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Characteristics and Nine Month Outcomes of Discharged Methadone Maintenance Clients

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Abstract

This study is a secondary data analysis of a clinical trial assessing the effectiveness of outreach case management (OCM) in linking discharged methadone patients back into treatment. The original trial assessed the effectiveness of the OCM intervention compared to a passive referral (PR) among methadone clients who needed treatment post-discharge, but had not re-engaged. The purpose of the current study was to assess the characteristics and long-term outcomes of all clients who were discharged from methadone maintenance treatment (MMT) including those who had re-engaged in treatment. A total of 230 methadone clients were interviewed three months and then again at nine months following discharge from treatment. Compared to participants who needed treatment, but had not re-engaged (NoTx: 56%), those who had successfully re-enrolled in treatment (Tx; 44%) were more likely to be female, not married, unemployed, had a longer history of sedative use, reported more psychiatric hospitalizations and were originally enrolled in a community-based rather than a Veterans Administration (VA) program. Despite having more severe problems, the Tx group had fewer opioid positive urines and reported less IV drug use at nine months post-discharge compared to the NoTx group. The findings highlight the importance of rapid treatment re-engagement.

1. Introduction

It is widely known that enrollment in methadone maintenance treatment (MMT) reduces drug use and crime as well as improves employment outcomes (Ball & Ross, 1991; Hubbard et al., 1997; Sheerin et al., 2004). Conversely, those who are not in treatment have an increased risk for mortality (Caplehorn et al. 1996; Esteban et al., 2003; Gronbladh et al., 1990; Zanis & Woody, 1998). Moreover, MMT reduces the transmission of HIV and viral hepatitis (Metzger et al., 1993; Rhoades et al., 1998; Sees et al., 2000). Finally, MMT is also cost effective (Mattick, 2001) and has demonstrated social-cost benefits (Simoens et al., 2006).

While the benefits of MMT have been demonstrated, the dropout rate from treatment is high. Simpson et al. (1997) reported that 50% of methadone clients dropped out without

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completing treatment within the first year and more recently, Bell et al. (2006) found that nearly two-thirds of methadone clients dropped out within the first year. In addition, those who drop out of treatment are likely to quickly relapse to opioid use (Ball & Ross, 1991; Zanis et al., 1996) and most of these individuals relapse within three months after treatment (Hubbard & Marsden, 1986).

Some individuals who drop out of treatment return to MMT in a revolving door fashion (Bell et al., 2006). However, others remain out of treatment placing them at risk for HIV and other diseases. It is unclear why certain substance abusers who are in need of treatment are able to re-engage on their own after discharge and others are not. While much research has examined predictors of retention in MMT (Ball & Ross, 1991; Magura et al., 1998; Hser et al., 1990; Stark, 1992), and a few studies have evaluated re-admission of substance abusers in general (Grella et al., 2003; Kosten et al., 1986; Luchansky et al., 2000), not much is known about the characteristics and outcomes of methadone clients post-discharge.

Fischer et al. (2008) found that baseline variables of current injection drug use, current heroin use, and stable housing were predictors of MMT enrollment whereas, current alcohol users were less likely to enroll in treatment. Among a sample of injection drug users (IDUs), Shah et al. (2000) found that females and those who had Medicaid insurance were more likely to enroll in MMT, whereas, having been recently incarcerated was associated with lack of participation in MMT. However, the Fischer et al. (2008) and Shah et al. (2000) studies examined MMT engagement and not necessarily re-enrollment. While the ultimate goal is to retain clients in treatment, it is important to understand the characteristics of those who leave treatment prematurely and are able to quickly return to treatment, compared to those who fail to re-engage. Moreover, it is imperative for those who drop out of a methadone program and are in need of treatment to re-engage as quickly as possible. The sooner substance abusers return to treatment after a relapse and the longer they stay in treatment, the better their long-term outcomes (Scott et al., 2003; Simpson et al., 2002; Stout et al., 1999).

