van, while treatment readiness groups were conducted at the Addiction Treatment Services program in east Baltimore MD. Participants were encouraged to continue to attend these sessions even after they had enrolled in substance abuse treatment to facilitate retention. Participants also received a handout that included correct information about methadone and treatment with methadone.
Table 1 Demographics, drug use, treatment history and treatment interest at baseline across study conditions.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall (n = 281)</th>
<th>MRC (n = 94)</th>
<th>MRC+I (n = 94)</th>
<th>SRC (n = 93)</th>
<th>F or χ²</th>
<th>P</th>
<th>Multiple comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (%)</td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
<td>Mean (SE)</td>
<td>χ²</td>
<td>P</td>
<td>Multi</td>
</tr>
<tr>
<td>Male</td>
<td>71.2%</td>
<td>76.6%</td>
<td>61.7%</td>
<td>75.3%</td>
<td></td>
<td>0.044</td>
<td>MRC, SRC &gt; MRC+I</td>
</tr>
<tr>
<td>Female</td>
<td>28.8%</td>
<td>23.4%</td>
<td>38.3%</td>
<td>24.7%</td>
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<tr>
<td>Race (%)</td>
<td></td>
<td>C² = 6.22</td>
<td>0.49</td>
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<tr>
<td>Non-whiteb</td>
<td>75.4%</td>
<td>75.5%</td>
<td>74.5%</td>
<td>76.3%</td>
<td></td>
<td>0.956</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>24.6%</td>
<td>24.5%</td>
<td>25.5%</td>
<td>23.7%</td>
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<td></td>
<td></td>
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<tr>
<td>Age (years)</td>
<td>41.0 (0.51)</td>
<td>40.7 (0.87)</td>
<td>39.9 (0.87)</td>
<td>42.4 (0.88)</td>
<td></td>
<td>0.107</td>
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<tr>
<td>Education (years)</td>
<td>11.4 (0.11)</td>
<td>11.5 (0.19)</td>
<td>11.7 (0.19)</td>
<td>11.0 (0.19)</td>
<td></td>
<td>0.036</td>
<td>MRC+I &gt; SRC</td>
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<tr>
<td>Marital (%)</td>
<td></td>
<td>C² = 3.90</td>
<td>0.142</td>
<td></td>
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<tr>
<td>Not married</td>
<td>89.7%</td>
<td>88.3%</td>
<td>86.2%</td>
<td>94.6%</td>
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<td>Married</td>
<td>10.3%</td>
<td>11.7%</td>
<td>13.8%</td>
<td>5.4%</td>
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<td></td>
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<td>Employment (%)</td>
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<td>C² = 3.67</td>
<td>0.453</td>
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<tr>
<td>Unemployed</td>
<td>81.5%</td>
<td>75.5%</td>
<td>85.1%</td>
<td>83.9%</td>
<td></td>
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<tr>
<td>Employed</td>
<td>11.7%</td>
<td>16.0%</td>
<td>8.5%</td>
<td>10.7%</td>
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<tr>
<td>Under the table</td>
<td>6.8%</td>
<td>8.5%</td>
<td>6.4%</td>
<td>5.4%</td>
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<td></td>
<td></td>
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<tr>
<td>Homeless (%)</td>
<td></td>
<td>C² = 0.98</td>
<td>0.612</td>
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</tr>
<tr>
<td>No</td>
<td>90.4%</td>
<td>88.3%</td>
<td>92.5%</td>
<td>90.3%</td>
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<tr>
<td>Yes</td>
<td>9.6%</td>
<td>11.7%</td>
<td>7.5%</td>
<td>9.7%</td>
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<td></td>
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<tr>
<td>Heroin use (past 30 days)</td>
<td>27.6 (0.32)</td>
<td>27.2 (0.56)</td>
<td>27.04 (0.56)</td>
<td>28.7 (0.56)</td>
<td>F = 2.64</td>
<td>0.073</td>
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<tr>
<td>Heroin IV (past 30 days)</td>
<td>27.5 (0.35)</td>
<td>27.1 (0.60)</td>
<td>27.04 (0.60)</td>
<td>28.4 (0.61)</td>
<td>F = 1.63</td>
<td>0.197</td>
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<tr>
<td>Cocaine use (past 30 days)</td>
<td>14.7 (0.71)</td>
<td>14.8 (1.2)</td>
<td>14.3 (1.2)</td>
<td>14.9 (1.2)</td>
<td>F = 0.07</td>
<td>0.935</td>
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</tr>
<tr>
<td>Cocaine IV (past 30 days)</td>
<td>13.5 (0.73)</td>
<td>13.9 (1.3)</td>
<td>13.3 (1.3)</td>
<td>13.3 (1.3)</td>
<td>F = 0.06</td>
<td>0.944</td>
<td></td>
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<tr>
<td>Street corner (%)</td>
<td></td>
<td>C² = 0.98</td>
<td>0.614</td>
<td></td>
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<tr>
<td>Caroline</td>
<td>44.8%</td>
<td>45.7%</td>
<td>47.9%</td>
<td>40.9%</td>
<td></td>
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</tr>
<tr>
<td>Mount &amp; Westwood</td>
<td>55.2%</td>
<td>54.3%</td>
<td>52.1%</td>
<td>59.1%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Treatment history (%)</td>
<td></td>
<td>C² = 4.68</td>
<td>0.097</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No opioid treatment history</td>
<td>26.4%</td>
<td>26.6%</td>
<td>19.4%</td>
<td>33.3%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>History of opioid treatment</td>
<td>73.6%</td>
<td>73.4%</td>
<td>80.6%</td>
<td>66.7%</td>
<td></td>
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<tr>
<td>Treatment interest (1–10)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Methadone</td>
<td>7.7 (0.21)</td>
<td>8.2 (0.35)</td>
<td>7.4 (0.36)</td>
<td>7.4 (0.36)</td>
<td>F = 2.02</td>
<td>0.134</td>
<td></td>
</tr>
<tr>
<td>Drug free</td>
<td>8.0 (0.19)</td>
<td>8.2 (0.33)</td>
<td>7.8 (0.33)</td>
<td>8.2 (0.33)</td>
<td>F = 0.58</td>
<td>0.558</td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>7.3 (0.22)</td>
<td>7.4 (0.38)</td>
<td>7.2 (0.38)</td>
<td>7.4 (0.38)</td>
<td>F = 0.05</td>
<td>0.947</td>
<td></td>
</tr>
</tbody>
</table>

