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Buprenorphine Treatment for Probationers and Parolees

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Abstract

Background—Pharmacotherapy studies involving buprenorphine have rarely been conducted with US community corrections populations. This is one of the first reports of buprenorphine treatment outcomes of adult opioid-dependent probationers and parolees.

Methods—This longitudinal study examined the 3-month treatment outcomes for a sample of probation and parole clients (N=64) who received community-based buprenorphine treatment.

Results—Approximately two-thirds of the sample (67%) were still in treatment at three months post-baseline. Furthermore, there was a significant decline in the number of self-reported heroin use days and crime days from baseline to three months post-baseline. While there was not a significant reduction in reincarcerations, there was no evidence that they had increased.

Conclusions—Given that buprenorphine is approved by the FDA as a safe, effective treatment for opioid use disorders, individuals on parole or probation should have the opportunity to benefit from it through community-based programs.

Keywords

Buprenorphine treatment; probationers; parolees; opioid use

INTRODUCTION

In the United States, slightly less than five million adults were under community supervision by the criminal justice system in 2010, with approximately four million on probation and 840,700 on parole.¹ The current economic crisis has prompted many states to decrease costs by attempting to reduce incarceration and expand the role of community corrections.²

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AUTHOR CONTRIBUTIONS Drs. Gordon, Kinlock, and Schwartz were responsible for research conception and all aspects of the study. Mrs Couvillion and Ms. Sudec were responsible for collection of the data. Dr. O'Grady was responsible for data analysis, interpretation of the results, writing, and revision. Dr. Vocci was responsible for interpretation of the results, writing, and revision. Dr. Shabazz was responsible for writing and revision.

Pharmacotherapy studies involving buprenorphine have rarely been conducted with US criminal justice populations.³ Although previous research has been reported of buprenorphine treatment outcomes of individuals under criminal justice supervision in controlled settings,³⁻⁵ the present study is one of the first reports of buprenorphine treatment initiated in the community for probationers and/or parolees. Because individuals on parole and probation are in the community, they have a greater opportunity to use drugs and commit crime than those in a controlled environment.⁶

Parolees and probationers have disproportionately higher rates of substance use disorders than the general United States population⁶⁻⁸; however, most of these individuals do not receive substance abuse treatment.⁹ Furthermore, when parolees and probationers with opioid use disorders do enter treatment, they frequently drop-out of treatment before any longer-term benefits can be achieved.^{6,10} The rate of substance use among probation/parole populations, similar to that of prisoners, tends to be higher among women than men, with an estimated 68% of female probationers reporting lifetime drug use.¹¹

Buprenorphine Treatment for Opioid Use Disorders with Criminal Justice Populations

There have been several studies of buprenorphine treatment in criminal justice populations that have been initiated in controlled environments. In the first randomized controlled trial of buprenorphine in a jail setting, Magura et al.⁵ found that self-reported relapse to illicit opioid use, re-arrest, and severity of criminal behavior did not significantly differ at 3-month post-release between opioid dependent inmates randomly assigned to buprenorphine compared to methadone treatment during incarceration. Lee and colleagues⁴ found that newly-released jail inmates who began buprenorphine treatment during incarceration in that study had similar rates of treatment retention and opioid positive urine test results at 48 weeks post-release compared to individuals who began buprenorphine treatment as outpatients. Finally, in a small-scale random assignment study of women under criminal justice supervision in a residential drug treatment facility, those who received placebo compared to buprenorphine for 12 weeks were significantly more likely have opioid-positive by urine tests (92% vs. 33%) at the end of the treatment period.³