The current study is a secondary data analysis of research comparing outreach case management (OCM) to a passive referral (PR) in re-enrolling discharged methadone patients (Coviello et al., 2006). All participants for the study were recruited while they were still active clients in a methadone maintenance treatment program (MMTP) and provided consent for research staff to contact them if they should leave the program for any reason. Research staff attempted to contact all discharged patients three months after they left MMT. The original paper only assessed those who were eligible for the intervention because they were not enrolled in treatment at three months post-discharge and compared those who were randomized to OCM with those who received a PR. This paper is a secondary analysis of a larger dataset that also includes those who had returned to treatment on their own at three months post-discharge.

The purpose of this paper is to examine the characteristics (e.g., demographics, drug history, discharge reasons) of all methadone patients who are discharged from treatment. First, we will compare the two groups (OCM and PR) of methadone patients from the prior study who were in need of treatment, but were not enrolled in a program (NoTx) to those who were not eligible for the intervention because they had engaged in treatment on their own at three-months post-discharge (Tx). Second, we will examine the nine month post-discharge outcomes of the Tx and NoTx groups. Given that rapid treatment re-engagement after a relapse results in better treatment outcomes (Scott et al., 2003; Simpson et al., 2002; Stout et al., 1999), it is hypothesized that at nine months post-discharge, those who are able to re-engage on their own (Tx) will have fewer opioid positive urines, commit fewer crimes,

engage in fewer HIV risk behaviors, experience less psychological distress, and will be more likely to be employed compared those who failed to re-engage (NoTx).

2. Materials and methods

2.1 Recruitment

The study was conducted in three MMTPs in Philadelphia, PA by recruiting clients who were actively enrolled in these programs. Participants were recruited from two community-based and one Veterans Administration program through counselor referral and on-site advertisement of the project. Institutional Review Board approvals were obtained from the University of Pennsylvania, the Veterans Administration and the research review committees of the two community-based MMTPs.

In order to obtain a representative sample of methadone clients by length of enrollment in treatment, both existing clients as well as new admissions were recruited over the course of a three-year period. A total of 1,171 subjects consented to participate in the study by agreeing to be contacted if they should become discharged from their MMTP for any reason. Participants provided the research technicians with the names, telephone numbers and addresses of three individuals who could help locate them if they should be discharged. These 1,171 participants represented 83% of the active clients who were currently in treatment at each of the three MMTPs.

2.2 Discharges

All subjects were assessed regardless of the reason why they left MMT and were defined in this study as having been “discharged” even if they completed treatment successfully. The rationale for this approach is that even if someone completes MMT treatment successfully there is still a high likelihood of relapse (Gossop et al., 1989; Zanis et al., 1996). Moreover, even if a patient transfers to another program there is no guarantee that the individual will engage in the new MMTP after the transfer, or that a client who is released from jail or prison will re-enter MMT upon release. For example, many who want to return to MMT after incarceration often experience difficulties due to the lack of coordination between the criminal justice and treatment system (Schwartz et al., 2007). Therefore, we wanted to determine whether there was a relationship between discharge reason and later re-engagement.

There were seven categories of discharges: 1) dropped out, 2) suspended, 3) transferred, 4) hospitalized, 5) noncompliant with treatment, 6) incarcerated, and 7) treatment completed. Those who were considered “drop outs” were clients who had no contact with the MMTP in 30 days or more. Suspended clients violated program rules and were given a methadone taper, referred to another clinic and were only able to return to the program after a specified amount of time (usually six months). Noncompliant clients were also detoxified and given a referral to other treatments. However, most of these individuals left the program before detoxification was complete. Those who were transferred were given an intake appointment with another MMTP and the assumption was that their methadone would continue without interruption. Clients who were hospitalized or incarcerated were absent from the clinic for at least 30 days and were officially discharged. The small number of clients (n=10) who completed treatment successfully had been in the program an average of six years, had sustained drug-free urines and experienced a number of positive outcomes (e.g., obtained employment, established a drug-free support system). Both the client and treatment team were in agreement about the client leaving the MMTP and all of the treatment completers were successfully tapered off methadone.