MRC: motivated referral condition; MRC+I: motivated referral condition plus incentives; SRC: standard referral condition; SE: standard error; *95.28% African American, 0.47% American Indian; nine patients identified themselves as biracial (4.25%), six as African American/American Indian, two as African American/white and none as white/American Indian.
Motivational enhancement

We used the Motivational Enhancement Therapy (MET) manual developed for project MATCH [20] and extended the number of sessions from four to eight, with the goal of motivating treatment enrollment and use of other available community resources. MET uses specific clinical strategies designed to increase and consolidate motivation and readiness to change (e.g. listening with empathy; eliciting self-motivational statements; reframing resistance). The MET manual describes three phases associated with facilitating behavior change: (i) building motivation; (ii) strengthening commitment; and (iii) creating a plan.

Building motivation to change involved the summary of baseline assessment data to provide feedback on drug use, risk behaviors and treatment experience, emphasizing areas of most concern. Subsequent sessions used exercises to motivate behavior change by creating dissonance between current behavior and desired values and goals: (i) cost–benefit analysis of change (‘what are the pros and cons of remaining out of treatment?’); (ii) the ‘readiness ruler’, designed to encourage ‘defense’ of motivations to enter treatment (e.g. ‘how ready are you to abstain from drug use [1–10]?’; ‘why did you report ‘9’ and not ‘8’?’); and (iii) value card sort (‘you wonder if drug use effects your parenting’). Those reporting treatment interest developed an explicit change plan worksheet that included: (i) proposed behavior changes; (ii) reasons for changing behavior; (iii) steps of change; (iv) roles for significant others; (v) measures of success; and (vi) potential obstacles.

