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Factors Associated with Recidivism among Corrections-Based Treatment Participants in Rural and Urban Areas

Michele Staton-Tindall, Ph.D., M.S.W.[a,*], **Kathi L.H. Harp, Ph.D.**[b], **Erin Winston, M.A.**[c], **J. Matthew Webster, Ph.D.**[d], **Kevin Pangburn, M.F.T.**[e]

[a] University of Kentucky, College of Social Work, 659 Patterson Office Tower, Lexington, KY 40508

[b] University of Kentucky, College of Medicine, Department of Behavioral Science, 643 Maxwelton Court, Lexington, KY 40506-0350

[c] University of Kentucky, Center on Drug & Alcohol Research, 643 Maxwelton Court, Lexington, KY 40506-0350

[d] University of Kentucky College of Medicine, Department of Behavioral Science, 120 College of Medicine Office Bldg, Lexington, KY 40506

[e] Kentucky Department of Corrections, 2439 Lawrenceburg Rd., Frankfort, KY 40601

Abstract

The majority of corrections-based treatment outcome studies focus on individuals paroling to urban areas; thus there is a significant gap in the literature on outcomes, including recidivism, among individuals paroling to non-urban and rural communities. This study examines differences in factors associated with recidivism among former corrections-based treatment participants living in urban and rural communities following release. Analyses focused on secondary data collected from treatment participants in one southeastern state over a four year period between July 2006 and June 2010 including both baseline (treatment intake) and follow-up data (12-months post-release). Findings indicated that individuals in urban areas were 2.4 times more likely to recidivate than rural individuals. Other factors identified in separate rural and urban analyses also emerged as significant predictors in the overall model including age, gender, race, employment and drug use. Overall, these findings suggest that corrections-based treatment participants living in urban and rural areas following release may share similar risk factors for recidivism. However, rural areas may be protective for returning to custody despite the presence of some of these risks.

Keywords

Corrections-based treatment; Recidivism; Rural offenders; Treatment outcomes

* Corresponding author. Tel.: +1 859 312 8245. mstindall@uky.edu (M. Staton-Tindall).

1. Introduction

1.1. Drug use and crime

The substance use prevalence rate among criminal justice populations is five times higher than the general population (SAMHSA, 2009), and the relationship between drug use and crime has been well established in the empirical literature (e.g., Leukefeld, Tims, & Farabee, 2002; Nurco, 1998). A large majority (more than 80%) of incarcerated individuals report lifetime drug use, and more than half (53%) meet diagnostic criteria for substance use disorder (Mumola & Karberg, 2006). These high rates of drug use have been consistently noted across individuals in different criminal justice venues including jail, prison, and community custody/supervision (Staton-Tindall, Havens, Oser, & Burnett, 2011). Substance users typically become involved in the criminal justice system due to (1) possession of an illicit substance, (2) sale or illegal distribution of a substance, or (3) engaging in other illegal activity (i.e., theft, robbery) to support on-going drug use (NIDA, 2006).

1.2. Drug treatment among offenders

The National Institute on Drug Abuse has estimated that for every dollar spent on drug and alcohol treatment, there is a $4 to $7 reduction in the cost of drug-related crimes (NIDA, 2012). Therefore, it is not surprising to see recent increases in corrections-based substance abuse treatment with a particular interest in reduction of future crimes and recidivism. While substance use education and awareness is the most prevalent form of drug-related services in correctional agencies (Taxman, Perdoni, & Harrison, 2007), the treatment modality that has been consistently associated with sustained outcomes over time is the therapeutic community (TC). TCs have become a widely used framework for substance abuse treatment in prisons because they typically operate on the key principle that drug use is part of a larger, more complex behavior disorder and that behavior change depends on adoption of prosocial behaviors (De Leon, Melnick, Thomas, Kressel, & Wexler, 2000). Thus, TCs share similar behavior change philosophies as correctional institutions, making them an appropriate treatment modality for delivery within prisons and jails.

