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Determinants of Successful Treatment Outcomes among a Sample of Urban American Indians/Alaska Natives: The Role of Social Environments

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Abstract

Very few studies have analyzed the role of social environments on substance abuse treatment outcomes among urban American Indians/Alaska Natives (AI/ANs). This study examined a measure of positive treatment response—abstinence from substance use at treatment discharge—among urban AI/ANs in Los Angeles County. The sample included all AI/ANs in outpatient drug-free (e.g., no methadone) treatment and residential treatment from 2004–2008 (N = 811).

Predictors of abstinence at discharge were (a) having recovery-oriented social support and (b) not having a difficult living situation, i.e., experiencing family conflict and/or living with someone who uses alcohol and/or drugs. Higher levels of recovery-oriented social support in the past 30 days predicted abstinence during outpatient treatment. In residential treatment, retention of 90 days or more, high recovery-oriented social support, and not experiencing difficult living situations predicted abstinence. Suggestions for optimizing treatment outcomes among AI/ANs and areas of further research are provided.

Keywords

American Indians; Alaska Natives; substance abuse treatment; gender differences; treatment performance

Introduction

Little is known about how urban American Indian and Alaska Native (AI/AN) adults respond to publicly funded substance use disorder treatment programs. This gap in knowledge is significant because a majority of AI/ANs live in urban areas today.¹ Los Angeles County, in particular, is home to the second largest population of AI/ANs in the United States.^{1,2} Examination of treatment response among this population is critical because AI/ANs are more likely to have alcohol and illicit drug use disorders compared with other racial/ethnic groups in the United States.^{3,4} A recent study of at-risk AI/ANs in Los Angeles County found that, compared to all other ethnic/racial groups, AI/ANs reported a significantly younger age of onset of alcohol, marijuana, methamphetamine, and other drug use, and a higher mean number of illicit drug injections in the past 30 days.⁵ Thus,

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Conflict of Interest

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understanding potential predictors of positive in-treatment outcomes may optimize treatment interventions and reduce substance use-related health risks for urban AI/ANs.

A few evaluation studies of publicly funded treatment systems have reported that AI/AN adults responded well to mainstream substance use disorder treatment programs, evidenced by improvements in alcohol and drug use, family relations, physical health, and mental health.^{6,7} While AI/AN adults appear to do as well as adults from other racial/ethnic groups in substance use disorder treatment,⁷ very little empirical data exists on specific therapeutic processes that contribute to abstinence and other indicators of treatment success among AI/AN adults. To date, only one study has examined predictors of positive treatment outcomes for AI/AN adults. In a study of treatment outcomes among AI/AN women receiving residential treatment in Arizona, Chong and Lopez found that having more positive life events and attending self-help groups were associated with remission from alcohol use.⁸ Predictors of relapse included having poorer family relations at admission, polydrug use, being around others who used drugs or alcohol, and experiencing cravings. The present article adds to the current knowledge of treatment outcomes among AI/ANs by examining predictors of abstinence during treatment (demographic, social-environmental, and treatment retention). Abstinence during treatment represents positive progress toward the improvement of a patient's health and functioning.⁹ Moreover, information on patient progress in treatment is critical for monitoring treatment quality, identifying patient needs, and providing services to meet these needs.⁹

The present analysis is informed by social learning theory and social support theory, which are based on the reciprocal relationships between individuals and their social environments. The interpersonal relations between individuals and their family, friends, and peers are the social environments most proximal to the individual. Social learning theory proposes that individuals' behavior is shaped through their interactions with others in their personal social networks, e.g., family and peers. Social learning theory would predict that an individual's substance use behavior develops as a result of their interactions with family and friends who model substance use behaviors and provide positive reinforcements that encourage substance use.¹⁰ Social learning processes to counter these effects are commonly integrated into treatment models. For instance, providing patients with opportunities for recreational activities that do not involve alcohol and drug use allow peers to model attitudes and behaviors that support abstinence and recovery. Social learning and social support theories were chosen as general frameworks for this analysis because literature on substance abuse and AI/ANs has found evidence of the protective effects of family and community ties on individuals' health and well-being.^{11,12}

Close ties within families or communities may foster better health through mechanisms of social support, shared norms, and social control.¹³ With respect to recovery from addiction, having a partner, i.e., any adult household member to whom one feels close, can protect patients from relapsing, even after controlling for demographics, differences in primary drug use, and level of social integration.¹⁴ Recovery-oriented social support from peers functions as a social resource that promotes recovery by lowering one's risk of relapse.^{14,15} Such support includes emotional (e.g., nurturance) and instrumental (e.g., financial assistance) support that facilitate one's recovery from addiction.¹⁶ Studies have documented the benefits of 12-step participation as a form of recovery-oriented social support in diverse treatment populations;^{17–20} however, these studies did not assess the role of recovery-oriented social support among AI/AN adults.