Discharges were monitored over the course of the three year period. During that time 409 (35%) of the 1,171 methadone clients were discharged. Each of the discharged subjects was contacted three months post-discharge. A minimum of three follow-up letters were sent to each of the participant's contact source and telephone contact attempts were made until all leads were exhausted. As a result, a total of 266 subjects (65%) were successfully contacted and out of those subjects 260 agreed to participate in the study (six subjects refused participation). The 143 subjects (35%) who were not contacted were no longer living in the residence they listed prior to discharge, were not incarcerated and were not enrolled in local drug treatment programs. See Figure 1 for consort diagram.

2.3 Procedures

The 260 discharged subjects were asked to come to the research offices to participate in a three month post-discharge interview. The research technician first obtained informed consent to participate in the post-discharge study, and then administered a series of baseline assessments. After the baseline interview, the research technician determined the treatment status of each participant based on their responses to the Addiction Severity Index (ASI). A total of 128 subjects were in need of treatment, but not actively enrolled (NoTx), 102 subjects were already engaged in treatment (Tx), and 30 subjects were not using drugs and reported no need for treatment. The 128 subjects who were not enrolled in treatment, were randomized using a 2:1 ratio into one of two treatment conditions. In the first treatment condition subjects received a six week outreach case management intervention to assist participants in re-engaging in treatment (OCM, n=76), whereas, the second group received a passive referral for treatment (PR, n=52) (Coviello et al., 2006). For the purpose of this paper, the analyses compared those who were enrolled in treatment (Tx, n=102) to those who were not enrolled (NoTx, n=128). Both the Tx and NoTx groups were re-contacted in six months for a follow-up interview (nine months post-discharge).

2.4 Measures

The following measures were administered by trained research technicians at baseline (three months post-discharge) and at the nine month post-discharge follow-up time point.

The Addiction Severity Index (ASI) is a semi-structured interview that measures lifetime and recent (past 30 days) patient functioning across seven potential problem areas: medical, employment, drug use, alcohol use, legal, family/social, and psychological (McLellan et al., 1980; 1985). It yields seven indices called Composite Scores (CS) which are arithmetically weighted summary scores, ranging from zero to one, computed for each of the seven problem areas with higher values reflecting greater problem severity. The ASI composite scores have demonstrated good reliability and validity, especially with methadone patients (McLellan et al., 1980; 1985). The ASI also yields relevant demographic information.

The Risk Assessment Battery (RAB) is a self-report measure used to assess both sex and drug risk factors associated with HIV acquisition and transmission such as needle sharing and unsafe sexual practices (Metzger et al., 1991). The RAB has demonstrated satisfactory psychometric properties and good predictive validity (Metzger et al., 1993).

The Symptoms Checklist-90 Revised (SCL-90-R) is a standardized 90 item self-report questionnaire which assesses recent levels of psychological distress (Derogatis, 1994). The SCL-90-R provides a Global Severity Index score (GSI) which is the average of all 90 items and measures overall psychiatric distress (Derogatis, 1994; Schauenburg & Strack, 1999; Tingey et al., 1996). Higher scores are indicative of more psychiatric distress. These scores were used to control for levels of distress as it applies to treatment entry and subject functioning.

Urine Drug Screens (UDS) were collected by research technicians using standard urine collection techniques. Urines were analyzed using the Enzyme Multiplied Immunoassay Technique (EMIT) system in our urine toxicology lab. We tested for five drugs: opioids, cocaine, methadone, benzodiazepines, and cannabis.

2.5 Analysis

The first set of bivariate analyses compared the group that had re-engaged in treatment (Tx) to those who had not (NoTx) on a number of demographic variables, treatment site, current and lifetime drug use, HIV risk behaviors, psychiatric problems, criminal behavior, ASI composite scores, and discharge reasons. These group differences were examined using chi-square tests for categorical variables and one-way ANOVAs for continuous variables. Additional bivariate analyses were performed to examine the nine month outcomes of treatment engagement, drug use, HIV risk, crime, psychiatric issues and employment for the two groups.

