

Factors associated with methadone maintenance treatment retention among street-recruited injection drug users

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Abstract

This study examined factors associated with methadone maintenance retention, defined as remaining in treatment for a minimum of 90 days, among street recruited injection drug users (IDUs). Targeted sampling methods were used to establish recruitment quotas in Denver census tracts. A total of 577 IDUs were randomly assigned to either a risk reduction intervention, focusing on safer injection and sex behaviors, or motivational interviewing, addressing more sweeping lifestyle changes including drug treatment. All subjects who wanted treatment were provided transportation, rapid intake and a waiver of the intake fee. In addition, 50% were randomly assigned a coupon for 90 days of free treatment. Overall, 33% entered treatment and of these, 60% remained for at least 90 days. Factors associated with retention included higher methadone dose, free treatment, greater contacts with the clinic and counselor rating of patient cooperation. Although desire for treatment, or motivation, was associated in univariate analyses with greater retention, there were no differences observed between the motivational interviewing and risk reduction interventions.

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1. Introduction

Injection drug users (IDUs) in the United States are the second largest group at risk for human immunodeficiency virus (HIV) infection, the etiological agent for the acquired immunodeficiency syndrome (AIDS) (Friedland and Klein, 1987; Centers for Disease Control, 1990). Moreover, the proportion of AIDS cases attributable to drug injection has steadily increased since 1981 (Centers for Disease Control and Prevention, 1993, 1998, 2001; Alcabes and Friedland, 1995). In light of the absence of a vaccine to prevent or eliminate HIV, behavioral interventions are critical to controlling its spread. In 1997, the National Institutes of Health Consensus Development Conference on Interventions to Prevent HIV Risk Behaviors recommended substance abuse treatment as one of the strategies to reduce the spread of the disease. A treatment approach that has demonstrated effectiveness in reducing HIV risk behaviors, as well as HIV seroconversion, is methadone maintenance (Sorensen and

Copeland, 2000; Longshore et al., 1993; Metzger et al., 1993; Ball et al., 1988a; Moss et al., 1994). Sorensen and Copeland (2000), in a review of drug treatment as HIV prevention, reported that recent research offers “clear evidence” that methadone maintenance reduces injection drug use and “strong evidence” that it prevents HIV infection. Methadone maintenance has also been associated with less criminal activity (Bell et al., 1992; Hunt et al., 1984; Ball et al., 1988b) and improvements in medical and social problems (Dole et al., 1968; Rounsaville et al., 1987).

Of critical importance to the success of treatment in reducing drug use, as well as increasing productivity, is the length of treatment (Dole and Nyswander, 1968; Des Jarlais et al., 1981; Simpson, 1979). Numerous studies have shown that outcomes for patients receiving fewer than 90 days of treatment are not significantly different from those of individuals who did not enter treatment in the first place (Simpson, 1979; Simpson, 1981; Simpson and Sells, 1981). Thus, a minimum of 90 days of methadone maintenance treatment is necessary for treatment to have some effectiveness. Many studies have also examined factors associated with retention, in particular, demographics (e.g., Brown et al., 1973), personality (e.g., Levine et al., 1972) and motivation (e.g.,

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Simpson et al., 1997), as well as clinical factors, such as methadone dose (e.g., Saxon et al., 1996) and clinic visits (e.g., Morral et al., 1999). It should be noted, however, that participants in the vast majority of studies on treatment retention were patients who were already in treatment at the time or in the process of entering. It is uncertain as to why they entered or how they differed from those who chose not to enter. In addition, as randomized control groups were not included, it is not possible to establish causal relationships. Patients who were highly motivated or under the threat of legal sanction may have remained in treatment longer than those dropping out, thus there may have been a self-selection bias. The present study was designed to fill these gaps. Specifically, among a group of street-recruited drug injectors who may not have contemplated treatment, what factors could account for them entering and remaining for at least 90 days? Incentives to enter treatment were provided to all participants, including scheduling the initial appointment, rapid intake, transportation and a waiver of the customary US\$ 40 intake fee. In addition, 50% were randomly selected to receive a coupon for 90 days of free treatment. Treatment coupons had to be redeemed within 2 months of their issue or they were invalid. Finally, participants were randomly assigned to one of two interventions, risk reduction (RR), which stressed engaging in safer injection and sex behaviors, or motivational interviewing (MI), with an emphasis on entering drug treatment and eliminating drug use. The data for this paper were obtained from a larger project testing various interventions designed to reduce HIV-related risk behaviors, including drug treatment. Findings from that assessment have been published elsewhere (Kwiatkowski and Booth, 2001; Corsi et al., 2002). Because of the importance of retention in this effort, the present study was undertaken.

