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Treatment Outcomes of African American Buprenorphine Patients by Parole and Probation Status

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Abstract

This secondary analysis compared outcomes of African-American adults newly-admitted to buprenorphine treatment who were on parole and probation to patients who were not under criminal justice supervision. Buprenorphine patients (N=300) were randomly assigned to receive either Intensive Outpatient Treatment (IOP) or Standard Outpatient Treatment (OP) treatment and were assessed at baseline, 3- and 6-months. There were no differences between groups in treatment retention. Among probationers/parolees, IOP was associated with lower 3-month treatment retention compared to OP, but among participants not on probation/parole the relationship was reversed ($p=.004$). Both conditions showed significant declines in heroin and cocaine use, illegal activity, and in meeting DSM-IV criteria for opioid and cocaine dependence. Probationers/parolees reported lower frequency of illegal activities at 3-months compared to non-probationers/parolees ($p=.007$). Buprenorphine treatment should be made more widely available to individuals on parole/probation as they respond as well to treatment as patients not supervised by the criminal justice system.

Keywords

Buprenorphine treatment; Parole and Probation; Criminal Justice; Drug Abuse Treatment; African Americans

INTRODUCTION

Opioid addiction is a serious problem in the United States among the general population as well as among individuals involved in the criminal justice system. It is associated with criminal behavior and incarceration, bacterial and viral infection, and overdose death (Degenhardt et al., 2011; Hser, Hoffman, Grella, & Anglin, 2001; Metzger et al., 1993;

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Nurco, Hanlon & Kinlock, 1991). Following periods of incarceration, relapse to opioid use is common (Langenauer & Bowden, 1971; Duvall, Locke, & Brill, 1963). Over the past 50 years, a variety of approaches have been tried in an attempt to reduce this return to opioid use and associated criminal behavior. Most of these approaches have involved the use of the criminal justice authority and the threat of return to incarceration should evidence of opioid use be detected (Langenauer & Bowden, 1971; Turner et al., 2002). Some of the approaches were more effective than others.

Prior to the widespread availability of methadone maintenance treatment in the US, there were reports that opioid-dependent individuals under parole were more likely to be abstinent at follow-up than those who were treated voluntarily and were not supervised in the community (Vaillant, 1966). However, several of these approaches had discouragingly low rates of abstinence (Desmond & Maddux, 1977). For example, Kurland, Wurmser, Kerman, Kokoski (1966) used coerced abstinence based on positive opioid urine testing without much success.

Other approaches involved the use of a variety of opioid antagonist medications. The administration of the short-acting opioid antagonist naloxone (narcane) contingent on opioid positive urine tests was found to be no better than placebo (Kurland, McCabe, & Hanlon, 1975). A more recent random assignment study among federal probationers ($N=51$) showed that the group receiving the orally administered opioid antagonist naltrexone had significantly lower rates of opioid positive urine tests and parole revocation at 6-month follow-up than the group receiving placebo (Cornish et al., 1997), but those findings were not replicated in a larger, subsequent trial with state probationers (Coviello, Cornish, Lynch, Alterman, & O'Brien, 2010).

Methadone is an opioid agonist that, when taken regularly at an adequate dose, blocks the euphoric effects of self-administered opioids (Dole, Nyswander & Kreek, 1966). With the emergence of methadone maintenance as a treatment in the late 1960s and early 1970s, a number of individuals under parole or probation entered such opioid agonist treatment programs, but many did so without the knowledge or approval of the officials supervising their criminal justice status in the community.

The impact of methadone maintenance treatment on relapse to illicit opioid use and criminal behavior has been extensively studied (Ball & Ross, 1991; Mattick, Kimber, Breen, & Davoli, 2009; Simpson & Sells, 1982). A number of early studies found that methadone treatment was associated with a reduction in criminal behavior (Dole & Nyswander, 1965; Dupont & Katon, 1971). These single site studies were confirmed by several multi-site studies (Ball & Ross, 1991; Hubbard et al., 1989; Simpson & Sells, 1982). In terms of the association between methadone treatment and arrest rates, several quasi-experimental studies demonstrated a decrease in the number of arrests during methadone treatment as compared to the period pre-treatment entry (Bowden et al, 1978; Cushman, 1972; Newman, Bashkow, & Cates, 1973). In contrast, the multi-site longitudinal DATOS study conducted in the 1990s did not find a reduction in arrest associated with methadone treatment, likely due to the prevalence of cocaine use among methadone patients at that time (Rothbard et al., 1999). In a clinical trial with 319 newly-admitted methadone patients, the group randomly