To our knowledge, although there have been a number of reports of opioid agonist treatment with methadone provided to probationers and parolees in the community,¹²⁻¹⁷ and relatively few reports of the opioid antagonist naltrexone in this population^{10,18,19}; there has been relatively little study of buprenorphine treatment among parole or probation populations outside of controlled environments. In a study by Wang et al.²⁰ of secondary analysis of patients treated with buprenorphine in a primary care office, they found that there were no significant differences in treatment retention between individuals with versus without a prior history of incarceration. In a secondary analysis of 300 African American opioid-dependent adults treated with buprenorphine in two outpatient drug abuse treatment programs, there were no significant differences between probationers and parolees and participants not under criminal justice supervision in terms of treatment retention, positive urine drug tests, or self-reported criminal activity.²¹ Because buprenorphine can be offered at locations other than opioid treatment programs, such as physicians' offices, community health centers, and outpatient drug treatment programs, these preliminary findings indicate that such treatment

might be useful to probationers/parolees as it could offer for them more scheduling flexibility to accommodate other requirements (employment, drug treatment, parole/probation visits).

Present Study

The present longitudinal observational study was conducted in the context of an ongoing NIDA-funded multi-site study (Criminal Justice Drug Abuse Treatment Studies; CJ DATS 2) to increase the number of referrals from parole and probation agencies to pharmacotherapy for substance use disorders. This parent multisite study is examining approaches to improve inter-organizational coordination that can, in turn, increase the volume of referrals of opioid-dependent individuals on parole or probation to community-based treatment that includes pharmacotherapy for alcohol or opioid dependence.²² Correctional agency representatives participating in this study expressed a need for data to support that the use of buprenorphine treatment for this population would be beneficial (in effect, worth the effort in making the inter-organizational linkages). This supplemental study was funded to provide data to address such concerns by examining treatment outcomes for a sample of probation and parole clients who received community-based buprenorphine (bup-naloxone) treatment. This report addresses two questions: (1) do probationers and parolees who participate in buprenorphine treatment show improvements in drug use and crime outcomes?; and (2) what factors are associated with better treatment outcomes?

METHODS

Treatment Sites

The treatment programs were all outpatient drug treatment programs. One operated within a community health center, one within a community mental health center, and one within an opioid treatment program (that provided buprenorphine and methadone). All programs were located in Baltimore City and had participated in previous studies involving criminal justice clients and opioid treatment.

Participants

Male ($n=54$) and female ($n=10$) probationers and parolees who met study eligibility criteria (see below) and provided their written informed consent to participate were included in the current study. Participants were recruited from November, 2011 through September, 2012. This study was approved by the Friends Research Institute's Institutional Review Board (IRB) and by the Maryland Department of Public Safety and Correctional Services (DPSCS) Research Committee.

Eligibility/Exclusion Criteria

Data for the present analyses were obtained from probationers and parolees who met the following criteria: (1) serving a minimum of three months remaining on probation and parole; (2) history of heroin dependence [meeting Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria]; (3) newly admitted (began dose induction) within two weeks of signing the consent form at one of the three treatment programs described above in Baltimore City; and (4) residing in Baltimore City.

Participant Screening and Recruitment

Two different strategies were used to recruit potential participants. Individuals were recruited at one treatment site, located in West Baltimore, by having the study's Research Assistant (RA) attend the weekly group counseling session to explain to potential participants the requirements for participation in, and potential risks and benefits of, the research. Afterward, the RA left a study flyer and business card for interested individuals to contact her to set up an appointment to discuss the research in more detail. At the other two treatment clinics (one located in Midtown Baltimore and the other in West Baltimore), the intake coordinator at each respective treatment center handed out a study flyer to all newly admitted clients, informing them of how they could contact the study RA directly to discuss the research study in more detail. Research staff conducted a brief screening interview to assess eligibility either in person or by phone for individuals who contacted the RA. After this initial screening, potential participants met with the study RA individually either at the treatment clinic or at the research center, whichever the potential participant preferred. After screening, interested individuals were next asked to provide their written informed consent, complete a number of baseline assessments (described below), and provide an unobserved urine drug sample.