2. Methods

Beginning in 1996 through 2000, IDUs were recruited from street settings in Denver, Colorado to participate in a study designed to facilitate treatment entry and reduce HIV-related risk behaviors. Drug use indicators (e.g., drug-related arrests, treatment admissions among IDUs) were used to estimate the number of drug users living in the city's census tracts. Recruitment quotas were established for each census tract based on the estimated number of drug users residing in each area. Outreach workers who were not former or current IDUs themselves but were familiar with IDUs and knowledgeable about working in community settings, were used to recruit study participants, provide interventions and maintain contact for follow-up research interviews. Outreach was conducted using a variety of methods, including walking the streets, manning tables with refreshments and prevention materials, and visiting bars, parks and other locations frequented by the target population. Free condoms, bleach and informational brochures, including a description of the project, were of-

fered to potential participants. Those expressing interest were informed of the study's eligibility requirements and, if they appeared eligible, scheduled for their baseline interview. Final determination of eligibility was performed by project interviewers.

Eligibility criteria included: (1) self-reported drug injection in the 30 days prior to the interview; (2) 18 years of age or older; (3) no self-reported participation in substance abuse treatment during the previous 30 days; and (4) not too intoxicated or otherwise impaired to provide informed consent. A checklist was used to assess comprehension of study requirements and procedures prior to all research interviews. Those who were unable to correctly answer questions about the study were re-scheduled for a later interview. Eligibility requirements were verified through urinalysis and inspection for evidence of recent venipuncture. Individuals who tested negative for opiates, cocaine and amphetamines, or positive for methadone, were ineligible. A negative methadone urine test was required since those currently in methadone maintenance treatment could attempt to enter the study in the hope of receiving 90 days of free treatment. Eligible participants were provided informed consent and compensated for their time as research subjects, both at the baseline (US\$ 20) and 6-month follow-up (US\$ 25) interviews. Study procedures were approved by the Institutional Review Board of the University of Colorado School of Medicine.

Trained interviewers conducted all research interviews. Instruments included the Risk Behavior Assessment (RBA); the Addiction Severity Index (McLellan et al., 1980); and the anti-social personality disorder (ASPD) measure from the Diagnostic Interview Schedule (DIS), fourth edition (Robins et al., 1996). Other variables assessed included the number of drug and non-drug using friends and whether or not treatment was desired, measured by "yes," "unsure," or "no". A cooperative agreement consortium with the National Institute on Drug Abuse (NIDA) developed the RBA. It assesses demographics, drug use, criminal and medical histories and HIV-related sex and drug risk behaviors. The risk period assessed with the RBA included the 30 days prior to the interview. Reliability and validity studies of the instrument support its adequacy as a research instrument with this population (Dowling-Guyer et al., 1994; Weatherby et al., 1994). The Addiction Severity Index (ASI) has been widely used in drug treatment research and its reliability and validity are well-established (McLellan et al., 1985). The ASI measures the status of subjects in seven problem areas commonly affected by substance abusers, including medical status, employment status, alcohol use, drug use, legal status, family and social relationships, and psychological status. Within each problem area, subjective and objective items are summed to create a composite measure of recent severity in that area, ranging from zero (no problem) to one (extremely severe problem). For individuals who entered treatment, clinical information was provided by two study-affiliated counselors at the clinic, following participant authorization. This information included the number

of treatment days, maximum methadone dose, the number of treatment sessions and counselor ratings of patient cooperation in the therapeutic process. Finally, outreach workers obtained extensive locator information on all participants (e.g., address, phone, nick names, where they usually could be found, who would know if they were incarcerated) in order to locate them for interventions and the follow-up interview.