assigned to receive methadone treatment without counseling (termed interim maintenance) for 4 months followed by entry into standard methadone treatment was compared to the group assigned to a waiting list control and encouraged to call the local methadone programs for admission. The interim methadone group had a significantly greater reduction in the number of arrests at 6-months post-study enrollment compared with the waiting list control group (Schwartz et al., 2009). In that study participants who were on probation or parole at baseline did as well as, or better than, participants not on probation or parole in terms of illicit drug use and criminal activity at 12-month follow-up (Kelly, O'Grady, Jaffe, Gandhi, Schwartz, 2013).

Methadone treatment has been made available to probationers in some localities since the early 1970s (Joseph, 1973). Yet despite Food and Drug Administration approval for methadone treatment for opioid addiction treatment, strong evidence from clinical trials and meta-analyses of the effectiveness of such treatment in reducing opioid use (Mattick, Breen, Kimber, & Davoli, 2009), and the recommendation of its use by the National Institutes of Health (NIH, 1998), the Institute of Medicine (Institute of Medicine, 2006), and the World Health Organization (WHO, 2005), methadone treatment has been underutilized in parole and probation settings (Gryczynski et al., 2012). This underutilization persists despite evidence that methadone treatment is effective for probationers and parolees (Anglin, 1988; Brecht & Anglin, 1993; Desmond & Maddox, 1996; Gryczynski et al., 2012; Kelly et al., 2013).

National data gathered on methadone treatment admissions indicate that those individuals who are referred to treatment by the criminal justice system are more likely to face delays in admission than other types of referrals (Gryczynski, Schwartz, Salkever, Mitchell & Jaffe, 2011). In a recent multi-state survey, probation and parole agents estimated that 17% of their clients were opioid-dependent (Friedmann et al., 2012). These agents cited the lack of community-based pharmacotherapy (which includes the opioid agonists methadone and buprenorphine and the opioid antagonist naltrexone) as the major barrier to providing such treatment. It is possible that the implementation of health care reform may reduce this particular barrier.

Like methadone treatment, buprenorphine treatment is approved by the FDA for the treatment of opioid dependence and has been shown to be effective in randomized clinical trials and in meta-analyses of clinical trials (Mattick, et al., 2008). Buprenorphine is a partial μ -opioid agonist with a superior safety profile compared to methadone because it is less likely to suppress respiration and result in overdose death (Walsh, Preston, Stitzer, Cone, & Bigelow, 1994). It affords other potential advantages over methadone. For example, its long half-life, slow dissociation from the opiate receptor, and the plateau of its opiate effect permit it to be administered effectively every other day rather than daily (Amass, Kamien, & Mikulich, 2000; Chawarski, Schottenfeld, O'Connor, & Pakes, 1999). In addition, because some opioid-dependent individuals refuse to take methadone (Peterson et al., 2010) and some correctional officials oppose methadone (Friedmann et al., 2012), buprenorphine may provide an effective alternative choice. Furthermore, in the US, where methadone is tightly regulated, buprenorphine can be made available in service venues other than specialized

opioid treatment programs. Thus, buprenorphine can be provided through physician offices or in formerly drug-free outpatient programs.

Despite its potential advantages and proven effectiveness, buprenorphine's availability through publically-funded treatment has been limited compared to methadone (Clark, Samnaliev, Baxter, & Leung, 2011; Ducharme & Abraham, 2008; Koch, Arfken, & Schuster, 2006; Knudsen, Ducharme, & Roman, 2006). The relative lack of access to buprenorphine through public sector funding has restricted its access disproportionately to minorities, to the uninsured, to Medicaid recipients, and to individuals who are under criminal justice supervision. Early reports from SAMHSA indicated that over 90% of the patients receiving buprenorphine were White (Stanton, 2006), indicating that African Americans faced disparities in access to buprenorphine treatment relative to Whites.