Across the three study sites, 93 individuals were screened and 26 (28%) of these 93 were found to be ineligible for the following reasons: prescribed buprenorphine during the past year ($n=9$); not currently in buprenorphine treatment ($n=4$); did not attend study intake appointment ($n=4$); not on probation/parole ($n=3$); on unsupervised probation/parole ($n=2$); not a resident of Baltimore City ($n=2$); not enrolled in one of the three treatment programs mentioned above ($n=1$); or had less than 3 months remaining on probation/parole ($n=1$). Subsequently, 67 (72%) individuals provided consent and completed baseline assessments. However, following consent, two individuals were found to have misrepresented the fact that they had three months remaining on parole or probation and another individual misrepresented being treated with buprenorphine. These three individuals were subsequently withdrawn from the study. Thus, the final sample for the study included 64 of the 93 (69%) individuals who had an initial meeting with the project RA, and 64 of the 67 (95.5%) individuals who provided consent and completed baseline assessments.

Assessments

Individuals consenting to participate completed a baseline assessment, which consisted of several assessment instruments (described below) and provided an unobserved urine sample for drug screening. This baseline assessment was completed at some point within the participant's first two weeks of treatment, which was anywhere from day one to day 14 of buprenorphine dose induction. Afterward, at one-month post-baseline, participants provided an additional urine sample for drug screening (no assessment instruments were administered at this time). Subsequently, at three months post-baseline, participants were asked to provide a third unobserved urine sample for drug screening and to complete a series of assessment instruments.

Addiction Severity Index (ASI)—The ASI is a standardized, 40-60 minute clinical research instrument widely used in addiction research to quantify problem areas of alcohol/

drug use.^{23,24} ASI items used in the present study were the following self-report measures in the 30 days from the baseline interview, adjusted for days at risk (days at risk refers to those days in which an individual had full opportunity to use drugs and commit crime, excluding days spent in a controlled environment): (1) days reported using heroin, (2) days reported using cocaine, and (3) days reported committing criminal activity (excluding illicit drug use and/or possession).

Self-Report Questionnaire—A structured interview, in use in our previous and current research²⁵⁻²⁸, was utilized at baseline and three-months to obtain more detailed historical and in some cases, current information than obtained with the ASI regarding drug and alcohol use, psychological problems, criminality, criminal justice system supervision and sanctions, legitimate employment, and substance abuse treatment.

Urine Drug Testing—Urine testing with the Enzyme Multiplied Immunoassay Test (EMIT) was conducted at baseline and also, regardless of treatment status, at each follow-up point. Urine specimens were tested by Redwood Toxicology, a nationally certified laboratory and included tests for morphine, methadone, buprenorphine, cocaine, PCP, amphetamines, benzodiazepines, and marijuana.

Follow-up Rates

In terms of follow-up assessments, 89% completed one-month follow-up urine drug tests (missing data were as follows: 6 participants were incarcerated and one refused to provide a urine sample). Ninety-eight percent completed a three-month follow-up assessment and provided a urine sample for drug testing (one participant refused to be interviewed and to provide a urine sample). Participants received a urine drug screen at one-month post baseline ($Mean=31.5$; $SD=3.0$) and at three months post baseline ($Mean=92.7$; $SD=8.4$).

Outcome Variables

Five outcomes were examined in this study:

1. Retention in substance abuse treatment (yes v. no), measured at 1 and 3 months post-baseline [obtained from clinic records].
2. Opioid urine testing results (positive v. negative), measured at baseline and at 1 and 3 months post-baseline.
3. Self-reported heroin use during the past 90 days (ASI and supplemental questionnaire), measured at baseline and 3 months post-baseline. The ASI only captures the past 30 days, so we used the supplemental questionnaire to capture the additional 60 day time-period.
4. Self-reported crime days during the past 90 days (ASI and supplemental questionnaire), measured at baseline and 3 months post-baseline. The ASI only captures the past 30 days, so we again used the supplemental questionnaire to capture the additional 60 day time-period.
5. Self-reported reincarceration (jail or prison) during the past three months (yes v. no), measured at baseline and 3 months post-baseline [supplemental questionnaire].