Following the baseline research interview, participants were offered free HIV, HBV and HCV testing and counseling, as well as interventions designed to facilitate an interest in treatment (MI), or reduce HIV-related risk behaviors (RR), over the course of the next 5 months. On average, four MI or RR interventions were conducted with each participant, in addition to testing and counseling, after the baseline interview. Interventions were conducted approximately once a month with each participant. A 1-month period without any intervention was required prior to the 6-month interview in order to reduce the influence of social desirability during the final interview.

Based upon previous research (e.g., Simpson, 1979; Simpson, 1981), we defined a retention group comprised of individuals who had been in methadone maintenance treatment for at least 90 days between the baseline and follow-up interviews. Clinic counselors provided this information. Because participants had 2 months in which to redeem their free treatment coupon, treatment entry was further defined as entering within this 2-month window. Those entering after 2 months ($N = 25$) were not counted as entering treatment, since treatment coupons were no longer valid. It is important to note that methadone maintenance was not the only treatment option available for study participants. The treatment program affiliated with the project offered a variety of treatment services, including drug-free outpatient and therapeutic community treatments. The study itself also did not restrict eligible IDUs to those injecting only opiates and outreach workers did not concentrate their recruitment activities on opiate injectors. Since, however, only one study participant entered and remained at least 90 days in a modality other than methadone maintenance, the focus of this report is restricted to methadone.

2.1. Interventions

A number of approaches have been recommended to increase the number of IDUs who enter and remain in treatment. Among these, rapid intake has been found to increase both treatment admissions and retention (Dennis et al., 1994; Festinger et al., 1996). Providing coupons for free drug treatment has also been shown to increase treatment admissions (Bux et al., 1993; Sorensen et al., 1993; Wells et al., 1995), as well as retention in methadone maintenance (Maddux et al., 1994). The consensus across these studies is that free treatment facilitates treatment entry, increases retention, and that a substantial number of those who enter report no previ-

ous treatment experience. Moreover, many drug users continue in treatment after the expiration of their free treatment coupon (Jackson et al., 1989). The present study continued this line of research by randomly selecting one-half of all participants to receive a coupon for 90 days of free treatment. It differed from the majority of these earlier investigations in its emphasis on long-term treatment, not detoxification, and the focus on drug injectors who were not seeking treatment.

The study was also designed to evaluate the differential effectiveness of two intervention strategies in facilitating treatment, a RR intervention we had conducted in Denver since 1987, and MI. The RR intervention was adapted from the Indigenous Leader Outreach Model (Wiebel, 1993). Focusing on changing the behaviors that place IDUs at risk for HIV, outreach workers initially attempted to increase AIDS awareness and encourage a realistic assessment of risk behaviors. A hierarchy of behavioral options for IDUs, ranging from quitting drug use, or at least injection drug use, to disinfecting needles/syringes was presented. Individuals were asked to show where they see themselves on the hierarchy and to identify strategies to move to a lower risk position. Through repeated contacts, risk reduction reinforcement was offered, empathy for any relapse to high-risk behaviors provided and prevention advocacy encouraged through presenting HIV as a community problem.

MI (Miller and Rollnick, 1991), on the other hand, was designed to facilitate more sweeping lifestyle changes by assisting individuals in articulating their ambivalence about behavior change and the need to change. It emphasized a belief that drug injectors can correct their dysfunctional behaviors and adopt pro-social behaviors, including eliminating drug use, possibly through drug treatment. A combination of role-induction and motivational interviewing strategies were employed to increase motivation to change. Individuals were assessed according to their willingness to change (i.e., stage of change), ranging from pre-contemplation or lack of recognition that change is needed, to contemplation or ambivalence about making change, to determination, where a plan for change has been developed. Intervention strategies were tailored to the stage of the individual. For example, since ambivalence is the hallmark of the contemplation stage, one strategy was to present a “pros and cons worksheet” where positive and negative responses are elicited regarding a specific behavior’s consequences. Each item was discussed, with the goal of increasing motivation to change.

In sum, free versus non-free treatment and MI compared to RR interventions were evaluated using a 2×2 factorial design with study participants randomly assigned to one of four conditions: MI with free treatment, MI without free treatment, RR with free treatment and RR without free treatment. Clinic counselors were responsible for recommending each client’s substance abuse treatment modality, but as stated, treatment was restricted in this report to methadone.