Although there have been some recent reports on the use of buprenorphine treatment in prisons (Garcia et al., 2007; Kinlock, Gordon, & Schwartz, 2011; Magura et al., 2009; Springer, Chen, & Altice, 2010), we are aware of only one study that focused on buprenorphine for probationers and parolees (Cropsey et al., 2011). In that pilot study, 27 women were randomly assigned to buprenorphine or placebo following opioid detoxification in a residential drug abuse treatment center. During the 12 week trial of active medication, participants assigned to buprenorphine had significantly fewer weekly opioid-positive urine tests ($p < .001$). While methadone treatment has been shown to be associated with marked reduction in heroin and cocaine use and income-generating crime among individuals under criminal justice supervision (Gryczynski et al., 2012; Kelly et al., 2013), there has been little research on the outcomes of probationers and parolees in buprenorphine treatment.

In Baltimore, where the heroin-dependent population is predominantly African American, and public sector access to buprenorphine treatment was expanded beginning in 2006 (Schwartz et al., 2013), the authors conducted a randomized clinical trial comparing the outcomes of opioid-dependent African American buprenorphine patients receiving intensive outpatient *vs.* standard outpatient treatment in two outpatient programs which treat a predominantly African American population (Mitchell et al., 2013). The parent study found that both groups showed substantial improvement from baseline to 6-month follow-up but that there were no differences between the groups in terms of retention in treatment, heroin or cocaine use, criminal behavior, arrest, quality of life, or HIV-risk behavior. The present report is a secondary data analysis of that trial and examines the outcomes of study participants who were on probation or parole *vs.* participants not on probation or parole.

METHODS

PARTICIPANTS

Participants were eligible for the parent study if they were 18 years of age or older, were newly admitted to the participating treatment program, and had received at least one dose of buprenorphine from the program. Exclusion criteria included pregnancy, unstable medical or psychiatric illness requiring acute care, or inability to provide informed consent. The study protocol was approved by Friends Research Institute's IRB. All study participants provided

written informed consent and were paid \$30 for completing the baseline interview and \$40 for completing each of the 3- and 6-month follow-up interviews.

STUDY SITES

The two study sites were formerly drug-free outpatient programs that were publicly funded and had been providing buprenorphine for their opioid-dependent patients as part of a larger city initiative. The clinical goal was to stabilize patients in terms of curtailed opioid use and demonstrated ability to handle prescriptions responsibly, prior to facilitating ongoing buprenorphine treatment through a primary care provider.

STUDY TREATMENT CONDITION

Intensive Outpatient Treatment (IOP)—As described in the ASAM PPC-IIR (Gastfriend & Mee Lee, 2003), IOP offers counseling for at least nine hours per week. The two treatment programs offered counseling four days per week for at least two hours of group counseling on each day, as well as a weekly individual session. After the IOP phase was completed, patients typically continued treatment at the OP level of care at the same program.

Outpatient Treatment (OP)—This level of care corresponds to Standard Outpatient Services in the ASAM PPC-IIR and consists of individual and group counseling programmed for less than nine hours per week.

MEASURES

Participants were assessed at baseline, and at 3- and 6-month follow-up.

Addiction Severity Index (ASI)—The fifth edition of the ASI (McLellan et al., 1992) was administered to participants at baseline, and at 3- and 6-month follow-up. Participants' age, gender, marital status, years of education, and lifetime injection status (yes/no) were obtained from this measure. In addition, criminal justice supervision status at baseline was obtained from the item in the Legal section of the ASI: "Are you on probation or parole?" Participants answered "yes" or "no" to the question. The number of days that participants reported using heroin, using cocaine, and committing illegal activities for profit were drawn from the respective ASI items.

Friends Research Institute (FRI) Supplemental Questionnaire—FRI's Supplemental Questionnaire (Nurco, Hanlon, Kinlock, & Duszynski, 1988) is a structured interview that obtains more detailed information than the ASI about participants' drug use history and previous drug treatment experiences. For the purposes of this study, the questionnaire items used were the number of prior methadone maintenance treatment episodes and number of prior buprenorphine maintenance treatment episodes. The Supplemental Questionnaire was administered at baseline and both follow-up points.