Explanatory Variables

Four explanatory variables were chosen for inclusion in the model (see Rationale for Explanatory Variables, below). We chose those explanatory variables that we believed were important to understanding the outcomes; we also wanted to limit the number of explanatory variables because of the small sample size. The variables are as follows: gender; age at baseline assessment; age of onset of criminal activity (earliest age reported committing any of the following crimes that were inquired about at baseline): (a) homicide, (b) attempted homicide, (c) using a weapon to harm someone, (d) robbery, (e) assault, (f) rape, (g) carjacking, (h) hurt/torture animals, (i) vandalism, (j) forgery, (k) prostitution, (l) theft, (m) larceny, (n) burglary, (o) arson, (p) sell illicit drugs, and (q) illicit drug distribution (recorded from the ASI and supplemental questionnaire); and prior number of drug treatment episodes (lifetime drug treatment episodes from supplemental questionnaire).

Rationale for Explanatory Variables

Despite considerable research evidence for gender differences in substance abuse treatment needs, and much emphasis by researchers and practitioners that these differences are critical in delivering effective treatment to both men and women, these differences have rarely been examined in intervention outcome studies with criminal justice populations.²⁹ Given that, for heroin-dependent individuals, the peak age groups for drug use and criminal activity are in the late adolescent and early adulthood years, it is not altogether surprising that older age is associated with a lower likelihood of opioid and other substance dependence.³⁰ In the criminal justice literature, early onset of criminality is related to negative outcomes in treatment for substance use disorders.^{27,28} Finally, individuals with more experience with treatment tend to have better outcomes.³¹

Statistical Analyses

Using inferential statistics, we presented percentages for count variables and for continuous measures, we reported means at baseline, and 1 and 3-months post baseline where applicable. Because results were available on either two (interview data) or three (urine test data) occasions, Generalized Estimating Equations (GEE) analyses were conducted, with the addition of a repeated factor for assessment time point and with an unstructured covariance matrix for the time effect. Urine testing results, treatment status, and self-reported reincarceration were binary, and assumed to follow a binomial distribution. Heroin use days and crime days were count variables, assumed to follow a Poisson distribution. Analyses of these latter two variables allowed for overdispersion.

We took a two-step approach to evaluating our statistical model: (1) first, we fit a model that included the first-order interactions of each of the explanatory variables (mentioned above) with time in order to determine if change over the course of treatment was different for one or more of the explanatory variables, and (2) if none of the interactions in step 1 were significant, we then dropped all interactions from the model and re-fit the model with only main effects. This approach was taken to ensure we had the most parsimonious model given the small sample size.

RESULTS

Participant Characteristics

As shown in Table 1, most participants were male (84.4%), African American (95.3%), with a mean age of 47 years ($SD=5.8$), and 27 (42%) had less than a high school education. Just over four-fifths had at least one prior substance abuse treatment episode. Thirty-nine percent of the sample had previous experience with buprenorphine treatment while slightly less than three in ten participants reported having prior methadone treatment. Of those with past opioid maintenance treatment experience, 14.1% reportedly experienced both methadone and buprenorphine treatment. Participants, on average, initiated heroin use in their early twenties, approximately four years after their onset of criminal activity. In terms of drug use in the 30 days prior to the baseline study interview, participants reported using cocaine 16.5 ($SD=24.1$) days, marijuana 6.4 (16.1) days, and alcohol 10.8 (16.9) days. Participants had multiple incarcerations. More than half of the participants reported being self-referred to the most current treatment, although the remaining ones were referred by some entity of the criminal justice system. Slightly less than half the population reported being prescribed medications for some type of psychological problem other than opioid use disorder. While 74% were on probation, this only refers to the individuals' current criminal justice status, and the vast majority of them have had multiple experiences with the criminal justice system and juvenile justice system. Moreover, we examined all the variables in Table 1 in bivariate analyses to determine if there were any baseline differences by criminal justice status (probation vs. parole). Other than gender [100% of the women were on probation ($p<.05$)], all other $ps >.05$, indicating the populations were similar.