2.2. Statistical procedures

Data were entered, edited, and analyzed using SPSS (Statistical Package for the Social Sciences, 2002) and SAS (1999). The primary outcome variable was treatment retention, operationally defined as remaining in treatment for 90 days or more. In the initial analyses, IDUs who were in treatment for at least 90 days were compared to those who stayed less than 90 days or who did not enter treatment at all. To assess factors associated with treatment retention the following variables were used: intervention assignment (free versus no free treatment, RR versus MI), demographics (gender, ethnicity, age, employment status and arrests), ASPD, drug use in the previous 30 days (smoked crack, injected heroin, injected cocaine, number of times injected any drug, smoked crack, injected heroin or injected cocaine, for those who used each of these drugs), HIV risk behaviors in the prior 30 days (used dirty needle/syringe, shared drug solution, shared drug paraphernalia), number of drug-using friends, number of years injecting, ASI scores, desire for treatment, and previous drug treatment experience. Baseline differences on these same variables were also compared between subjects who were successfully interviewed at 6 months and those who were not. Next, the subset of 194 subjects who entered treatment was dichotomized into those who stayed 90 or fewer days and those staying more than 90 days and compared on the following additional variables: free vs. no free treatment, maximum methadone dose received, number of contacts per month in treatment, and counselor ratings of patient cooperation during treatment.

An alpha level of 0.05 was used for all statistical tests. Continuous variables were examined for departures from normality, and t-tests were used for comparing the groups described above for approximately normally distributed variables; if non-normal, Mann–Whitney *U* tests were conducted. Group differences on categorical variables were assessed using χ^2 analyses. Variables found to be significantly related to treatment retention in the univariate analyses were considered as candidates in multiple logistic regressions predicting treatment retention for the full sample, and separately for the 194 who entered treatment. A forward stepwise logistic regression was conducted in which variables were individually tested for entry into the model. The most significant candidate ($P < 0.05$) was entered into the model at each step and variables already in the model were then tested for possible removal based on the likelihood-ratio criterion (i.e. the significance of the change in the log likelihood for the model when the variable was removed exceeded 0.10; SPSS, 2002). The final model was produced when no additional variables met entry or removal criteria. For the subset of participants who entered treatment a Kaplan–Meier survival analysis (SAS, 1999) was used to compare retention curves for those who received free treatment coupons and those who did not by computing nonparametric (product-limit) estimates of the survival function (i.e., retention) for each group.

3. Results

3.1. Study sample

A total of 577 IDUs participated in the study, including 49% who were randomized to receive the MI intervention and 51% the RR, while 50% were offered free treatment and 50% were not. The sample consisted of 68% males, 43% whites, 32% Hispanics, 12% African Americans, 6% Native Americans and 6% of another ethnicity. Their average age was 39.6 years (S.D. = 11.0). More than half (53%) had previously been in treatment. At the time of the interview, only 11% reported full time employment, 25% had worked part time or occasionally, 36% were unemployed and 24% were disabled. Ninety-two percent had previously been arrested, 75% had a diagnosis of ASPD and they averaged 17.5 years of injection history (S.D. = 11.4). In the 30-day period preceding the interview, 81% had injected heroin, 55% cocaine and 36% had smoked crack. In this same time period, participants averaged 95 times injecting (S.D. = 110.4) and 53 times smoking crack (S.D. = 121.8). HIV-related risk behaviors showed that, at baseline, 27% had injected with a previously used uncleaned needle/syringe, 63% had shared other paraphernalia (i.e., cotton, cooker or rinse water) and 69% had shared the drug solution. Participants reported an average of 3.33 (S.D. = 4.63) drug-using friends. ASI scores in all seven problem severity areas were significantly greater than zero, or ‘no problems’ ($P < 0.0005$). Overall, 51% indicated they wanted drug treatment, 21% were unsure and 28% did not want treatment.