Treatment readiness groups

These sessions followed a manual-guided protocol to shape the development of an informed and positive view of the benefits of substance abuse treatment. Each group presented information on what to expect in treatment, finding treatment and utilizing harm-reduction strategies (e.g. use of the BNEP). Four other motivational topics designed to encourage treatment enrollment were presented alternately throughout the groups: (i) developing discrepancy between current behavior and life goals; (ii) positive and negative effects of drug use; (iii) positive and negative aspects of drug abuse treatment; and (iv) two possible futures: contrasting potential short- and long-term consequences of drug use versus abstinence. Participants received an information sheet with telephone numbers and addresses of treatment programs, treatment request lines, community resources and BNEP locations.

MRC+I

Participants received all MRC procedures as described above, and incentives for attending each motivational enhancement session ($10 cash, $10 McDonalds gift certificate, $3 day bus pass) and treatment readiness group ($10 cash, $3 day bus pass). Participants who entered treatment also received a $50 voucher to help pay for intake and admission charges. This voucher was mailed directly to the program, on behalf of the participant. Intake/admission fees vary across treatment programs in Baltimore. Most of the non-profit publicly supported programs in Baltimore use a State of Maryland sliding fee scale that reduces a percentage (ranging from approximately 5% to 100%) of the standard intake charge that is based on household income and number of dependents for low-income uninsured patients. This translates into a standard intake/admission charge for low-income uninsured participants in the present study of $10–30. Programs generally permitted patients to use any remaining dollars from the $50 incentive to cover additional weeks of treatment, again using the state’s sliding scale fee that produced an average weekly charge of approximately $5–10 per week for low-income uninsured cases. Participants were eligible for this voucher-based incentive whether or not they participated in any of the above interventions.

SRC

These participants were informed of usual care referral services offered at the BNEP. Those interested in treatment were encouraged to speak with the BNEP about treatment options in the community.

Treatment fidelity

Interventionists were trained by a licensed clinical psychologist certified in motivational interviewing (Daniel Squires PhD, trained by William Miller PhD) to conduct the motivational enhancement sessions and treatment readiness groups. The first author provided follow-up training and supervision based on published guidelines [18]. We elected to forgo audio or visual recording of scheduled sessions due to the anticipated sensitivity of the study population. Although space in the research van was limited, we examined fidelity via direct observation of interviews in 7% of participants. Research assistants were trained by the first author to use a checklist of verbal responding that coded progression of the motivational sessions and statements of empathy, questions and ratio of empathy to questions. Space permitted one research coder per session that was not blind to study condition. Interventionists followed the study protocol uniformly for each motivational enhancement phase. They used more empathic responding (mean = 25.2 responses/session) than questions (mean = 15.9 questions/session), close to the 2 : 1 ratio advocated by the training guidelines (71% of interviews had more empathic responses than...
questions). The guidelines also suggested that interventionists employ more ‘open’ than ‘closed’ questions—in the present study, 69.8% of the questions were open versus closed.

Data analysis

ANOVA and χ² tests were used to compare the three study conditions on baseline demographics, drug use, treatment history and treatment interest.

t-Tests were used to compare the MRC and MRC+I conditions on adherence to scheduled motivational enhancement (eight sessions) and treatment readiness group sessions (16 sessions). Logistic regression was used to compare study conditions on rates of treatment enrollment during the 4-month assessment period. Methadone maintenance enrollment was evaluated separately during the 4-month assessment period. Methadone maintenance enrollment was evaluated separately because it is regarded widely as one of the more effective interventions for treating persistent and severe opioid dependence and is often the preferred choice by people with persistent and severe opioid dependence disorder [36]. Participants with no follow-up data were classified with persistent and severe opioid dependence and is often the preferred choice by people with persistent and severe opioid dependence disorder [36]. Participants with no follow-up data were classified as not enrolled in treatment. Significant χ² P-values were followed by between-group comparisons using adjusted odds ratios (ORs) and 95% confidence intervals (CI).