Social connections with family members and peers are not always associated with positive health outcomes. For example, family conflicts can represent an absence of social support or "negative support." Another social connection that can be counterproductive for people in

treatment is living with or having close ties to others who abuse alcohol or drugs. Social contexts such as family conflict, abusive relationships, and minimal contact with others in recovery can function as environmental risks that put patients at risk for poor treatment adherence and subsequent relapse.^{14,15,21} For example, Knight and Simpson found in a sample of Caucasian, African American, and Hispanic heroin users that family conflict and peer deviance predicted frequency of injection drug use and illegal activity during treatment.¹⁵ Moreover, in a study of AI/AN women in substance use disorder treatment, researchers found that being in the presence of people who use alcohol and drugs, including one's family, and being in conflict with others were associated with relapse 1 to 3 years post-treatment.⁸

Substantive theories are emerging to explain the health-promoting role of positive social relationships for AI/ANs with substance use disorders.^{12,22} Walters, Simoni, and Evans-Campbell posit that social relationships, particularly close ties to family and community members, are thought to mitigate the impact of traumatic experiences on the development and persistence of harmful substance use among AI/ANs.¹² Research on substance use disorders among AI/ANs has shown an association between substance abuse and a history of multiple forms of trauma, including historical trauma and childhood abuse.^{23–25} For example, urban AI/AN women with alcohol or drug dependence experience social stressors resulting from domestic violence and trauma due to childhood physical and sexual abuse.²⁶ In sum, more treatment evaluation studies are needed to examine the impacts of social environments on treatment outcomes for urban AI/AN adults.

Using administrative data from the Los Angeles County Department of Public Health, Substance Abuse Prevention and Control (SAPC), this study examined the socio-demographics of patients who received treatment in outpatient and residential settings. To explore the role of social environments on abstinence during treatment, the associations between abstinence and two social environmental variables available in the administrative database were tested: (1) recovery-oriented social support from family, friends, and/or peers, and (2) difficult living situations, which include the experience of family conflict and living with someone who uses alcohol and/or illicit drugs. The analysis focuses on publicly funded drug-free (e.g., no methadone) outpatient and residential programs. The study hypothesized that individuals who had a high level of recovery-oriented social support while in treatment would have a higher probability of abstinence at discharge. Conversely, the study hypothesized that having difficult living situations would have a negative effect on abstinence.

Methods

Sample

The sample was drawn from the Los Angeles County Participant Reporting System (LACPRS) database, administered by SAPC. Treatment admission and discharge data from 2004–2008 were pooled to obtain the largest possible sample. The study focused on drug-free outpatient and residential treatment because these settings treat the largest numbers of AI/ANs and they share similarities in terms of their drug-free orientation, i.e., they do not use medication-assisted treatment. AI/AN adults 18 years or older at the time of admission who were treated in residential or outpatient settings and who received services for at least 1 day were included in the sample. AI/AN ethnicity was based on self-report; information on tribal affiliation was not available. The sample comprised 811 admissions. LACPRS data are anonymous and, therefore, it was not possible to determine the number of unique patients in the sample. However, for simplicity, this article describes the sample as consisting of “patients” as opposed to “admissions.” The present study was conducted under the auspices

of the Los Angeles County Evaluation System, which has been approved by the UCLA Institutional Review Board.

Forty-nine percent of the patients in the study were treated in outpatient settings and 51% in residential settings. The majority of AI/AN patients received treatment for alcohol use and methamphetamine use (34.5% and 31.1%, respectively). Heroin, cocaine, and marijuana users made up approximately one third of the patient population. A small fraction (2%) of the sample reported primary drug problems with a range of other substances including other amphetamines, PCP, hallucinogens, tranquilizers, and OxyContin. Due to their low numbers, patients reporting other primary drugs were dropped from the analysis, reducing the sample to 792 adults.