A logistic regression was used to determine the adjusted odds ratio for predicting opioid use at nine months post-discharge. As described in the introduction, there was theoretical support for certain covariates to be included in the logistic regression model. These variables include gender, drug and alcohol use, illegal activities, and IV drug use. In this study, we gathered a much broader set of variables, and used this larger set in our model. We followed Hosmer and Lemeshow's (2000) suggestions for model building. In our first step we examined the individual associations between the covariates and the outcome, and included any covariate that had an association significant at the $p=0.2$ level or lower in a multivariate model. We used a backwards stepwise approach to reduce this model to our final model. Of our original set of theoretical covariates, all variables except gender and recent alcohol use made it through the first step, and seven variables were selected into the final model. These variables included marital status, employment, treatment site, discharge reason, IV drug use, ASI drug composite score and treatment group. Since we did not have adequate measures of two other variables identified by the literature, stable housing and Medicaid insurance, these were unable to be included as covariates in our model. However, with regard to Medicaid insurance, most of our participants were receiving medical assistance so there would be virtually no variance on this measure. Finally, additional analyses were conducted using propensity scores in the logistic regression model to adjust for the lack of randomization between the Tx and NoTx group.

3. Results

3.1 Baseline Characteristics at Three Months Post-Discharge

Table 1 displays the baseline characteristic of the 128 NoTx and the 102 Tx subjects who were interviewed at three months post-discharge. A total of 70% of the 102 participants who returned to treatment were enrolled in a methadone program. The 230 subjects were predominately male, not married, unemployed, about one-half were African-American, they had a lengthy history of heroin use with over one-half reporting IV drug use, and they were in considerable psychiatric stress at the time of the interview as indicated by the SCL-90-R.

While the NoTx group had higher ASI drug composite scores ($F=14.1$, $df=228$, $p < .0001$), the Tx group had somewhat higher ASI psychiatric composite scores ($F=3.6$, $df=227$, $p=.060$).

3.2 Discharge Reasons

The most common reason for discharge was that a participant dropped out of treatment (34%), whereas only 4% ($n=10$) of participants completed treatment successfully (Table 2).

It should be noted that seven of the ten people who completed treatment had re-engaged in treatment within three months after discharge, and the three who did not re-enroll were using opioids and in need of treatment.

Participants who were not engaged in treatment were more likely to have been discharged due to noncompliance ($\chi^2=13.0$, $df=1$, $p < .0001$), whereas those who re-engaged were more likely to have transferred to another program ($\chi^2=10.9$, $df=1$, $p=.001$) or were hospitalized ($\chi^2=23.2$, $df=1$, $p < .0001$). It appears that the most of the hospitalizations were due to psychiatric rather than medical problems.

Since 35% ($n=143$) of the methadone clients were not contacted following discharge, additional analysis were conducted to assess the discharge reasons for these individuals and to compare them to those who were contacted post-discharge. Those who were not contacted were more likely to have been discharged because they completed treatment (15% vs. 4%) whereas, those who were contacted were more likely to have dropped out of treatment (34% vs. 20%) or were hospitalized (11% vs. 0%).

3.3 Nine Month Post-Discharge Treatment Outcomes

Study retention. Nine subjects (4%) had died by the time of the nine-month post-discharge assessment. There were no differences in death rate by group (three subjects had died in the Tx group and six subjects died in the NoTx condition). Of the remaining 221 subjects, a total of 194 (88%) were contacted and completed a nine-month post-discharge follow-up interview. Of the 27 participants who did not complete the follow-up, 15 were not responsive to repeated attempts to contact, seven were not located, two were incarcerated and were unable to be interviewed, one refused and two had unknown reasons. While the NoTx group had a better follow-up rate (91%), than the Tx group (84%), this difference was not statistically significant ($\chi^2=2.6$, $df=1$, $p=.107$).

Nine Month Outcomes. Not surprisingly, at nine months post-discharge, the NoTx group continued to be less likely to re-engage in treatment, used more heroin, reported more IV drug use and were more likely to have been incarcerated since the baseline assessment compared to the Tx group. In contrast, the Tx group had more urine drug screens positive for benzodiazepines and reported more psychiatric outpatient visits than the NoTx group (Table 3).