Outcomes

As shown in Table 2, the majority of participants were retained in treatment at 1 and 3 months post-baseline (73.4% and 67.2%, respectively). Only 25% of the participants tested positive for opioids at 1- and 3-months post-baseline, which was an increase from the baseline at 18%. However, the baseline assessment and research urine was administered at any time up to two weeks after dose induction, so urine results at time of admission to the treatment clinic were not collected and would probably have been much higher because the vast majority of newly-enrolling patients in buprenorphine treatment test positive for opioids.²¹ Participants reported reducing the number of days [mean (SD)] they used heroin in 90 days prior to baseline to the 3-month follow-up from 31.4 days (30.1) to 6.7 (25). In addition, the number of days in which participants reported committing crimes dropped from baseline of 12.6 days (25.9) to 8.9 days (23.1). Finally, 23.4% reported having been incarcerated between baseline and 3 month follow-up.

Retention in Treatment—As shown in Table 3, there was a significant interaction between age of onset of first criminal activity and assessment time point. The relationship between age of onset of first criminal activity and retention in treatment was non-significant at one month post-baseline ($OR=.98$; 95% $CI=0.92, 1.05$) but was significant at three months post-baseline ($OR=0.89$; 95% $CI=0.79, 0.99$), indicating that participants whose age of first criminal activity was later in life were more likely to be in retained in treatment at

three months post-baseline than participants who began crime at an earlier age. None of the explanatory variables were statistically significant (all $ps>.05$).

Opioid urine testing results—There were no significant first-order interactions (all $ps>.05$). The only significant explanatory variable was age, with older rather than younger participants more likely to be opioid-negative ($OR=1.08$; 95% $CI=1.002, 1.16$).

Heroin use days—There were no significant first-order interactions (all $ps>.05$). There was a statistically significant decline in self-reported days of heroin use from baseline to three months post-baseline ($OR=4.69$; 95% $CI=2.50, 8.80$). The only significant explanatory variable was lifetime number of drug treatment episodes, with participants having more prior treatment episodes reporting less days of use of heroin ($OR=.90$; 95% $CI=.83, .98$).

Crime days during the past 90 days—There were significant interactions between each of the four explanatory variables and time. Males declined slightly [$M_s=10.9$ ($SE=3.7$) $v.$ 8.8 ($SE=2.8$)] while females declined significantly more [$M_s=10.6$ ($SE=5.4$) $v.$.08 ($SE=.2$)] from baseline to three months. For age, although the relationship between past 90-day number of crime days and age was non-significant at baseline ($OR=1.00$; 95% $CI=.93, 1.08$), it was significant at three months post-baseline ($OR=0.91$; 95% $CI=.85, .97$), with increasing age related to decreasing number of past-90 number of crime days. Similarly for drug treatment episodes, the relationship between number of drug treatment episodes and past-90 day number of crime days was non-significant at baseline ($OR=.93$; 95% $CI=.80, 1.07$) but was significant at three months ($OR=1.19$; 95% $CI=1.04, 1.38$), with increasing number of past drug treatment episodes related to an increasing amount of crime. In contrast, age of onset of criminal activity was unrelated to past 90-day number of crime days at baseline ($OR=.92$; 95% $CI=.32, 1.02$) and at three months ($OR=1.06$; 95% $CI=0.97, 1.15$), with a change in the direction of the relationship from negative at baseline to positive at three months.

Reincarcerated (jail or prison)—There were no significant effects (all $ps>.05$). However, it should be noted that fifteen (23.4%) of the participants reported being incarcerated at any time during the three months post-baseline period. Of these 15 participants, 12 (80%) had discontinued treatment because of the incarceration.

Treatment Process Data

At the time participants provided informed consent, they had been receiving buprenorphine treatment for an average of 7.39 days ($SD=3.87$). In addition to the outcomes above, we were able to obtain treatment process data on 61 participants (95.3%). The majority of participants were attending intensive outpatient programs (IOP) [IOP, $n=46$ (75%) $v.$ outpatient [OP, $n=15$ (25%)]. Participants completed a mean of 26.8 ($SD=14.8$) individual and group counseling sessions. The mean buprenorphine dose at discharge or at the end of three months (when the study ended) was 13.8 mg ($SD=4.1$); doses ranged from 4mg to 24mg, which varied based on length of stay in treatment.