Multi-level analyses [37] were used to compare study conditions on days of drug use (heroin, cocaine) and HIV risk behavior (days injecting and sharing needles) across each 30-day assessment period. Significant P-values derived from F-tests were followed by between-group t-test comparisons. Two sets of analyses evaluated dose–response effects of attendance to both psychosocial interventions (i.e. motivational enhancement plus treatment readiness group sessions) on any treatment enrollment for those assigned to the MRC+I condition (n = 94). The first analysis used a t-test to compare participants enrolled versus not enrolled in treatment on number of sessions attended. The second analysis used a frequency distribution to classify participants into one of three attendance categories: low (0–5 sessions), 33% of sample; medium (6–11 sessions), 30% of sample; or high (12–24 sessions), 37% of sample. The Mantel–Haenszel χ² test was used to test for trends and logistic regression was employed (using ORs and 95% CI) to compare high versus low and medium versus low categories.

RESULTS

Attendance at scheduled motivational enhancement and treatment readiness sessions

Participants attended on average 4.65 (SE = 0.29) motivational enhancement sessions and 4.07 (SE = 0.49) treatment readiness group sessions. t-Tests (comparing groups with unequal variances) showed that MRC+I participants attended a higher proportion of motivational enhancement (mean = 0.58; SE = 0.03 versus mean = 0.07; SE = 0.03; t = 13.39, df = 119, P < 0.001) and treatment readiness group sessions (mean = 0.26; SE = 0.02 versus mean = 0.04; SE = 0.03; t = 6.79, df = 118, P < 0.001) than MRC participants. MRC+I participants earned a mean of $161.64 (SE = 10.95) in money and coupons for attending scheduled sessions: 90% (n = 85/94) earned at least some money or coupons.

Substance abuse treatment enrollment

Overall, 40% of participants enrolled in treatment. The majority of this group (64%) enrolled in methadone maintenance; others enrolled in out-patient detoxification, in-patient detoxification and/or ‘drug-free’ settings, while 18% enrolled in more than one modality. Table 2 shows that MRC+I participants were more likely to enroll in any treatment (mean = 52.1%) than MRC (mean = 31.9%) or SRC (mean = 35.5%) participants (P = 0.01), and were more likely to enroll in treatment including methadone maintenance (mean = 40.4%) than MRC (mean = 20.2%) or SRC (mean = 16.1%) participants (P < 0.001). No condition differences were found for enrollment to other therapeutic modalities.

Drug use and other risk behaviors

Table 2 shows that participants engaged in high rates of heroin use, cocaine use and other risky behaviors during the study. MRC+I participants reported fewer days of heroin use per each 30-day assessment (mean = 19.5) than MRC (mean = 25.1) or SRC (mean = 25.9) participants (P < 0.001), and fewer days of injection use per each 30-day assessment (mean = 19.1) than MRC (mean = 23.5) or SRC (mean = 23.8) participants (P = 0.001). No condition differences were observed in cocaine use or syringe sharing.

Dose–response of motivational enhancement and treatment readiness group sessions

Participants who enrolled in any treatment attended more motivational enhancement and treatment readiness group sessions than those who did not (mean = 11.6; SE = 0.92 versus mean = 5.7; SE = 0.71; t = 4.95, df = 92, P < 0.001). The percentage of participants enrolling in treatment varied by category of session attendance: low (0–5 sessions), 33.3%; medium (6–11 sessions), 45.6%; high (12–24 sessions), 80.0% (χ² = 14.6, df = 2, P < 0.001), providing some support for a possible dose–response to the intervention (Mantel–Haenszel χ² = 13.37, df = 1, P < 0.001). Logistic regression detected category differences between low and high
Self-report treatment enrollment, drug use and risk behaviors compared by condition, adjusted for education and gender.