1.3. Targeted treatment outcomes

The literature examining outcomes of corrections-based TC treatment has consistently shown positive results for reduction of drug-use following release. One meta-analysis indicated that TCs were particularly beneficial in reducing drug use over time, along with related behaviors, when implemented in a criminal justice setting such as a prison (Fiestas & Ponce, 2012). In a longitudinal study, Inciardi, Martin, and Butzin (2004) found that TC participation was a robust predictor of sustained abstinence in the community at 42 and 60 months post-release from prison. Other outcome studies have indicated that TCs are effective not only at reducing drug use over time, but also result in improved post-release mental health outcomes among individuals with co-occurring disorders (Sacks, McKendrick, & Hamilton, 2012).

While reduction in drug use is an important primary outcome for substance abuse treatment, overall reduction in recidivism following TC treatment is also of particular interest to criminal justice administrators. One study found that TC program graduates

were significantly less likely than program non-completers to be reincarcerated six months post-release (Knight, Simpson, Chatham, & Camacho, 1997). TC programs that target specific needs among offenders, such as co-occurring substance use and mental health, have also shown positive outcomes for reducing recidivism (Sacks, Chaple, Sacks, McKendrick, & Cleland, 2012). In addition, even among TC graduates who may return to custody, they are likely to spend more time on the street than non-treatment participants (Prendergast, Hall, Wexler, Melnick, & Cao, 2004). TC outcomes related to recidivism have historically been shown to be strengthened by participation in aftercare programming in the community (Butzin, Martin, & Inciardi, 2002; Knight, Simpson, & Hiller, 1999; Wexler, Melnick, Lowe, & Peters, 1999).

The Pew Center on the States (2011) reported that national recidivism rates remained steady at approximately 40% between 1994 and 2007, but depending on the study sample, estimates have shown that between 40% and 70% of individuals released from prison will return to custody within three years (Durose, Cooper, & Snyder, 2014; Pew Center on the States, 2011). Research efforts focused on understanding factors associated with recidivism have largely focused on all released offenders and typically use assessments and measures of risk factors associated with returning to custody (e.g., Andrews & Bonta, 1995; Bonta, 1996). Among the strongest and most consistent predictors of recidivism for offenders, in general, include being non-white, male, younger, unemployed, and having a more extensive criminal background (e.g., Durose et al., 2014; Jhi & Joo, 2009; Yang et al., 2015). In addition, having family members involved in the criminal justice system or having less stable family relationships have been associated with recidivism (Gendreau, Little, & Goggin, 1996).

While factors associated with recidivism have been well-established in the literature for criminal justice populations in general, less emphasis has been placed on behavioral health factors related to recidivism among individuals participating in corrections-based TC treatment programs. Behavioral health factors such as substance use and mental health are viewed as behaviors that can be modified through treatment approaches (Gendreau et al., 1996); therefore, these factors may also be viewed as important indicators of success following corrections based treatment. Substance use and mental health, which could be perceived as dynamic risks, have received less attention in the recidivism literature because 1) they are often considered individual differences and may receive less attention among criminal justice professionals; 2) they change over time and change can be difficult to measure; and 3) they may not be viewed as priorities over criminal risk or public safety (Gendreau et al., 1996). Despite this gap in the recidivism literature, problems associated with substance use and mental health affect a significant percentage of incarcerated individuals. Recidivism has been shown to be higher among substance users (Gendreau et al., 1996), among offenders with mental health problems (Baillargeon, Binswanger, Penn, Williams, & Murray, 2009), and even higher among offenders with a co-occurring substance use and mental health disorders (Swartz & Lurigio, 2007).