3.2. Preliminary analyses

Of those recruited into the study, 73% were re-interviewed at follow-up 6 months after their baseline interview, including 77% who had received a free treatment coupon and 69% who did not receive a coupon. This difference was significant ($\chi^2 = 4.464$, $P < 0.05$). In addition, participants who were successfully interviewed at follow-up averaged 86.9 (S.D. = 89.5) injections in the 30 days prior to the initial interview compared to 116.3 injections (S.D. = 150.7) for those not re-interviewed ($U = 29460.5$, $P < 0.05$). No differences were found between RR and MI, or on any demographic variable, ASPD, other drug use measures, HIV risk behaviors, desire for treatment or prior treatment experiences.

3.3. Treatment retention in the total sample

Approximately one-fifth (20.3%) of the out-of-treatment IDUs recruited into the study entered methadone maintenance treatment and remained at least 90 days or more. The remainder either did not enter or they entered and dropped out within 90 days. There were no differences observed between those entering and remaining vs. those who did not on age, gender, ethnicity, employment status, RR compared

Table 1
Significant associations with treatment retention in univariate analyses

Variable	Stayed ≤ 90 days	Stayed >90 days	Statistic; <i>P</i>
90-day free treatment coupon	<i>N</i> = 460	<i>N</i> = 11	$\chi^2_1 = 38.6$; <0.0005
Yes	43.0%	75.2%	
No	57.0%	24.8%	
Had prior treatment	<i>N</i> = 460	<i>N</i> = 117	$\chi^2_1 = 9.12$; <0.002
Yes	50.2%	65.8%	
No	49.8%	34.2%	
Desired treatment	<i>N</i> = 460	<i>N</i> = 117	$\chi^2_2 = 31.1$; <0.0005
Yes	45.2%	73.5%	
Unsure	22.6%	14.5%	
No	32.2%	12.0%	
Number of drug using friends	<i>N</i> = 458, mean = 3.6 (5.1)	<i>N</i> = 117, mean = 2.1 (2.0)	<i>U</i> = 21137; <0.0005
Used heroin past 30 days	<i>N</i> = 459	<i>N</i> = 117	$\chi^2_1 = 27.6$; <0.0005
Yes	77.1%	98.3%	
No	22.9%	1.7%	
Times injected heroin past 30 days (of 465 users)	<i>N</i> = 351, mean = 59.9 (43.6)	<i>N</i> = 114, mean = 71.7 (43.8)	<i>U</i> = 16592.0; <0.007
Used cocaine past 30 days	<i>N</i> = 460	<i>N</i> = 117	$\chi^2_1 = 13.8$; <0.0005
Yes	58.5%	39.3%	
No	41.5%	60.7%	
Times injected cocaine past 30 days (of 301 users)	<i>N</i> = 257, mean = 54.3 (90.5)	<i>N</i> = 44, mean = 23.2 (45.4)	<i>U</i> = 4202.5; <0.007
ASI employment status (<i>n</i> = 571)	<i>N</i> = 456, mean = 0.73 (0.24)	<i>N</i> = 115, mean = 0.67 (0.27)	<i>T</i> ₁₆₀ = 2.20; <0.03
Completed 6-month follow-up	<i>N</i> = 460	<i>N</i> = 117	$\chi^2_1 = 23.9$; <0.0005
Yes	68%	90.6%	
No	32%	9.4%	

to MI (21% versus 20% entered, respectively), prior arrest history, ASPD, HIV-related risk behaviors, overall injection frequency and years of injection, crack use, nor on any of the ASI measures other than problems associated with employment. Free treatment, however, was strongly associated with entering and remaining in treatment (75% of those remaining had a free coupon), as was desire for treatment and having been in treatment previously. Retention was also associated with having fewer drug-using friends and the use of heroin (rather than cocaine or amphetamines) as well as injecting heroin more often. On the other hand, using cocaine and the frequency of injecting cocaine were associated with not entering treatment or entering and dropping out early. Those who entered and remained had fewer substance use problems related to employment than those who did not en-

ter or dropped out. Univariate differences between the two groups are shown in Table 1.

In stepwise multiple logistic regression, seven independent factors predicted treatment retention at 90 days (Table 2). These were: free treatment ($P < 0.0005$); using heroin in the previous 30 days ($P < 0.005$); desire for treatment ($P < 0.0005$); fewer ASI employment-related problems ($P < 0.005$); prior treatment ($P < 0.003$); not using cocaine in the past 30 days ($P < 0.011$); and having fewer friends who used drugs ($P < 0.007$). After adjusting for other variables in the model, the odds of entering treatment and staying for at least 90 days for participants who received a coupon for free treatment, compared to those who had to pay for their treatment, was 4.6 (CI = 2.77–7.63).