3.4 Logistic Regression

The final logistic regression model, based on the procedures of Hosmer and Lemeshow (2000) as described earlier, yielded four factors predictive of opioid use: marital status, treatment site, ASI drug composite score and treatment group. The sample size for this model was 175 rather than 194 due to missing data. Specifically, 10 subjects had missing urine data for nine month opioid use, eight had missing discharge reasons and one had missing data for the ASI drug composite score. The model showed significant variation explained (LR chi-square = 203.7, $df=7$, $p < .0001$) with a Nagelkerke R square statistic of 0.26. The Hosmer and Lemeshow (2000) goodness-of-fit test statistic was not significant ($\chi^2=4.0$, $df=8$, $p=.858$) indicating that the model was a good fit. Participants who were married (OR=2.7, CI=1.1-6.7, $p=.034$) and those who were originally enrolled at a VA versus a community-based MMTP (OR=2.2, CI=1.1-4.4, $p=.033$) were more likely to have an opioid positive UDS. More drug problems at baseline were also predictive of opioid use at nine months (OR=39.7, CI=2.3-688.5, $p=.011$). Subjects who were not re-enrolled in treatment at three months post-discharge were twice as likely as the Tx group (OR=2.2, CI=1.1-4.4, $p=.036$) to have an opioid positive urine nine months after leaving MMT. The area under the

ROC curve for the model was 0.76, suggesting that the model has fair to good discrimination between opioid users and non-users at nine months.

We attempted to use a propensity score method to adjust for the fact that we did not have randomized allocation to the two treatment groups. We fit a logistic regression model that predicted group membership from a set of baseline covariates. The model showed highly significant variation explained (LR chi-square = 83.2, df = 13, $p < 0.001$), with Nagelkerke R square statistic of 0.51. The Hosmer-Lemeshow test for lack of fit was not significant ($\chi^2 = 7.7$, df=8, $p=0.46$), and the area under the ROC curve was 0.87. The variables that contributed most to the prediction of treatment group were marital status (OR=7.9, CI=2.3-27.0, $p=.001$), treatment site (OR=3.8, CI=1.5-9.8, $p=.005$) and days (in past 30) of heroin use (OR=0.89, CI=0.84-0.94, $p < .0001$). Our model is predicting the probability of being in treatment at baseline, so being unmarried and originally attending a community-based program (rather than a VA facility) were positively associated with being in treatment, while higher numbers of days of heroin use in the last 30 days was negatively associated with being in treatment. However, we found very little overlap in the propensity score for the two groups. As a result, we have only a very small subset of the groups where we have subjects from different groups with comparable propensity scores, so we cannot find a subset matched on the score. As discussed in Shadish et al. (2002), it is not advisable to use propensity scores when there is little overlap in the score distribution across the two comparison groups. In the analyses reported in the paper, we stratified on the basis of a set of empirically selected covariates. This set of covariates included the three described in the propensity model, so we have made some adjustment for the imbalance in their distributions across the treatment groups. However, we are unable to state that we have adjusted completely for non-random assignment, and acknowledge that some of our group effect is probably due to some baseline differences between the two groups.

A final logistic regression analysis was conducted that employed a slightly different three group classification that included participants who: 1) enrolled in treatment at baseline (same InTx group, $n=102$), 2) re-enrolled nine months after discharge ($n=25$), and 3) never re-engaged in treatment ($n=84$). Results from the logistic regression predicting opioid use at 9 months showed similar findings as the previous classification. That is, those subjects who never enrolled in treatment were about five times more likely than the re-enrolled group (OR=4.9, CI=1.4-16.9, $p=.012$) and 2.4 times more likely than the InTx group (OR=2.4, CI=1.0-5.6, $p=.043$) to have an opioid positive urine at 9 nine months post-discharge.