1.4. Treatment outcomes among rural offenders

In addition to the limited research focus on behavioral health predictors of recidivism, there is also limited research on differences in these factors among offenders paroling to urban and rural areas. One study found that corrections-based treatment participants paroling to urban and rural areas of one state reported very similar patterns of relapse (Staton-Tindall et al., 2011). This same study reported that participants paroling to urban areas were significantly more likely to use community treatment aftercare following prison release than individuals paroling to rural areas. These differences in treatment outcomes, particularly behavioral health treatment, have been noted in other studies with significant disparities in urban and rural communities (Borders & Booth, 2007; Staton-Tindall, Duvall, Leukefeld, & Oser, 2007). It is possible that the dearth of existing health and behavioral health services in rural communities are associated with limited utilization and related outcomes. However, research is limited in understanding how behavioral health indicators, treatment utilization, and other factors affect recidivism among corrections-based treatment participants released to urban and rural areas.

1.5. Focus of the current study

With the majority of the recidivism literature focused on criminal justice populations in general and those paroling specifically to urban areas, there is a significant gap in the literature on differences associated with behavioral health treatment outcomes and recidivism among individuals paroling to non-urban and rural communities. Staton-Tindall et al. (2011) found that a slightly higher percentage of individuals paroling to urban areas were reincarcerated one-year post release compared to those paroling to non-metro communities. However, the analysis did not focus on predictors of recidivism and did not examine factors associated with recidivism specifically by geographic area. Considering the importance of relapse prevention and recidivism reduction as treatment outcomes, a better understanding of these factors is critical for re-entry planning following substance abuse treatment for offenders. The current study is guided by the following objectives: 1) describe rural and urban participants in correction-based substance abuse treatment; 2) examine differences in factors associated with recidivism among corrections-based treatment participants released to urban and rural areas; and 3) examine the unique contribution of geographic location as a predictor of recidivism among corrections-based treatment participants.

2. Material and methods

2.1. Participants

This analysis focuses on secondary data collected from participants in one state-based corrections substance abuse treatment in over a four year period. Data were collected from participants enrolled in substance abuse treatment during the final six to nine months of their sentence in seven prisons, nineteen jails, and one community custody program between July 2006 and June 2010. Baseline data were collected by treatment providers as part of their initial corrections-based treatment assessment and focused on the participant’s history of drug use, treatment, mental health, and criminal involvement prior to incarceration.

Follow-up data were collected by research staff one year after their release to the community (See Staton-Tindall et al., 2011 for more detail on study methodology). In order to be eligible for the follow-up sample, participants had to 1) be released from a corrections-based facility within the fiscal year study time frame, and 2) provide locator information of at least one community telephone number and address. Eligible participants were randomly selected for one-year follow-up in the community using a stratified design by prison, jail or community custody.

Data were included in this secondary analysis if participants had valid information for county of residence after release and completed both baseline and follow-up interviews. The final sample size for this analysis was 1,215.

2.2. Procedure

Substance abuse programs in the targeted southeastern state are grounded in a modified therapeutic community modality, and the study pre-posttest methodology is consistent with outcome studies for substance abuse treatment (Hubbard et al., 1989; Simpson, Joe, & Brown, 1997; Simpson, Joe, Fletcher, Hubbard, & Anglin, 1999). The study was approved by the university's Institutional Review Board (IRB), and participants were consented for follow-up data collection in the community one-year post release by research staff. All data were collected and stored in compliance with HIPAA regulations, including the use of encrypted identification numbers, and abbreviated birthdays (month and year) to secure confidentiality of protected health information.

Secondary data for this analysis focused on one-year post-release follow-up interviews for a sample of 1,215 substance abuse treatment participants released in 2007–2010. Of the total number randomly sampled for follow-up during this time period, some participants were ineligible (n = 54) because they had either moved out of state, were detained on other charges and not released or were deceased at the time they were located for follow-up. Of the 1587 participants randomly selected for follow-up, 1270 were successfully located and interviewed for a follow-up rate of 80%. Of the study participants who were not interviewed, reasons included refusals (3.2%) and being unable to locate (16.5%). Of the 1270 participants who completed both data collection points, 55 had missing data on at least one key variable of interest and were omitted from this analysis. Thus, the final sample size was n = 1,215.