Table 2
Multiple logistic regression predicting treatment retention with full sample (*n* = 568, missing 9)

Step	Variable entered	$-2\log L^a$	Incremental significance (<i>P</i>)	<i>B</i> (S.E.) for final model	Adjusted odds ratio (95% CI) for final model
1	90-day free treatment coupon	534.050	<0.0005	1.53 (0.26)	4.60 (2.77, 7.63)
2	Used heroin past 30 days	492.982	<0.0005	3.11 (1.03)	22.33 (2.99, 166.90)
3	Want treatment	473.032	<0.0005	0.86 (0.26)	2.36 (1.42, 3.92)
4	ASI employment	464.622	<0.005	-1.56 (0.49)	0.21 (0.081, 0.544)
5	Previous treatment	454.751	<0.003	0.79 (0.25)	2.21 (1.36, 3.60)
6	Used cocaine past 30 days	448.274	<0.011	-0.56 (0.24)	0.57 (0.36, 0.92)
7	Number drug using friends	440.792	<0.007	-0.12 (0.05)	0.89 (0.81, 0.98)
	Constant			-4.47 (1.12)	0.012

^a $-2\log L$ = negative log likelihood value for each model multiplied by 2.

Table 3
Multiple logistic regression predicting treatment retention with sample entering treatment ($n = 167$, missing 27)

Step	Variable entered	$-2\log L^a$	Incremental significance (P)	B (S.E.) for final model	Adjusted odds ratio (95% CI) for final model
1	Methadone dose	194.739	<0.0005	0.037 (0.01)	1.04 (1.02, 1.06)
2	90-day free treatment coupon	181.478	<0.0005	1.53 (0.43)	4.63 (1.99, 10.76)
3	Contacts per month	172.237	<0.003	0.90 (0.34)	2.47 (1.27, 4.80)
4	Counselor rated status	166.524	<0.018	-0.74 (0.32)	0.48 (0.26, 0.89)
	Constant			-2.70 (1.10)	0.067

^a $-2\log L$ = negative log likelihood value for each model multiplied by 2.

3.4. Retention among only those who entered treatment

Of the 194 participants who entered methadone maintenance, 117 (60.3%) remained at least 90 days. In univariate analyses, those who remained were more likely to have received a free treatment coupon (79% remained compared to 49% for those who had to pay; $\chi^2 = 18.7$, $P < 0.0005$). Clinical variables indicated that clients in treatment for 90 days or more received a higher average maximum methadone dose than those who left early (mean = 76.9 versus 54.2; $t = 6.00$, $P < 0.0005$) and more monthly treatment contacts on average (1.33 versus 0.93; $t = -4.76$, $P < 0.0005$). On a four-point scale, with 1, general compliance; 2, some difficulties with program requirements; 3, poor compliance; 4, terminated, they were also rated by their counselor as more compliant during treatment than those who left before 90 days (mean = 1.81 versus 2.14; $t = 3.44$, $P < 0.002$). Table 3 presents findings from the stepwise multiple logistic regression predicting treatment retention.

As illustrated, the first variable entered into the model was methadone dose (OR = 1.04, CI = 1.02–1.06). After adjusting for the other variables in the model, clients who received a coupon for free treatment were 4.6 (CI = 2.77–7.63) times more likely to stay in treatment at least 90 days and for each increase in our measurement of compliance, clients were more than twice as likely to stay in treatment at least 90 days (CI = 1.12–3.85). Similarly, more treatment contact increased retention: with each increase in

number of treatment contacts during the past month, clients were nearly two and a half times more likely to remain in treatment at least 90 days (CI = 1.27–4.80).