DISCUSSION

Probationers and parolees with opioid use disorders are a difficult and challenging population to treat and do not have high rates of treatment adherence.^{10,32} This lack of treatment completion is further compounded by the United States criminal justice system (e.g., probation and parole staff) and their lack of enthusiasm and willingness to refer individuals to opioid treatment such as buprenorphine.^{9,33,34}

Retention in Treatment

Approximately two-thirds of the sample (67%) were still retained in treatment at three months post-baseline. There was a significant decline in the number of heroin use days from baseline to three months post-baseline. This latter finding is consistent with the literature on community-based buprenorphine, summarized earlier, that longer stay in treatment is associated with reduced heroin use.^{35, 36, 21} Concerning retention in treatment and onset of criminal activity, it was not surprising that individuals with earlier ages of onset of crime were more likely to drop out of treatment early. The criminal justice and heroin addiction literature for many years has found that individuals with earlier age of onset of criminality tend to have patterns of crime that are more frequent, varied, and severe, and that continue over time despite addiction and treatment status.^{6,37,38} These individuals tend to be more non-compliant with rules, and, as summarized in the Introduction, tend to either not attend when referred to treatment or drop out very early in the treatment process. Also, with regard to crime-days, it has long been a finding that across societies and over time, males commit more crime than females.^{39, 40} This finding has, not surprisingly, extended to heroin-dependent individuals.^{6,38,41} Also, among both the general population³⁹ and among heroin-dependent individuals,^{6,38, 41} males tend to have much earlier onsets of crime, and early onset of crime is related to having more persistent patterns of criminality, regardless of addiction or treatment status.^{6, 39}

Opioid Urine Testing Results

With regard to opioid use drug testing results, older participants were significantly less likely to have positive urine screening results. This is consistent with many previous studies summarized by Inciardi⁶ and Epstein, Phillips, and Preston³⁰ that the peak years of active heroin use tend to be in the late teens, 20s, and 30s. However, because opioid use disorder is a chronic, relapsing disease, periods of relapse and remission often also occur in the 40s and 50s,^{30, 31} although the length of addiction periods tend to be shorter with increasing age. The 25% urine opioid positive rate was consistent with findings by Cunningham et al.⁴² in a study of buprenorphine treatment embedded within a community health center in New York City.

Heroin Days

Self-reported heroin use decreased sharply over time. This is in keeping with findings from clinical trials⁴³ and community treatment studies.²¹ Only 24% of urine opioid tests were positive at each follow-up point, which was in keeping with the reduction in self-reported days of use. Because the baseline urine sample was collected between 7 and 14 days from the initiation of buprenorphine treatment, it was not possible to document the drop in urine

opioid positive tests from prior to the start of buprenorphine treatment to follow-up. However, it was likely that the majority of urine tests at study entry were positive as that is typical of urine testing results in buprenorphine treatment,²¹ where an opioid positive drug tests or a negative test in combination with symptoms of opioid withdrawal are often requirements for initiating buprenorphine treatment.⁴⁴

Crime Days

It was found that the frequency of criminal activity for women declined significantly more than that for men from baseline to 3 months. This finding is not entirely surprising as such results have been found in other larger longitudinal studies.⁶ The similarity of the number of crime-days between men and women at baseline may have occurred because participants of both genders were heroin-dependent in the past month prior to baseline and it is common for both men and women, during periods of heroin addiction, to commit crime on a daily or near-daily basis.⁶ The difference in number of crime days at follow-up between the genders might have been attributable to research findings that indicate that men compared to women are more likely to have begun committing crimes prior to becoming drug dependent and for such individuals, criminal behavior often continues after abstinence from opioid use.^{6, 45}

Older participants, as expected, tended to commit fewer crimes than younger participants at three months post-baseline assessment. This is consistent with the literature on the relationship between participant age and heroin use and crime outcomes for individuals in substance abuse treatment, summarized earlier in this manuscript. Older participants were more likely to produce opioid-negative urine test results, so it was not altogether surprising that they were also more likely to commit fewer crimes three months after treatment entry.