2.3. Measures

Rural and urban variables were based on the population of the county that participants reported living in at the time of the one-year post-release interview. If the participant was incarcerated at the time of their follow-up, they were asked what county they lived in during the time they were not incarcerated. Beale codes were used to compare county population density/geographic areas. "Urban" was defined as "more densely populated areas" (Beale Codes 1–3), and "rural" was defined as "less densely populated areas" (Beale Codes 4 – 9). Beale codes (also called Rural-Urban Continuum Codes) have been used as a way to classify areas based on population size and adjacency to an urban area (US Department of Agriculture, 2003). Beale codes have been used in other studies focused on substance users

returning to rural and urban communities from prison (Oser et al., 2009; Staton-Tindall et al., 2011).

Recidivism was defined as being re-incarcerated in any state jail or prison for a technical parole violation and/or a new charge in the one-year post-release study follow-up period. The state Department of Corrections database was used to document reincarceration status, dichotomized as 1 = reincarcerated and 0 = not reincarcerated for analysis. The number of days the participant was "on the street" or living in the community prior to re-arrest was also collected from the database as well and used in the analysis as a continuous variable.

Behavioral health factors were defined as substance use and mental health during the one-year post-release period. *Substance use* measures included any self-reported use of illicit drugs during the one-year post-release period including amphetamines, cocaine, marijuana, opiates and tranquilizers. Dichotomous variables were created for each analysis where 1 = reported any use of the substance and 0 = did not report any use of the substance. Variables were also combined to indicate an overall measure of relapse to any illicit drug during the one-year post release period. *Mental health* was assessed using an indicator of self-reported depression symptoms during the one-year post release period. The variable was derived from the Addiction Severity Index (McLellan, Luborsky, O'Brien, & Woody, 1980) and questioned whether or not the person felt depressed during the one-year post-release period (1 = yes) or not (0 = no).

Treatment involvement prior to the corrections-based treatment program was also included. Specifically, *treatment history* was also examined as baseline reports of number of times in substance abuse treatment during a participant's lifetime (detoxification, outpatient, inpatient substance abuse treatment included). *Self-help* participation was also measured by asking whether any self-help groups (AA/NA) were attended during the one-year post-release period. This variable was coded as dichotomous variables (yes = 1, no = 0).

2.4. Analytic plan

Descriptive statistics were generated for each variable of interest. Next, bivariate analyses were conducted to determine significant differences between rural and urban participants at treatment intake and to examine differences among rural and urban individuals who returned to custody during the 12-month follow-up period compared to those who did not. chi-Square analyses and ANOVA were used to determine statistical significance. Finally, a logistic regression model was used to examine if geographic location (rural vs. urban) differentiated the odds of recidivism one-year post-release. Demographic and behavioral health variables were included as controls in this model.

3. Results

3.1. Sample profile

Descriptive statistics for the overall sample (n = 1215) are reported in Table 1. Slightly more than half (57%) reported living in an urban county in the one-year post-release period and 43% reported living in a rural county. Participants were 33.1 years old on average, they were mostly male (70%), more than three quarters were white (77%), and fewer than

half (42%) reported they had never been married. More than half of participants reported working during the one-year post-release period (53%).

Among the overall sample, 55.2% of participants reported any use of an illicit substance during the one-year post-release period. Rates of illicit substance use during this time were highest for marijuana (24.5%) followed by opiates (17.6%), cocaine (13.1%), tranquilizers (8%), and amphetamines (7%). More than three quarters (78.8%) reported having attended a self-help (AA/NA) group meeting in the past year at follow-up. Nearly 30% of participants reported having experienced depression during the one-year post-release period.