Table 2

<table>
<thead>
<tr>
<th>Study outcome</th>
<th>Overall (n = 281)</th>
<th>MRC (n = 94)</th>
<th>MRC+I (n = 94)</th>
<th>SRC (n = 93)</th>
<th>Overall statistic</th>
<th>Multiple comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment enrollment (%)</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Any treatment</td>
<td>39.9</td>
<td>31.9</td>
<td>52.1</td>
<td>35.5</td>
<td>(\chi^2 = 9.12, \text{df} = 2, P = 0.01)</td>
<td>OR = 2.32 CI (1.27–4.23)</td>
</tr>
<tr>
<td>Methadone maintenance</td>
<td>25.6</td>
<td>20.2</td>
<td>40.4</td>
<td>16.1</td>
<td>(\chi^2 = 16.65, \text{df} = 2, P &lt; 0.001)</td>
<td>OR = 2.87 CI (1.48–5.58)</td>
</tr>
<tr>
<td>Substance use (days/month)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin use: mean (SE)</td>
<td>23.5 (0.52)</td>
<td>25.1 (0.95)</td>
<td>19.5 (0.91)</td>
<td>25.9 (0.92)</td>
<td>(F_{2, 211} = 14.46, P &lt; 0.001)</td>
<td>(t = 4.30, \text{df} = 233, P &lt; 0.001)</td>
</tr>
<tr>
<td>Cocaine use: mean (SE)</td>
<td>12.3 (0.68)</td>
<td>12.4 (1.2)</td>
<td>10.8 (1.2)</td>
<td>13.7 (1.2)</td>
<td>(F_{2, 211} = 1.58, P = 0.21)</td>
<td>(t = 1.0, \text{df} = 233, P = 0.34)</td>
</tr>
<tr>
<td>Injection use: mean (SE)</td>
<td>22.1 (0.55)</td>
<td>23.5 (1.06)</td>
<td>19.1 (1.01)</td>
<td>23.8 (1.02)</td>
<td>(F_{2, 211} = 6.86, P &lt; 0.001)</td>
<td>(t = 1.9, \text{df} = 233, P = 0.05)</td>
</tr>
<tr>
<td>Shared syringes: mean (SE)</td>
<td>3.2 (0.45)</td>
<td>3.3 (0.81)</td>
<td>3.0 (0.78)</td>
<td>3.3 (0.78)</td>
<td>(F_{2, 214} = 0.06, P = 0.94)</td>
<td>(t = 0.19, \text{df} = 233, P = 0.95)</td>
</tr>
</tbody>
</table>

Cl: confidence intervals; MRC: motivated referral condition; MRC+I: motivated referral condition plus incentives; OR: odds ratio (adjusted); SRC: standard referral condition; SE: standard error.

DISCUSSION

Motivating treatment enrollment in SEP participants

The effectiveness of the MRC+I condition in motivating treatment enrollment is impressive when viewed in contrast with other referral strategies [15,16]. That most participants chose to enroll in methadone maintenance enhanced the potency of the referral intervention because this modality is better matched to the severity of opioid use found in SEP populations [17] and appears to account for associated reductions in heroin use and injection behavior observed in those assigned to the MRC+I condition [10,12]. Thus the first published report on the use of motivational enhancement interventions in opioid use and injection behavior observed in SEP samples. The success of the one-time voucher to pay for syringe exchanges, although this appears to be the first study to employ this model to motivate treatment-seeking in out-of-treatment drug users using alternative strategies [19,28,30,31].

Behavioral incentives facilitated attendance at the motivational enhancement and treatment readiness group sessions, suggesting the importance of integrating these interventions, although this may appear to be the first study to employ this model in outpatient settings. That motivational interviewing sessions offered at community-based treatment entry among opioid users [15,19] are consistent with a growing number of studies showing that motivational interviewing sessions are effective in increasing attendance to all of these sessions. That increasing attendance to these sessions, offering them in combination with a treatment readiness group, and by reinforcing attendance to these sessions through incentives leading to increased attendance to the sessions, offering them in combination with a treatment readiness group, and by reinforcing attendance to these sessions through incentives leading to increased attendance to the sessions, were associated with higher rates of treatment enrollment.