Composite International Diagnostic Interview (CIDI-2) for Drug Use Disorders—The CIDI-2 is a structured interview that maps symptoms onto the DSM-IV diagnostic criteria and reports whether the diagnostic criteria are satisfied (Forman, Sviki, Montoya, &

Blaine, 2004). The CIDI-2 diagnostic items for opioid and cocaine dependence were administered by trained research assistants. The time frame for assessing dependence is typically the past 12 months. At the 3- and 6-month follow-up points, however, the items were assessed using a past 30 day time frame in order to accurately capture changes in symptoms.

Urine Drug Testing—Urine samples were collected at baseline and both follow-up points by study research assistants. Collection was not observed but there were no contingencies associated with test results, as participants were aware that samples were collected for research purposes only and results were not shared with the treatment providers or probation/parole agents. All urine samples were analyzed for opioids and cocaine by a certified laboratory using enzyme multiplied immunoassay testing (EMIT).

Treatment Enrollment Data—Treatment status and discharge information were determined from clinic records provided by program staff. Enrollment in buprenorphine treatment at a different provider was determined by participant self-report at each follow-up interview.

Incarceration—Whether participants were incarcerated during the 6 months following study enrollment was determined by participant self-report, as well as regular examination of public criminal justice and court databases.

STATISTICAL ANALYSIS

Outcome Variables—Outcome variables examined at each time point in the present study included urine test results for opioids and cocaine (positive/negative), self-reported frequency of heroin use, cocaine use, and illegal activities in the past 30 days, and DSM-IV criteria for opioid dependence and cocaine dependence (yes/no). In addition, incarceration through 6 months and treatment retention at 3 and 6 months (yes/no) were included as outcomes measures. For the purposes of this study, retention was defined as enrollment in either the original treatment program or with another buprenorphine provider at the time of the follow-up interview.

Explanatory Variables—Criminal justice (CJ) supervision status—whether participants were on probation/parole at baseline—was the primary explanatory variable. To examine changes in outcomes over time by CJ status, the interaction of CJ status with time was included in all models that included a time effect. An additional interaction variable was created to investigate the differential impact of study treatment condition by CJ status over time, and was included in all models with time effects, as were the requisite main effects and lower-order interactions.

Covariates—All analyses controlled for gender, age, lifetime drug injection history (yes/no), number of prior methadone maintenance treatment episodes, and number of prior buprenorphine maintenance treatment episodes. Baseline cocaine-positive drug test result (yes/no) was included as a covariate in all analyses except for the outcomes of self-reported cocaine use, cocaine drug test results, and cocaine dependence.

Statistical Model—Data were analyzed on an intent-to-treat basis. We examined the relationship between the two between group factors of CJ status (parole/probation: yes or no) and assigned counseling condition (IOP or OP), and the repeated factor of assessment time point (baseline, 3-Month follow-up, 6-month follow-up) on the above-mentioned outcome measures. Generalized Estimating Equation (GEE) models of the binomial family and logit link were used to assess all outcomes assumed to follow a binomial distribution, while GEE models with the Poisson family and log link were used to assess all outcomes assumed to follow a Poisson distribution. A repeated time effect was included in all models examining differential change based on CJ status and assigned treatment condition. A time effect was not included in analyses of retention or re-incarceration, which were examined separately in logistic regression outcome models due to no baseline variability (i.e., everyone was in treatment and previous incarceration was a defining feature of CJ status).

RESULTS

PARTICIPANT CHARACTERISTICS

Of the total sample of 300 African-American participants, 124 (41.3%) were on probation/parole at baseline. At the 3-month follow-up, 119 (96.0%) of probationers/parolees and 168 (95.5%) of the non-probationers/parolees completed interviews. At the 6-month follow-up, 113 (91.1%) of probationers/parolees and 166 (94.3%) of non-probationers/parolees completed interviews.

In terms of study treatment condition, 51.6% of probationers/parolees were randomly assigned to the IOP condition, while 46.0% of participants not on probation/parole were assigned to IOP. There were no differences in CJ status between treatment conditions ($p = .34$).

Table 1 shows baseline characteristics for the total sample and for the samples based on CJ status. Compared with participants who were not on probation/parole at baseline, probationers/parolees were significantly less likely to be female (25.8% vs. 46.0%; $p < .001$), and reported significantly fewer previous treatment episodes for both methadone maintenance [mean (SD) = .47 (.75) for probationers/parolees vs. .70 (1.14) for non-probationers/parolees; $p = .04$] and buprenorphine maintenance [mean (SD) = .73 (1.29) for probationers/parolees vs. 1.10 (1.38) for non-probationers/parolees; $p = .02$]. There were no differences between the two samples based on age, marital status, years of education, number of days worked in the last 30 days, or drug injection history.