As shown in Table 1, primary study variables were also examined between rural and urban participants. Urban participants were significantly more likely than rural participants to be nonwhite ($p < .001$), to report never being married ($p < .001$), and to have been employed in the past year at follow-up ($p < .05$). Urban participants were also more likely to have a history of substance abuse treatment ($p < .001$) and were significantly more likely to have used cocaine in the past year compared to their rural counterparts ($p < .05$). Finally, urban participants reported more self-help group participation with 82.5% having attended a self-help group in the past year compared to 73.8% of rural participants ($p < .001$).

3.2. Rural and urban recidivism

There were differences in rates of recidivism between rural and urban participants. Specifically, urban participants were significantly more likely to have recidivated during the one-year post-release period (31% compared to 19.9% of rural participants, $x^2 = 18.93$; $p < .001$). Among recidivists, urban participants also had fewer days on the street before reincarceration with an average of 184.8 days on the street compared to the 210.4 days reported by rural participants ($t = -2.27$; $p < .05$).

Several significant differences emerged when examining bivariate differences between individuals who were reincarcerated during the one-year post-release period (See Table 2). Rural participants who recidivated were younger ($p < .001$), less likely to have been married ($p < .01$), and less likely to be employed ($p < .001$) compared to rural participants who did not recidivate. Additionally, rural recidivists reported more baseline criminal involvement ($p < .01$) and were more likely to have relapsed to drug use at follow-up ($p < .001$) compared to rural participants who were not reincarcerated. Rural participants (37.9%) were also more likely than urban participants (25.6%) to have returned to custody for a new charge compared to a parole violation ($p < .001$).

Urban recidivists were younger ($p < .05$), more likely to be male ($p < .05$), less likely to be employed at follow-up ($p < .001$), and more likely to have experienced serious depression in the past year ($p < .01$). Urban participants who recidivated were also significantly more likely to report using each type of illicit drug in the past year than urban non-recidivists (all $p < .001$).

3.3. Predictors of recidivism

As shown in Table 3, a logistic regression model was used to examine geographic location as a predictor of recidivism among corrections-based treatment participants. Findings indicated

that living in a rural county significantly reduced the odds of recidivism. Specifically, participants living in a rural county were 2.5 times less likely to be re-incarcerated during the one-year post-release period (OR = 0.43, 95% CI = 0.31–0.58. $p < .001$). Additionally, several of the control variables reached significance. Specifically, being older ($p < .01$), female ($p < .001$), non-white ($p < .01$), and employed ($p < .001$) significantly *decreased* the odds of recidivism at follow-up, while any relapse to illicit drug use *increased* the odds of reincarceration at follow-up by a factor of 2.53 (95% CI = 1.86–3.44, $p < .001$).

4. Discussion

The overall aim of this study was to examine factors associated with recidivism among individuals released to urban and rural communities following corrections-based treatment. This study contributes to the treatment outcome literature with a primary focus on recidivism as a treatment outcome, as well as the unique factors associated with rural treatment participants. The first objective of the study was to provide an overall description among corrections-based treatment participants from rural and urban communities. Findings indicated that there were demographic differences in that urban treatment participants were more likely to be non-white, unmarried, and employed than rural participants. These demographic differences have been reported elsewhere with consistency for a higher percentage of single, African American individuals in urban areas (e.g., Staton-Tindall et al., 2011). In addition, while other studies have also shown unique challenges to employment for offenders re-entering the community from prison (e.g., Visher, Debus, & Yahner, 2008) it is likely that employment opportunities for individuals in rural areas may be even more limited. In addition, individuals in rural areas were also less likely to report a substance abuse treatment history prior to corrections-based treatment, which is consistent with other studies focused on behavioral health service disparities in rural areas (Shaw et al., 2014; Staton-Tindall et al., 2007) and self-help groups (Oser & Harp, 2014). In addition to demographic differences, it should also be noted that abstinence rates during the one-year post-release period were not significantly different by rural and urban participants. Specifically, about 45% of participants overall were abstinent at the 12 month follow-up. These rate are consistent with other one-year studies on similar therapeutic approaches (e.g., Greenwood, Woods, Guydish, & Bein, 2001; Moos, Moos, & Andrassy, 1999; Prendergast, Hall, & Wexler, 2003). It is interesting, however, that while abstinence rates were similar for both rural and urban participants, urban participants were more likely to engage in lifetime substance abuse treatment and to participate in self-help groups following release. These findings suggest that future research should examine factors associated with recovery successes for rural participants that may be related to factors other than treatment.