4. Discussion

Similar to other research findings, this study showed that women had a higher likelihood of treatment engagement than men (Luchansky et al. 2000; Shah et al., 2000; Schutz et al., 1994). Shah et al. (2000) found that females were twice as likely as males to participate in MMT. According to Humphrey et al. (1997), while there may be few females enrolled in treatment overall, they may be more likely to seek treatment because they receive pressure from family or friends or there is greater social stigma for women substance abusers which pressures them into treatment.

The finding that married clients were less likely to re-enter treatment was inconsistent with other research (Carroll & Rounsaville, 1992; Grella et al., 2003; Hubbard et al., 1989; Schutz et al. 1994). However, Moos et al. (1994) found that clients who were never married were more likely to be re-admitted to treatment and Goldstein et al. (2002) demonstrated that unstable living arrangements and living alone was associated with MMT re-entry. It could be reasoned that those who were married or living with others were less likely to re-enroll because their partners may be using drugs making difficult for them to be motivated

to re-engage in treatment. Results of the logistic regression support this since subjects who were married were more likely to be using opioids at nine months. This is also supported by research showing that women with male drug abusing partners were retained in treatment for a shorter period of time compared to women with drug-free partners (Tuten & Jones, 2003).

Employment may serve as a barrier to MMT re-engagement since those who were working were less likely to re-engage. Working substance abusers often lack insurance to cover the cost of treatment which is a barrier to treatment entry (Amaro, 1999; Booth et al., 1998). In addition, Kleyn and Lake (1990) found that intravenous drug users (IDUs) who were employed were less likely to enter drug treatment since treatment could interfere with time spent on the job.

Opioid addicted veterans are an important group to target for treatment re-engagement. While it is believed that veterans should have greater access to insurance and treatment services, the current study found that they were less likely to re-engage in treatment on their own and veterans were twice as likely as their community-based counterparts to have an opioid positive urine at nine months post-discharge. More research is needed to understand why veterans are being discharged from treatment, how they could be retained, and if they do leave treatment prematurely, what can be done to re-engage them quickly.

The fact that participants with more psychiatric inpatient hospitalizations were more likely to re-enter treatment was consistent with the findings of Moos et al (1994), but inconsistent with Hser and colleagues (1998) who found that those who experienced more severe psychiatric distress were less likely to re-engage in treatment. It could be that the level of psychiatric distress was so severe for individuals in the current study that they required hospitalization and the admission to a hospital may have facilitated re-admission to MMT, thereby bypassing the lengthy waiting lists that were prevalent at the time the study was conducted (Coviello et al., 2006). This is consistent with the fact that participants who were discharged due to hospitalization (most likely a psychiatric stay of greater than 30 days) were more likely to re-enter MMT compared to participants who were discharged for other reasons. Upon discharge from the hospital these individuals may have been automatically re-instated at their MMTP.

This study is similar to others that have found poor treatment outcomes including more illicit drug use and criminal behavior among discharged clients who did not re-enter MMT (Anglin et al., 1989). Despite having more severe problems, especially more psychiatric disorders, methadone clients who are able to re-engage in treatment within three months after discharge had better nine month post-discharge treatment outcomes in terms of less opioid use, lower incidence of IV drug use, and fewer incarcerations than those who did not re-engage, suggesting that rapid treatment re-engagement is critical. Moreover, nearly two-thirds of those who had re-engaged on their own three months after discharged were still enrolled in treatment six months later compared to less than one-quarter of those who were not in treatment three months post-discharge.

4.1 Study limitations

A major limitation of the study was the lack of random assignment of subjects to the two treatment conditions. While it would have been impossible to randomly assign subjects to the Tx group since this is a naturally occurring event, the use of propensity scores should have helped to adjust for possible imbalances between the two groups. However, due to minimal overlap in the two groups, the use of propensity scores is not advised (Shadish et al., 2002) so we are not able to adjust for potential imbalances in the two groups. Caution is needed in interpretation of these findings since some of the difference in outcomes may

be due differences in the two groups at baseline (e.g., marital status, treatment site and heroin use) in addition to the differences between the two treatment groups.