The relative importance of the motivational enhancement and treatment readiness group sessions is less certain, given the poor response of participants in the present study entry among opioid users [15,19]. The present study entry among opioid users [15,19] are consistent with a growing number of studies showing that motivational interviewing sessions are effective in increasing attendance to all of these sessions. That increasing attendance to these sessions, offering them in combination with a treatment readiness group, and by reinforcing attendance to these sessions through incentives leading to increased attendance to the sessions, were associated with higher rates of treatment enrollment.

The effectiveness of the MRC+I condition in motivating treatment enrollment is impressive when viewed in contrast with other referral strategies [15,16]. That most participants chose to enroll in methadone maintenance enhanced the potency of the referral intervention because this modality is better matched to the severity of opioid use found in SEP populations [17] and appears to account for associated reductions in heroin use and injection behavior observed in those assigned to the MRC+I condition [10,12]. Thus the first published report on the use of motivational enhancement interventions in outpatient settings. That motivational interviewing sessions offered at community-based treatment entry among opioid users [15,19] are consistent with a growing number of studies showing that motivational interviewing sessions are effective in increasing attendance to all of these sessions. That increasing attendance to these sessions, offering them in combination with a treatment readiness group, and by reinforcing attendance to these sessions through incentives leading to increased attendance to the sessions, were associated with higher rates of treatment enrollment.

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provides some support for a possible dose-related response to these sessions in this population [21], although the concurrent provision of incentives for attendance and treatment enrollment makes this interpretation largely speculative.

Creating bridges between syringe exchange and substance abuse treatment participation

While previous studies have already shown that community SEPs provide good access to subgroups of injection drug users at greatest risk of transmission of HIV and other blood-borne diseases to self and others [4,23,39,40], the present findings provide evidence that SEP settings can also be effective conduits to substance abuse treatment programs. Community-wide efforts to fund and implement incentive and verbally based motivational interventions to encourage treatment enrollment can be supported by data showing diminished societal costs associated with reductions in injection risk behaviors and criminal activity [12,41]. Public enthusiasm and support for SEPs might even be strengthened by linking syringe exchange and substance abuse treatment participation more explicitly, and refining the conceptualization of these largely independent community-based interventions as a continuum of harm reduction services for both chronic and otherwise hard-to-reach injection drug users [13].

Study limitations

The randomized sample reported more drug use and somewhat more treatment interest than enrollees not randomized to a study condition, suggesting that it might not represent the general population fully. Secondly, the study design evaluated the effectiveness of using voucher incentives to reinforce both counseling attendance and treatment enrollment, and could not distinguish the independent effectiveness of either of these specific interventions. An alternative design that reinforced attendance in both MRC conditions and offered vouchers for enrollment in one of them may have addressed this question more effectively. The advantage of the current design was the use of multiple and powerful interventions to match the level of problem severity in this population. That these interventions were derived empirically and described clearly should facilitate the conduct of future studies to disentangle the unique contribution of the study components. The study design could also not determine if the treatment readiness group provided additional benefits over the motivational enhancement sessions, although these groups were less well attended. Additional limitations include infrequent measurement of treatment fidelity over the course of the study and some of the self-report assessments of study outcomes. Finally, it is important to acknowledge that the costs of monetary-based incentives remain a limitation to widespread practice in syringe exchange settings. At least two issues are critical in this consideration. The first is that the effectiveness of monetary incentives supports the role of behavioral reinforcement in modifying a fairly complex set of behaviors related to both seeking and obtaining admission to a treatment program. This finding supports continued work to develop non-monetary based incentives that can motivate this subgroup of opioid users to seek treatment at comparable rates—the principle works, the problem is merely the platform for delivering the intervention. Secondly, while the monetary incentives used in the present study can be considered a moderate expense, this concern must be viewed within the context of the considerable benefits (including financial) that can result from motivating more of this highly impaired subset of injection drug users to enter treatment programs. The facilitation of treatment entry with associated reductions in both heroin use and injection behavior would clearly expand the important harm reduction goals already achieved by exchanging used for sterile injection equipment.

Declarations of interest

None.

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