The second study objective was to examine differences in factors associated with recidivism among urban and rural treatment participants. Findings overall indicated that urban treatment participants were significantly more likely to return to custody than rural treatment participants. In addition, among individuals who returned to custody, urban treatment participants were on the street significantly fewer days before being reincarcerated. This study also found that rural participants were more likely to return to custody for new charges compared to urban participants. This finding has not been reported elsewhere, and should be a focus of future research. On the contrary, higher rates of recidivism more generally among

individuals paroling to urban areas have been reported in other re-entry studies (e.g., Stahler et al., 2013; Staton-Tindall et al., 2011). However, understanding the differential association of critical factors associated with recidivism among rural and urban individuals has not been examined.

This study included separate examinations of recidivism factors for urban and rural treatment participants. Several recidivism factors emerged in both analyses including age, employment, and relapse to drug use. The effect of being younger and unemployed has been noted in other studies examining recidivism more generally (e.g., Gendreau et al., 1996; Jhi & Joo, 2009). In addition, while other studies have demonstrated drug use as a contributor to recidivism overall for criminal justice samples (e.g., Gendreau et al., 1996), it is vital to examine the extent to which relapse is related to reincarceration among former participants in corrections-based treatment. Findings in this study indicate that across different types of drugs and across geographic locations, relapse to substance use is a robust predictor of recidivism. Therefore, success of corrections-based substance abuse programs should be measured not only in terms of substance abuse outcomes, but also through factors that have prime interest among criminal justice administrators such as recidivism.

While there were noted similarities in recidivism factors among urban and rural participants, there were also noted differences. For example, men were significantly more likely to return to custody than women in urban areas, while there were no gender differences in rural areas. In addition, self-reported depression was also a significant correlate of recidivism among urban individuals but not rural individuals. These findings are not surprising in that other studies have reported that men are more likely to recidivate than women (Durose et al., 2014; Stahler et al., 2013; Yang et al., 2015) and that mental health issues can be a significant predictor of recidivism (Baillargeon et al., 2009; O'keefe & Schnell, 2007). However, the uniqueness of these findings for urban areas compared to rural areas should continue to be examined in future treatment outcome research.

Among rural treatment participants, marital status was a significant predictor of recidivism. Specifically, individuals who had never married were more likely to recidivate. This finding is potentially related to the importance of social bonds and social norms around kinship and relationships that are possibly more common in rural areas. However, this finding is also in contrast to other studies which found marital status to be more predictive of treatment outcome success among urban drug court participants (Mateyoke-Scrivner, Webster, Staton, & Leukefeld, 2004). Perhaps in considering community re-entry from prison to rural areas, there is a unique importance of marital status and health relationships.

In addition, criminal history was also more closely associated with recidivism among rural treatment participants. Past criminal behavior has been consistently noted as a predictor of future recidivism (e.g., Durose et al., 2014; Gendreau et al., 1996; Yang et al., 2015). However, the uniqueness of this relationship for rural individuals is interesting in this study. It is possible that individuals who have been more regularly involved in the criminal justice system in rural areas are uniquely stigmatized and law officials are less tolerant of parole violations committed by these individuals. If this is the case, re-entry policy planning might

focus on specialized supervision for more criminally involved rural individuals. This should be a focus of future research.