A second major limitation was that about one-third of the former methadone clients were not able to be contacted at three months post-discharge suggesting that those who were not followed-up may represent a more severe group of out of treatment drug users. However, additional analyses of discharge reasons showed that those who were not contacted were more likely to have been discharged because they completed treatment, whereas, those who were contacted were more likely to have dropped out of treatment or were hospitalized. Individuals who complete treatment are less likely to need to re-engage in treatment than those who drop out prematurely (Luchansky et al., 2000). Therefore, it appears that the participants who were contacted may actually represent a more typical group of methadone clients who were at greater risk and more in need of an intervention.

Despite these limitations, there were several strengths of this study. These strengths included the fact that 83% of active MMT clients participated in the post-discharge study, the diverse sample that included newly enrolled and existing MMT clients as well as clients from a VA and community-based clinics, and the overall good follow-up rate.

4.2 Implications

While the findings show that those who were more receptive to treatment re-engagement were a more severe group, those who failed to re-engage on their own tended to be higher functioning in that they were more likely to be working. In order to reach these less receptive clients, the role of an intervention like outreach case management (OCM), which was originally designed to re-engage former methadone clients back into treatment (Coviello et al., 2006), could be expanded to help retain clients in treatment to prevent them from dropping out in the first place. For example, to prevent clients from dropping out due to conflicts with employment, a case manager could help them negotiate take-home doses, deal with transportation issues, or assist the client in developing a schedule that ensures they receive their medication and make it to work on time.

In general, drug treatment programs need better interventions to help retain and prevent the premature drop out of veterans and those who are employed. Other medications that have less restrictive dosing regimens such as depot naltrexone or buprenorphine may be more appropriate and result in better compliance for opioid addicted clients who work. Policies are needed that enhance treatment access for working substance abusers who are not eligible for Medicaid and are uninsured and unable to pay for treatment, or whose insurance does not cover the cost of treatment. Moreover, interventions that support the needs of clients who have drug abusing partners such as the work of Jones and colleagues at Johns Hopkins that involve methadone/detoxification treatment, contingency management and motivational interviewing for couples may also help retain these individuals in treatment.

Drug users often leave treatment prematurely and hence do not benefit sufficiently from treatment. In this study, about one-third (34%) of the subjects were discharged because they had stopped attending treatment. Even among those who completed treatment, seven out of ten had re-engaged in treatment at three months post-discharge, and the other three were in need of treatment, but had not re-enrolled. Opioid abusers who received intermittent treatment have more severe substance abuse and legal problems than those who receive continuous treatment (Kosten et al., 1986). Therefore, reducing drop out rates and immediate treatment re-engagement for those who drop out prematurely, are key to improving treatment outcomes. Due to the chronic nature of addiction, there is a need for interventions like recovery management check-ups (Dennis et al., 2003; Scott & Dennis, 2009) that involve monitoring substance abusers over extended periods.

Research is needed to examine the benefit-costs of interventions in terms of both re-engaging out of treatment drug users and potentially retaining users in treatment. While interventions that improve treatment continuity and help reduce the revolving door nature of chronic drug abuse are costly, these costs could be offset by the much more expensive consequences of continued drug use as demonstrated in this study, including more incarcerations and additional health care costs resulting from greater IV drug use among out of treatment drug users.

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Table 1
 Characteristics of the Sample Three Months Post-Discharge from Methadone Maintenance Treatment (Baseline)