Survival analysis was used to compare treatment retention in the subset of patients who entered treatment ($N = 194$) (Fig. 1). The retention curve for those receiving a free treatment coupon was significantly different from those not receiving a free treatment coupon based on nonparametric (product-limit) estimates of the survival function of each group (log rank $\chi^2 = 10.87$, $P < 0.002$). Participants receiving coupons stayed in treatment significantly longer than those who were required to pay for their treatment, even after free treatment was no longer offered. At 3 months, when the coupons expired, more than 60% of those who had been given a coupon were still in treatment compared to 34% of those not offered a coupon. At 4 months, these figures declined to 45 and 21%, respectively, and at 6 months to 26 and 16%, respectively.

4. Discussion

The primary focus of this paper was on assessing factors that could account for treatment retention at 90 days in a sample of street recruited drug injectors. Treatment, in particular methadone maintenance, is of major importance for IDUs in light of the HIV epidemic. While many studies have examined treatment retention among drug users, including

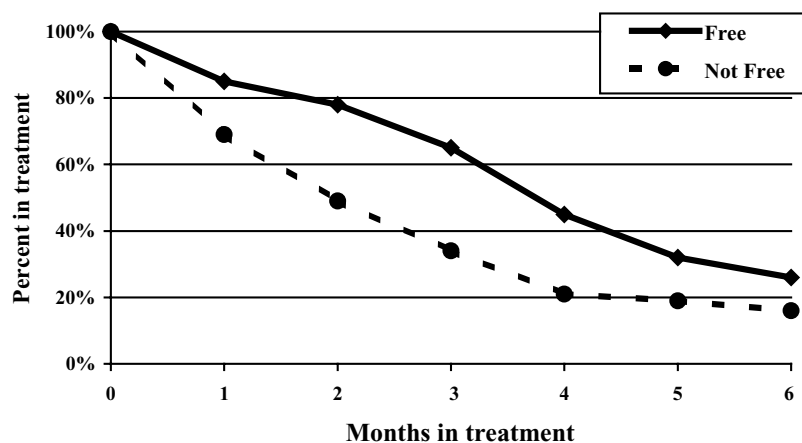


Fig. 1. Treatment retention comparing participants who received free treatment ($n = 127$) with those who had to pay for treatment ($n = 67$).

drug injectors, to our knowledge this is one of the few studies to look at this issue in a cohort that was not considering treatment when they were recruited to participate.

Overall, of the 577 IDUs in the study, one third ($N = 194$) entered and one fifth ($N = 117$) remained in methadone maintenance treatment for at least 90 days. Looking at only those who entered treatment, 60% remained for 90 days or more. While this dropout rate (40%) is somewhat higher than that typically found in retention studies (e.g., Simpson et al., 1997 reported one-third left within 3 months), it should be considered in reference to the population recruited. Three-quarters of the sample received a diagnosis of ASPD, 92% had a criminal history, participants averaged more than 17 years of injecting drugs and, at the time of their interview, they were injecting at an average greater than three times a day. The majority reported engaging in HIV-related risk injection behaviors, including sharing used needles, other drug paraphernalia and the drug solution, in the 30-day period preceding their baseline interview. They also scored as severely impaired on all seven problems areas in the ASI. This profile is very different from patients typically seen entering methadone maintenance treatment programs through more traditional entry routes (e.g., self or court referral). To further understand these differences, we compared patients who entered treatment at the clinic through our street-recruitment efforts and those who entered through more standard routes of admission (Kwaitkowski and Booth, 1999). Street-recruited admissions were more likely to be unemployed, homeless, and on public assistance than admissions from other sources. They also injected more frequently and were more likely to have used a dirty needle in the previous 30 days. Thus, the finding that more than half of those who entered treatment remained for at least 90 days indicates that methadone maintenance is a viable option, even for more marginalized drug users.

It is also important to note that when treatment was offered for free, retention was far better than when clients had to pay, although the intake fee was waived for everyone: of the 127 who entered treatment with a free coupon, 65% were still in treatment 90 days after admission compared to 33% of the 67 who entered treatment and were required to pay. As shown in the logistic regression, individuals with a free treatment coupon were 4.6 times more likely than those without a coupon to be in treatment at 90 days, after adjusting for the other variables in the model. These findings are supported by earlier research on the effect of free treatment on retention (Maddux et al., 1994), however, with a sample that may not have been contemplating entering treatment when they were recruited for the study. On the other hand, the rate of treatment entry we found among those who received a coupon was far greater than that reported by Sibthorpe et al. (1996), where only 8% redeemed a coupon. The authors of that study concluded, “additional strategies to increase motivation to enter and remain in treatment are needed” (p. 204). In our investigation, individuals who expressed an interest in treatment were scheduled for an intake

appointment by a project outreach worker and transported to the clinic, usually within 2 or 3 days. The rates of treatment entry and retention we achieved should be considered in the context of these additional strategies.