Measures

Administrative data from the Los Angeles County Participant Reporting System (LACPRS) were used for this study. LACPRS was developed by SAPC and designed as a brief assessment of patient health and treatment participation. Measures collected in LACPRS correspond to measures required by the California Outcome Monitoring System (CalOMS) as well as the National Outcome Measures (NOMS) collected by the Substance Abuse and Mental Health Services Administration. Many of the questions in LACPRS were based on the Addiction Severity Index (ASI). Information was collected on patients' demographics, substance use/abuse history, current substance abuse behaviors, and a range of other health-related variables. The demographic variables included sex, race/ethnicity, and age, as well as the presence of a disability, veteran status, and homeless status at treatment admission and discharge. The substance use questions assessed patients' primary and secondary substances of abuse, including routes of administration, frequency of use, and age at first use. Diagnostic information on substance use and mental health disorders are not assessed in LACPRS. Additional health-related variables gathered information on patients' medical and psychiatric problems and treatment, employment related activities, legal issues, and family conflict. LACPRS questions were administered by program staff for each individual who was admitted to and discharged from a publicly funded substance abuse treatment program in Los Angeles County. LACPRS requires treatment providers to enter data directly into SAPC databases via the Internet. LACPRS has been used to examine patient outcomes in Los Angeles County for almost a decade.

The dependent variable, abstinence at discharge, is based on the LACPRS question that asks patients to report the number of days that they had used their primary drug in the past 30 days. Independent variables were selected based on their identification as salient predictors of treatment outcomes in the literature and the availability of relevant measures. Given limited clinical data, circumstances hypothesized to predict abstinence during treatment were clustered into three main areas: demographics, retention in treatment, and social environments. Demographic variables included gender, age at admission, high school education, employment status, having one or more children under 18 years, criminal justice involvement, primary drug problem (alcohol, heroin, methamphetamine, cocaine, and marijuana), age at onset of primary drug use, number of days of primary drug use in the 30 days prior to admission, number of prior treatment admissions, and reported mental illness diagnosis in one's lifetime. The treatment retention measure was the number of days from admission to discharge or the last day of face-to-face service. Because retention was highly skewed, it was categorized as follows: less than 1 month, 1–2 months (30–59 days), 2–3 months (60–89 days), and 3 or more months (90 days or more).

Social environmental measures included being homeless at admission, social support at discharge, and difficult living situation. Social support is defined in LACPRS as participation in recovery-oriented activities, e.g., 12-step meetings, other self-help meetings,

or interactions with family members and/or friends supportive of recovery. The social support variable was dichotomized at the median of 13 days (0–12 days = low social support, 13+ days = high social support). The difficult living situation measure was constructed from responses on two variables: experiencing serious family conflict in the past 30 days and living with an alcohol/drug user in the past 30 days. Having a difficult living situation was based on having at least 1 day of serious family conflict and/or living with an alcohol/drug user. With the exception of being homeless, which was binary, family conflict, living with a user, and social support were measured as the number of days reported in the past 30 days. These variables were dichotomized to account for their skewed distributions.

Analysis

The description and comparison of characteristics between outpatient and residential treatment groups in this study covers the full sample. The examination of predictors of abstinence is based on 792 patients who reported either alcohol, marijuana, heroin, methamphetamine, or cocaine as their primary drug. Residential and outpatient treatment settings were examined separately because these two modalities differ by duration (outpatient having longer duration), structure (residential having more constraints on patient behavior), and content (residential having different types of activities). Patient characteristics in outpatient and residential treatment were compared using chi-square for categorical variables and *t* tests for continuous variables. Binary multivariate logistic regression was employed to predict the probability of abstinence at treatment discharge. The employment measure was dropped from the analysis due to the small number of patients who were employed at least part-time. To examine the main effects of social environments on the probability of abstinence, three models were tested in a stepwise sequence: the first with demographic predictors, the second adding treatment retention, and the third adding the two social environmental predictors. The variables on which patients in the sample and patients excluded from the sample differed were included as covariates. The significance level for all analyses was set at .05; SPSS v.19 was used for all analyses.