	Tx (n=102)	NoTx (n=128)	Total (N=230)	F-test or Chi-square	p
<u>Demographics</u>					
Average Age	43.3	45.0	44.2	2.3	ns
Average Education	12.0	12.0	12.0	.01	ns
% Female	24	13	18	4.1	.044
<u>Race</u>					
% African American	45	56	51	3.6	ns
% Caucasian	50	41	45		
% Hispanic	5	3	4		
% Employed	26	42	35	5.8	.016
% Married	8	23	16	9.2	.002
<u>Treatment Site</u>					
VA MMTP	32	52	43	8.5	.003
Community-based MMTP	68	48	57		
<u>Drug Use/Treatment</u>					
<u>Average Years of Lifetime</u>					
Heroin use	17.7	17.6	17.7	.01	ns
Other opioids	3.7	2.6	3.0	1.6	ns
Methadone use	5.7	5.2	5.4	.32	ns
Cocaine use	7.3	5.8	6.5	1.9	ns
Sedative use	5.8	3.4	4.5	6.5	.012
Alcohol use	14.7	15.1	14.9	.06	ns
<u>Average Last 30 Days</u>					
Heroin use	4.0	17.2	11.3	87.7	.000
Other opioids	2.0	3.3	2.7	1.7	ns
Cocaine use	2.0	4.9	3.6	8.4	.004
Sedative use	7.2	5.2	6.1	2.1	ns
Alcohol use	1.8	3.5	2.7	4.2	.041
Average # of Lifetime Drug Treatments Episodes	8.0	6.4	7.1	3.2	.077
<u>HIV Risk Behaviors</u>					

	Tx (n=102)	NoTx (n=128)	Total (N=230)	F-test or Chi-square	p
% IV Drug Use	40	67	55	16.7	.000
% Needle sharing	11	9	10	.32	ns
% Never Use Condoms	32	31	32	3.5	ns
<u>Psychiatric</u>					
Average # of inpatient hospitalizations	3.0	1.4	2.1	6.4	.012
Average # of outpatient treatments	1.4	0.8	1.1	3.3	.069
Average SCL-90-R: GSI	1.2	1.0	1.1	3.0	ns
<u>Criminal Behavior</u>					
Lifetime Incarcerations (months)	24.7	23.4	24.0	.10	ns
Days in illegal activity in last 30	2.1	5.5	4.0	7.8	.006

Table 2

Reasons for Discharge from Methadone Maintenance Treatment

	Tx (n=100)	NoTx (n=120)	Total (N=220)^a
	%	%	%
Dropped out	28	39	34
Suspended from MMTP for a specific amount of time	10	18	14
Transferred to another MMTP	22	7	14
Hospitalized	22	2	11
Noncompliant with treatment	2	17	10
Incarcerated	9	11	10
Treatment completed	7	2	4
Other	0	5	3

$\chi^2=53.6$, $df=7$, $p < 0001$.

^aData for ten subjects (2 Tx and 8 NoTx) have a missing discharge reason.

Table 3

Treatment Outcomes at Nine Months Post-Discharge

	Tx (n=83)	NoTx (n=111)	Total (N=194)	F-test or Chi-square	p
<u>% In Treatment at 9 months</u>	65	23	41	34.7	.000
<u>Drug Use</u>					
Self-reported: Average Last 30 Days					
Heroin	2.7	11.3	7.6	32.5	.000
Other opioids	1.9	1.6	1.7	.17	ns
Cocaine	2.6	3.2	2.9	.41	ns
Marijuana	0.7	1.3	1.0	1.1	ns
Sedatives	7.7	5.4	6.4	1.8	ns
Alcohol	2.2	3.6	3.0	2.0	ns
<u>Urine Drug Screens: % Positive</u>					
Opioids	29	58	46	15.3	.000
Cocaine	28	41	35	3.4	.066
Marijuana	11	15	14	.57	ns
Benzodiazepines	27	12	18	6.0	.014
<u>HIV Risk Behaviors</u>					
% IV Drug Use	29	57	45	14.4	.000
% Needle sharing	10	11	11	.10	ns
% Never Use Condoms	22	34	29	4.1	ns
<u>Criminal Behavior</u>					
% Illegal activity last 30 days	15	16	16	.07	ns
% Incarcerated since baseline	1	9	6	5.5	.019
<u>Psychiatric</u>					
Average # inpatient hospitalizations	0.3	0.3	0.3	.00	ns
Average # outpatient treatments	0.4	0.2	0.3	11.6	.001
Average SCL-90-R: GSI	1.0	0.8	0.9	3.0	ns
<u>Employment</u>					
% Working past 30 days	31	37	35	.87	ns
Average Income past 30 days (\$)	262.8	385.8	332.8	1.2	ns