Results indicating that participants with younger onsets of criminal activity were less likely to show a decline in crime from baseline to three months are also consistent with findings, summarized earlier in the manuscript, which show that such individuals (both in the general population and among persons who are heroin-dependent) tend to have patterns of crime that persist regardless of treatment and addiction status.

One result that was not consistent with the results of prior studies was the relationship between number of previous substance abuse treatment episodes and the change in the frequency of crime-days from baseline to three months post-baseline. We anticipated, consistent with the work of Scott and Dennis,³¹ that the more substance abuse treatment episodes one has, the better the outcome. However, in the current study, crime-days were more likely to decline for individuals with fewer prior treatment episodes. While it is difficult to explain this finding, it may be that this finding results from a participant sample consisting entirely of individuals involved in the criminal justice system.

Finally, it is possible that the results regarding reincarceration may not have been significant in view of the relatively small numbers of individuals who were reincarcerated. Perhaps because most participants were remaining in treatment, there were only a small percentage of individuals who had become incarcerated. Parole/probation compliance also may have contributed to the relatively low occurrence of reincarceration. Furthermore, 80% of those

15 participants not in treatment at three months had reported that they dropped out of treatment because they were reincarcerated.

As indicated above, relatively few studies have been conducted in the United States that investigated buprenorphine treatment outcomes among opioid dependent adults under community supervision. While the results of buprenorphine treatment initiated in controlled settings are encouraging,³⁻⁵ they may not be generalizable to studies conducted among individuals who start treatment as outpatients while under probation and parole. Given the greater number of individuals under community corrections supervision than in controlled environments, outcome research is needed for community-based treatment in these populations at risk for recidivism and relapse.

Limitations

A cautious interpretation of results is recommended in view of a number of limitations in the current study. First, the study consisted of a convenience group at three treatment clinics that provide buprenorphine treatment for heroin dependence in Baltimore, MD. Furthermore, as indicated in the Introduction, because Baltimore's rate of heroin use among incarcerated individuals is among the highest of any American cities, this could pose a major contextual difference compared to other cities in the US. This differential use rate could impact the external validity of the current findings. As such, there may be a lack of representativeness of other patients in those programs and those treatment programs may not be representative of such programs in other cities. In addition, probationers and parolees sampled were those enrolled in treatment, and therefore, they may not be representative of those opioid-dependent probationers not in treatment, including those who refused to attend treatment. Maryland's parole and probation policies in which the state Department of Public Safety and Correctional Services supervises both parolees and probationers may differ from other localities where municipal authorities may supervise some probationers. Hence, the present findings may not generalize to localities outside of Maryland in which sentencing, supervision, and parole policies may differ. Moreover, the lack of a control group should be an additional cause for caution in the interpretation of the findings. Furthermore, there was an imbalance in the number of participants between genders. The small amount of female participants in this study might limit the generalizability and the impact that gender has as an explanatory variable. Further, the majority of participants reported being self-referred rather than being mandated to treatment, making parole/probation status potentially incidental in terms of motivation and criminal justice supervision for these individuals. While individuals on parole generally differ from those on probation in terms of recent incarceration history and severity of violations,^{6,2} there is much variation, both within and across jurisdictions and parole/probation agents, with regard to the type and severity of sanctions and other responses to client behavior.^{6, 46} Since there are no data available on the inter-organizational relationships between probation and parole, we are unable to make any inferences about treatment pressure or joint case planning between the treatment and criminal justice systems. Finally, the period of observation over three months post-admission was relatively brief.

Conclusion

Despite the study limitations, the majority of this sample of probationers and parolees remained in treatment and decreased self-reported heroin use and crime days at 3 months after treatment entry. While there was not a significant reduction in reincarcerations, there was no evidence that they had increased. It is likely that this lack of change was due to the relatively short observation period. Given that buprenorphine is approved by the FDA as a safe and effective treatment for opioid dependence, opioid dependent individuals on parole or probation should have the opportunity to benefit from it through community-based programs. Future studies should examine randomized controlled trials of buprenorphine compared to other treatments for opioid disorder among probationers and parolees over longer time periods. Furthermore, examining other new medications, such as extended-release, injectable naltrexone (Vivitrol®) may present advantages due to less frequent dosing schedules (monthly). In addition, studies should examine criminal justice clients and staff attitudes towards buprenorphine in order to determine the feasibility, impact, and implementation of pharmacotherapy treatment for criminal justice populations.