The final objective of this study was to examine the unique contribution of geographic location in a larger model of recidivism factors. Recidivism factors which were significant at the bivariate level were included in a regression model with rurality as an individual predictor. Findings indicated that, even with other variables in the model, individuals from urban areas were significantly more likely to recidivate than rural individuals. Other factors identified in the separate rural and urban analysis also emerged as significant predictors in the overall model including age, gender, race, employment and relapse to any form of illicit drug use. In additional analyses (not shown), rurality was explored as a moderator of the relationship between each of these factors and recidivism, and there were no significant findings. Overall, these findings suggest that while urban and rural treatment participants may share similar risk factors for recidivism, living in a rural area may be protective for returning to custody despite the presence of some of these risks, including relapse which has been shown to be a strong and robust predictor of recidivism (Staton-Tindall et al., 2011).

4.1. Limitations

The study has noteworthy limitations. First, findings from this secondary data analysis must be interpreted with a clear understanding of the data collection methodology which included self-reported data at treatment intake in corrections-based treatment programs and self-reported follow-up data collected approximately twelve months following release to the community. While self-report drug use data were examined using reliability checks through the state database for positive probation and parole drug screen data, self-report data is a potential limitation. Reliability checks revealed less than 10% discrepancy in self-report data and offender records reporting for positive drug screens.

Another limitation is that this secondary data analysis includes records collected from separate cohorts of treatment respondents during the four-year study period. While this is strength with regard to sample size and increasing generalization of findings, there were also slight measurement changes over time that led to elimination of key variables in the model which might have impacted recidivism. For example, other studies have shown that corrections-based treatment can be strengthened by community treatment utilization during the re-entry period (Butzin et al., 2002). Measurement on community behavioral health treatment changed from year one of this analysis to year three, eliminating that as a potential variable of interest. Considering the limitations in availability and accessibility of treatment in rural areas, this should certainly be considered as a variable in future research on treatment outcomes and recidivism.

Finally, while representative of the overall sample of offenders in corrections-based treatment in the target state, less than one-third of this sample was female. Studies have shown that women represent one of the fastest growing groups within criminal justice settings (Travis, Western, & Redburn, 2014), and women’s substance abuse issues can be more severe than men’s (for a review, see Greenfield, Back, Lawson, & Brady, 2010). Women are also like to have unique challenges during the re-entry period which may be related to trauma, mental health, child reunification, employment, and other family-related

concerns. Therefore, it is important in future studies examining treatment outcomes among rural and urban offenders to over-sample women when possible.

4.2. Conclusions and implications

Despite these limitations, these data are important because they highlight the importance of recidivism as a primary outcome of corrections-based substance abuse treatment. While offenders learn valuable skills related to relapse prevention and maintaining sobriety during corrections-based programming, being able to implement those skills during the transition to the community can either be threatened by or enhanced by the support of the re-entry community environment. Urban areas are likely to provide increased resources and opportunities for housing, employment, and behavioral treatment during community re-entry compared to rural areas. Despite having increased access to those resources, urban offenders in this study were more likely to return to custody compared to rural offenders. These findings potentially highlight differences in criminal justice and community supervision practices in rural areas. Findings may also highlight increased resilience and protective factors associated with recidivism that are culturally unique in rural areas – such as closely knit social support networks. Identification of the unique factors associated with recidivism in rural and urban communities increases awareness for re-entry planning following corrections based treatment. Planning for re-entry should be individualized to each individual, and should include recognition and awareness of the available resources in the community.

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Table 1

Descriptive statistics for all participants (n = 1215).