DRUG USE AND ILLEGAL ACTIVITY

Table 2 shows the sharp drop experienced by both probationers/parolees and non-probationers/parolees in self-reported heroin and cocaine use, illegal activity, and in meeting DSM-IV criteria for opioid dependence and cocaine dependence. Treatment retention outcomes at 3 months and 6 months post-enrollment are also shown in this table.

There were no differences over time based on CJ status in self-reported days of heroin or cocaine use, or in opiate-positive or cocaine-positive drug tests (all p s $> .05$). There was a significant CJ status by time effect for self-reported days of illegal activity [$\chi^2(2) = 9.9$; $p = .007$].

007]. As shown in Table 2, although the probationers/parolees reported a sharper reduction in days of criminal activity at 3 months compared to non-probationers/parolees, these samples converged at 6 months, albeit at less than 20% the baseline days of criminal activity.

The three-way interaction of CJ status by study condition by time was not significant for self-reported heroin or cocaine use, illegal activity, or opiate- or cocaine-positive drug tests (all p s >.05).

DSM-IV CRITERIA FOR OPIOID DEPENDENCE AND COCAINE DEPENDENCE

There were no differences by CJ status over time in whether participants met DSM-IV criteria for opioid dependence or cocaine dependence (all p s >.05).

No significant effect was found for the interaction of CJ status by study condition by time for whether participants reported symptoms consistent with DSM-IV criteria for opioid dependence (p >.05). However, a significant effect was observed for this interaction for the outcome of meeting cocaine dependence [$\chi^2(2)=8.4$; $p=.015$]. As shown in Figure 1, although both probationers/parolees and non-probationers/parolees in both IOP and OP showed declines in meeting DSM-IV criteria for cocaine dependence from baseline to 3-month follow-up, the probationers/parolees in IOP were the only group whose likelihood of meeting DSM-IV criteria for cocaine dependence continued declining between the 3- and 6-month follow-up.

RETENTION IN TREATMENT AT 3- AND 6-MONTH FOLLOW-UP

As shown in Table 2, approximately 75% of the total sample was retained in treatment at 3-Month follow-up and 60% was retained at 6-month follow-up. No significant differences in retention at either time point by CJ status were found. The interaction of CJ status and study condition was found to be significant for 3-month retention [$\chi^2(2)=8.2$; $p=.004$], whereby the effects of treatment condition were in opposite directions and magnitude depending on CJ status. At 3 months, a lower rate of probationers/parolees compared to non-probationers/parolees were retained in IOP (68.5% vs. 81.8%, respectively) whereas a higher rate of probationers/parolees were retained in OP (84.2% and 67.2%, respectively).

RE-INCARCERATION

Overall, 17.1% of participants were incarcerated (at least one day of detention) at some point during the 6 months since study enrollment. There were no significant differences between probationers/parolees and non-probationers/parolees in incarceration rates [probationers/parolees = 20.5%, non-probationers/parolees = 14.6%; $\chi^2(2)=.85$; $p=.36$], nor were there differences between probationers/parolees and non-probationers/parolees in the impact of study condition on incarceration ($p=.34$).

DISCUSSION

This secondary analysis study is the first report of which we are aware that compares outcomes for buprenorphine patients who are under criminal justice supervision in the

community with outcomes for non-supervised patients. Such an analysis was possible in Baltimore because the criminal justice and substance abuse agencies have a long history of collaboration and of providing access to methadone for probationers and parolees (Gryczynski et al., 2012) and now to buprenorphine treatment. Indeed, over 40% of the patient sample in these two formerly drug-free outpatient buprenorphine programs was on probation or parole at the time of treatment entry. This circumstance is in contrast to other jurisdictions where buprenorphine is not available to those on probation/parole because of a lack of public funding for treatment, a lack of collaboration between treatment programs and CJ agencies, or policies of CJ agencies.

Probationers/parolees had significantly fewer prior methadone treatment and buprenorphine treatment experiences than patients not currently on probation/parole. Involvement in the criminal justice system is an opportunity to engage out-of-treatment individuals in evidence-based approaches to treatment, which can improve their lives while protecting public safety and public health (Chandler, Fletcher, & Volkow, 2009).