Another factor that accounted for retention at 90 days was desire for treatment, measured at the baseline research interview. In earlier studies, we reported that desire for treatment was associated with higher rates of entering treatment (Booth et al., 1998, 2003). From these findings, it appears that desire is associated with retention as well. Patient motivation at intake also predicted treatment length in a related study by Simpson et al. (1997). What is interesting is that we found no difference in treatment retention based on the intervention participants received. As many entered treatment and remained for 90 days in the RR intervention, which focused on changing HIV-related risk behaviors, as those in the MI intervention, which focused on moving along the stage of change continuum using strategies designed to increase motivation to change, including entering treatment. Given the profile of the participants in this study, it is likely that this result may be due to the difficulty of increasing motivation in a limited amount of time and a limited number of intervention sessions.

We also found that cocaine use, as well as the frequency of cocaine injection, were negatively associated with retention. This finding has been reported previously (Farley et al., 1992; Grella et al., 1997) and points to the need for alternative treatment approaches for those individuals who use cocaine. Cocaine is a deterrent to entering treatment, even when treatment is free (Booth et al., 2003), and as shown here and elsewhere, it is an important predictor of dropping out of treatment, even among those who also use opiates and are in methadone maintenance. An approach that may be promising is a combination of group and individual drug counseling focusing on eliminating cocaine use and facilitating participation in 12-step programs. This combination was tested in the multisite NIDA Cocaine Collaborative Treatment Study and was found to be more successful than alternative approaches in reducing cocaine use and HIV-related risk behaviors (Woody et al., 2003).

Within the subset of those who entered treatment, a number of factors accounted for remaining 90 days or more. Of these, the first to enter the logistic regression model was methadone dose. Higher doses were associated with an improved likelihood of remaining in treatment, supporting the earlier work of Ball and Ross (1991), Saxon et al. (1996) and others. A higher dose of methadone is important for a number of other reasons, as it has been found to be associated with reduced frequency of injection (Wong et al., 2003), fewer opiate-positive results on urine screens (Rhoades et al., 1998; Strain et al., 1993) and fewer days of heroin use (Strain et al., 1993). What is of interest is that, among street-recruited IDUs with higher frequencies of injection drug use than typically seen in methadone patients, higher methadone doses were also associated with greater retention. It should be acknowledged, however, that

individuals leaving treatment early did not have exactly the same opportunity to achieve a higher dose of methadone than those who remained longer. We also found that more average monthly contacts with the treatment agency and better counselor ratings of patient compliance in the therapeutic process were associated with treatment retention. These factors relate to treatment motivation and indicate the importance of developing strategies to increase the motivation of those who enter treatment but are not as committed to remaining as others.

There are a number of limitations that should be considered when drawing conclusions from these findings. The IDUs participating in the study were recruited through targeted sampling methods. While this approach is experimentally more rigorous than convenience sampling, it likely overrepresents those who had the time to participate in a research study and were motivated by the modest monetary stipend offered for interviews. In addition, findings were based on self-report which may have been influenced by inaccurate recall and social desirability. Recall error was likely minimized by the relatively brief 30-day time period participants were asked to recall. Moreover, prior studies have found that drug users' self-reports have adequate validity for this type of investigation (Booth et al., 1996; Maisto et al., 1990).

This study supports the efforts of outreach interventions in facilitating treatment entry and retention among IDUs who may not have been contemplating treatment at the time they were contacted. It also demonstrates the importance of free treatment in increasing treatment entry and retention rates. In view of the numerous studies showing the benefits of methadone maintenance treatment, including reduced HIV seroconversion (Metzger et al., 1993; Moss et al., 1994), fewer criminal activities (Bell et al., 1992; Hunt et al., 1984) and improved medical and social conditions (Dole et al., 1968; Rounsaville et al., 1987) providing free treatment to IDUs may be cost-effective as well.

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