	Total sample % or mean	Rural n = 518	Urban n = 697	Test statistic[a]
Demographics				
Age	33.1	33.3	32.9	−0.82
Female	29.8%	27.8%	31.3%	1.72
Nonwhite	22.9%	11.4%	31.4%	67.57***
Never married	42.3%	32.6%	49.5%	34.66***
Employed full or part-time	53.3%	68.3%	73.3%	3.59*
Baseline arrests (past year)	2.1	2.0	2.1	0.49
Behavioral healthfactors				
Depression during one-year post-release	29.8%	29.7%	29.8%	0.01
Illicit substance use during one-year post-release				
- Amphetamines	6.9%	7.7%	6.3%	0.92
- Cocaine	13.1%	10.6%	14.9%	4.84*
- Marijuana	24.5%	23.2%	25.5%	0.90
- Any opiate	17.6%	19.7%	16.1%	2.69
- Tranquilizers	8.6%	8.9%	8.5%	0.07
Relapsed to any substance during one-year post-release	55.2%	54.6%	55.7%	0.13
Treatment utilization				
Any lifetime substance use treatment	61.6%	56.4%	65.4%	10.29***
Any AA/NA attendance during one-year post-release	78.8%	73.8%	82.5%	13.61***
Recidivism				
Any return to custody	26.3%	19.9%	31.0%	18.93**
Average days on the street before re-arrest (n = 319)	196.5	210.4	184.8	2.27*

[a]Note: test statistics represent significant differences between rural and urban participants using X^2/t-scores with

*p < .05;

**p < .01;

***p < .001.

Table 2

Comparisons between urban and rural recidivists and non-recidivists.

	URBAN recidivism			RURAL recidivism		
	YES n = 216	NO n = 481	Test statistic[a]	YES n = 103	NO n = 415	Test statistic[a]
Demographics						
Age	32.1	33.3	1.81*	30.8	34.0	3.37***
Female	25.5%	33.9%	4.92*	20.4%	29.6%	3.52
Nonwhite	28.2%	32.9%	1.47	6.8%	12.5%	2.69
Never married	53.7%	47.6%	2.22	43.7%	30.0%	7.16**
Employed full or part-time	50.5%	83.6%	83.54***	52.5%	72.3%	15.05***
Baselinearrests (pastyr)	2.3	2.0	−1.07	2.6	1.9	−2.08**
Behavioral healthfactors						
Depression in one year post-release	36.6%	26.8%	6.78**	32.0%	29.2%	0.32
Relapsed to any drug during one year post-release	69.4%	49.5%	24.07***	79.6%	48.4%	32.36***
Drug use one-year post release						
- Amphetamines	13.0%	3.3%	23.41***	19.4%	4.8%	24.68***
- Cocaine	23.6%	11.0%	18.62***	26.2%	6.8%	32.95***
- Marijuana	34.3%	21.6%	12.52***	45.6%	17.6%	36.45***
- Any opiate	27.3%	11.0%	29.35***	38.8%	14.9%	29.80***
- Tranquilizers	15.7%	5.2%	21.39***	22.3%	5.5%	28.74***
Treatment utilization						
Any lifetime substance use treatment	63.9%	66.1%	0.33	63.1%	54.7%	2.37
Any AA/NA attendance at FU	80.6%	83.4%	0.82	72.8%	74.0%	0.06

[a]Note: Significance is based on chi2/f-score tests at the within group level comparing urban and rural individuals who recidivated (YES) to individuals who did not recidivate (NO). Significance is interpreted as

*p < .05,

**p < .01, and

***p < .001.

Table 3

Logistic regression models examining predictors of recidivism.

	Odds ratio	95% CI
Age	0.97**	0.96–0.99
Female	0.53***	0.37–0.74
Non-white	0.58**	0.40–0.83
Employed full or part-time	0.21***	0.16–0.29
Never married	1.19	0.87–1.64
# times in substance use treatment (lifetime)	1.01	0.94–1.08
Past year AA/NA attendance at follow-up	1.13	0.80–1.60
Rural	0.43***	0.31–0.58
Relapsed to substance use	2.53***	1.86 – 3.44
Number of past year arrests	1.03	0.99–1.08
Depression	1.09	0.80–1.49
Number ofobservations	1215	
Wald chi-square	199.22	

* = p < .05;

** = p < .01;

*** = p < .001.