Patients under criminal justice supervision receiving buprenorphine treatment showed a marked drop from treatment entry to follow-up in terms of opiate- and cocaine-positive urine tests, as well as self-reported heroin and cocaine use and days of illegal activity. Buprenorphine patients under criminal justice supervision did not fare worse in treatment than patients not under community supervision. Both types of patients also showed sharp reductions in percentages meeting DSM criteria for opioid and cocaine dependence. Importantly, although approximately 1 in 6 patients experienced an incarceration event within the first 6 months of treatment entry, incarceration rates did not differ significantly between the probationer/parolee and non-probationer/parolee samples. Retention in treatment for the total sample at 3 and 6 months averaged 75% and 60%, respectively. These rates are somewhat lower than those found in recent studies of methadone treatment in Baltimore (Schwartz et al., 2006; Schwartz, Kelly, O'Grady, Gandhi, & Jaffe, 2012), although studies have found that buprenorphine treatment may have lower retention-in-treatment rates compared to methadone treatment (Mattick et al., 2008).

The finding that probationers and parolees receiving buprenorphine treatment significantly reduced their drug use as measured by self-report and urine drug testing is encouraging. Furthermore, their self-reported decline in criminal activity was significantly greater at 3-month follow-up than that reported by non probationer/parolees. This finding must be tempered by the lack of significant differences in re-arrest rates at 6 months post-treatment entry. Recidivism among individuals under criminal justice supervision is a vexing problem, with approximately 60% of those on parole and probation being re-incarcerated due to charges for new crimes or violations of the conditions of their parole/probation (Bureau of Justice Statistics [BJS], 2009; Glaze & Palla, 2005). Most individuals with substance use disorders under criminal justice supervision are not in treatment (Taxman, Perdoni, & Harrison, 2007) and many correctional agencies do not provide pharmacotherapy for their clients (Friedmann et al., 2012).

Probationers and parolees treated in OP compared to IOP had somewhat higher 3-month retention rates. Probation and parole requires supervisees to attend meetings with their

officers and they are often encouraged to obtain employment. It is possible that these requirements made IOP attendance more burdensome and led to greater drop out from IOP in the initial stages of treatment.

Although probationers/parolees and non-probationers/parolees in both conditions showed decreases in percentages meeting DSM-IV criteria for cocaine dependence at 3-month-follow-up, only the probationer/parolee group in IOP continued to decrease their percentages from 3- to 6-month follow-up. This may have been due to a delayed effect of IOP treatment or to continued pressure for improvement exerted by the probation or parole agent. It is also possible that this population was not accurately reporting the impact of cocaine use on their functioning because of fear of loss of confidentiality, despite the protections afforded by the study, including a federal Certificate of Confidentiality.

There are several limitations to the present analysis that bear mentioning. First, the participant sample was exclusively African American and findings may not be generalizable beyond this group. However, African Americans are disproportionately involved in the criminal justice system in the United States, and early reports of the implementation of DATA 2000 (the enabling legislation that permits the use of buprenorphine in the US) indicated that White patients were more likely to receive buprenorphine (Stanton, 2006). The finding that African Americans respond well to this treatment, regardless of their criminal justice status, should encourage policymakers to ensure that these individuals have access to buprenorphine treatment. Second, this was a secondary analysis of data collected for a clinical trial that was not focused on criminal justice outcomes. Finally, there may be differences among state criminal justice agencies in terms of organization, staffing, and policies that would warrant caution in generalizing findings to other jurisdictions.

Notwithstanding the limitations, the study provides evidence that opioid-dependent African American patients on probation or parole improve markedly with buprenorphine and fare comparably to African American patients not under criminal justice supervision. These findings should spur expansion of access to buprenorphine for this population.

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Figure 1.
LIKELIHOOD OF MEETING DSM-IV COCAINE DEPENDENCE BY CJ STATUS AND STUDY CONDITION.