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TABLE 1Participant Characteristics at Baseline ($N = 64$)

Variable	Total Sample
Male, n (%)	54 (84.4)
Race (African American), n (%)	61 (95.3)
Age (years), mean (SD)	46.6 (5.8)
Years of education, mean (SD)	11.3 (1.5)
Heroin use past 365 days, mean (SD)	145.9 (123.2)
Age of onset of heroin use, mean (SD)	20.8 (5.9)
Ever inject drugs (yes), n (%)	25 (39.1)
Other drug use past 90 days, mean (SD)	
Alcohol	10.8 (16.9)
Cannabis	6.4 (16.1)
Cocaine	16.5 (24.1)
Treatment Referral, n (%)	
Probation/Parole Office	19 (29.7)
Judge/Court	10 (15.6)
Self	35 (54.7)
Lifetime treatment episodes, mean (SD)	3.3 (3.4)
Previous methadone treatment (yes), n (%)	19 (29.7)
Previous buprenorphine treatment (yes), n (%)	25 (39.1)
Criminal Justice Status, n (%)	
Parole	17 (26.6)
Probation	47 (73.4)
Age of onset of criminal activity, mean (SD)	16.5 (7.5)
Lifetime incarcerations, mean (SD)	9.3 (14)
Prescribed medication for a psychological problem (yes), n (%)	30 (46.9)

TABLE 2**Outcome Variables by Assessment Point**

Outcome Variables	Baseline	1 month	3 month
Retention in Treatment, <i>n</i> (%)	-	47/64(73.4)	43/64 (67.2)
Opioid Urine Screening positive, <i>n</i> (%)	12/64 (18.8)	16/64 (25) ^a	16/64 (25) ^b
Heroin Days, <i>M</i> (SD) ^{c,d}	31.4/90 (30.1)	-	6.7/90 (18.3)
Crime Days, <i>M</i> (SD) ^{c,d}	12.6/90 (25.9)	-	8.9/90 (23.1)
Reincarceration, <i>n</i> , (%)	-	-	15/64 (23.4)

^a *Note.* One urine screen refusal.

^b Four urine screen refusals.

^c Baseline is past 90 days prior to consent.

^d Means for continuous measures may differ slightly from the multivariate analyses as some participants are excluded from multivariate analyses because of missing data.

TABLE 3Tests of Significance for Outcome Variables with Explanatory Variables ($N=64$)

	Treatment Status		Opioid Urine Screening		Heroin Days		Crime Days		Reincarceration	
	χ^2	p	χ^2	p	χ^2	p	χ^2	p	χ^2	p
Time	.04	.834	4.15	.126	23.24	<.001	.27	.603	.73	.394
Gender	.03	.859	.38	.536	.14	.712	4.13	.042	.17	.677
Age	1.22	.269	4.06	.044	.79	.373	2.69	.101	.13	.717
Number of prior drug treatment episodes	.11	.746	.11	.736	6.44	.011	.76	.382	1.57	.211
Age of onset of criminal activity	2.66	.103	.35	.556	.14	.707	.16	.688	1.84	.175
Time $\times$ gender	1.87	.172	-	-	-	-	3.86	.050	-	-
Time $\times$ age	1.65	.199	-	-	-	-	7.34	.007	-	-
Time $\times$ Drug treatment episodes	.37	.544	-	-	-	-	8.07	.005	-	-
Time $\times$ Onset of criminal activity	5.81	.016	-	-	-	-	5.33	.021	-	-

χ^2 is the Wald test. For the Time main effect and the interaction effects involving Time, $df=2$. For Gender, Age, Drug treatment episodes, and Onset of criminal activity, $df=1$.