PARTICIPANT SOCIODEMOGRAPHIC CHARACTERISTICS BY CRIMINAL JUSTICE STATUS AT BASELINE (N=300)

TABLE 1

Variable	Total Sample (N = 300)	Parolees/ Probationers (n = 124)	Non-Parolees/ Probationers (n = 176)	Test Statistic [†]	p
Female, n (%)	113 (37.67)	32 (25.81)	81 (46.02)	$\chi^2 = 12.66$	<.001
Age, mean (SD)	46.09 (6.45)	45.94 (6.04)	46.20 (6.74)	$t = .35$	.73
Married (yes), n (%)	31 (10.33)	14 (11.29)	17 (9.66)	$\chi^2 = .21$	.65
Years of education, mean (SD)	11.48 (1.61)	11.32 (1.72)	11.59 (1.53)	$t = 1.42$	.16
No. of days worked in last 30 days, mean (SD)	4.23 (7.66)	4.53 (7.78)	4.01 (7.58)	$t = .58$	.56
No. of prior MMT episodes, mean (SD)	.61 (1.00)	.47 (.75)	.70 (1.14)	$t = 2.02$	.04
No. of prior buprenorphine maintenance episodes, mean (SD)	.95 (1.35)	.73 (1.29)	1.10 (1.38)	$t = 2.34$	.02
Ever inject drugs (yes), n (%)	70 (23.33)	29 (23.39)	41 (23.30)	$\chi^2 = .00$	.99
IOP random assignment (yes), n (%)	145 (48.33)	64 (51.61)	81 (46.02)	$\chi^2 = .91$	.34

[†] Degrees of freedom for χ^2 tests were 1 and for t tests were 298, respectively.

TABLE 2

MODEL-PREDICTED VALUES (STANDARD ERRORS) FOR OUTCOMES AT BASELINE, AND 3- AND 6-MONTH FOLLOW-UP BY CRIMINAL JUSTICE SUPERVISION STATUS (N=300)

Variable	Parolees/ Probationers (n = 124)	Non-Parolees/ Probationers (n = 176)	Total Sample	CJ status BY time p value
Days of heroin use/last 30 days, mean (SE)				.60
Baseline	20.71 (.97)	23.35 (.65)	22.24 (.54)	
3-Month	2.30 (.57)	3.52 (.60)	3.05 (.43)	
6-Month	2.67 (.62)	4.05 (.65)	3.52 (.46)	
Days of cocaine use/last 30 days, mean (SE)				.74
Baseline	6.34 (.91)	7.79 (.77)	7.24 (.59)	
3-Month	1.89 (.53)	2.54 (.45)	2.29 (.34)	
6-Month	1.53 (.35)	2.32 (.44)	2.02 (.31)	
Days of illegal activity/last 30 days, mean (SE)				.007
Baseline	7.76 (.98)	7.69 (.82)	7.70 (.62)	
3-Month	.59 (.27)	2.27 (.53)	1.52 (.32)	
6-Month	1.22 (.40)	1.48 (.43)	1.37 (.30)	
Opiate-positive test, mean (SE)				.38
Baseline	.76 (.04)	.69 (.04)	.71 (.03)	
3-Month	.46 (.05)	.47 (.04)	.46 (.03)	
6-Month	.53 (.05)	.51 (.04)	.52 (.03)	
Cocaine-positive test, mean (SE)				.90
Baseline	.47 (.04)	.51 (.04)	.49 (.03)	
3-Month	.36 (.04)	.38 (.04)	.37 (.03)	
6-Month	.38 (.05)	.41 (.04)	.40 (.03)	
Meets DSM criteria for opiate dependence				.33
Baseline	.94 (.02)	.94 (.02)	.94 (.01)	
3-Month	.15 (.03)	.24 (.03)	.20 (.02)	
6-Month	.18 (.04)	.22 (.03)	.20 (.02)	
Meets DSM criteria for cocaine dependence				.63
Baseline	.45 (.04)	.34 (.04)	.41 (.03)	
3-Month	.12 (.02)	.10 (.03)	.11 (.02)	
6-Month	.14 (.03)	.07 (.02)	.11 (.02)	
Retained in buprenorphine treatment *				
3-Month	.76 (.04)	.74 (.03)	.75 (.03)	.70
6-Month	.62 (.04)	.58 (.04)	.59 (.03)	.47
Re-incarceration *				
6-month	19.1	15.0	16.8 (.02)	.36

Note: N = 300 at baseline, 287 at 3 months, and 279 at 6 months.

* p values for retention and re-incarceration are for differences between probationers/parolees and non-probationers/parolees.