Results

Sample Characteristics

As shown in Table 1, slightly more than one half of the patients were male and fewer than 10% were employed at least part-time at admission. One third of the patients were homeless at treatment admission and half were involved with the criminal justice system. Approximately 42% of the patients stayed in treatment for 90 days or more.

Gender differences were found in some areas but not in others. Men were significantly more likely to report alcohol as their primary drug than were women (43% vs. 22.5%, respectively). Women reported significantly higher rates of methamphetamine and cocaine use than did men (38.6% vs. 25.8%; 19.2% vs. 9.6%). Reports of heroin and marijuana use as primary drugs were not significantly different for men and women. Age at first use was 2 years higher for men. More women were treated in outpatient facilities, whereas more men were treated in residential. Men were more likely to report greater recovery-oriented social support. No gender differences in treatment retention (30, 60, or 90 days) or abstinence at discharge were found.

Differences in Patient Characteristics by Treatment Setting

Significant differences between patients in outpatient and residential treatment settings were found. Outpatient treatment programs had a higher proportion of patients that reported ever being diagnosed with a mental illness. More patients were in residential treatment for alcohol use, whereas outpatient programs served more with methamphetamine and

marijuana disorders. Levels of social support were significantly higher among patients in residential settings. Overall, 11.5% of patients reported experiencing a difficult living situation, as defined by having a serious family conflict or living with an alcohol and/or illicit drug user in the past 30 days. No significant difference between outpatient and residential treatment programs was found for patients in regard to difficult living situations. Outpatient and residential programs differed significantly in their retention of patients in treatment. In particular, patients in outpatient programs were more likely to remain in treatment for 90 days or more than were their counterparts in residential treatment (45.8% vs. 38%, respectively).

Predictors of Abstinence at Discharge from Outpatient Treatment

Results from the logistic regression analyses are presented for outpatient treatment in Table 2 and for residential treatment in Table 3. For outpatient treatment, no demographic variables were predictive of abstinence in Model 1 (demographics only). In Model 2 (demographics plus retention), treatment duration was also insignificant among outpatient patients. When the social environmental predictors were included in the third model, only high recovery-oriented social support was significant (OR: 3.52, 95% CI: 1.16–10.71).

Predictors of Abstinence at Discharge from Residential Treatment

For residential patients, the number of days of primary drug use at admission was associated with slightly lower odds of abstinence during treatment in Model 1 and Model 2. In contrast to outpatient treatment, treatment retention of 30 days or more was a significant predictor of abstinence in residential treatment. Model 2 shows that the odds of being abstinent for patients who stayed in residential treatment for 90 days or more was more than 10 times the odds of patients who were retained less than 1 month (Model 2, OR: 10.29, 95% CI: 4.43 – 23.93). When the social environmental predictors were added in Model 3, the magnitude of retention as a predictor of abstinence was reduced, although still high. As expected, a difficult living situation reported at discharge and high recovery-oriented social support at discharge were significant predictors of in-treatment abstinence in Model 3, even after controlling for individual characteristics and retention. Patients in residential treatment who reported a high level of recovery-oriented social support had 2.61 times the odds of being abstinent than did patients who reported a lower level of support (95% CI: 1.22–5.58). Not having a difficult living situation was also strongly protective of abstinence during treatment. The odds of abstinence for patients who did not suffer from difficult living situations were 7.54 times the odds of abstinence for patients who did experience either serious family conflict and/or living with someone who uses alcohol and/or illicit drugs (95% CI: 2.74–20.70).

Discussion

This study contributes to the sparse literature on urban AI/AN adults receiving publicly funded substance use disorder treatment. The majority of AI/AN adults in publicly funded substance use disorder treatment in Los Angeles County appeared to respond well to mainstream treatment services in outpatient and residential settings. Approximately 80% men and women were reported to be abstinent at treatment discharge, and approximately 42% were engaged in treatment for at least 90 days, the minimum length in treatment suggested to achieve optimal improvements in psychosocial functioning.²⁷ The present analysis supports the theory that social environments play an important role in promoting abstinence during treatment for urban AI/ANs. For outpatient treatment, our hypothesis that high recovery-oriented social support would be associated with higher odds of abstinence was confirmed. Contrary to expectations, however, no association between difficult living situations and abstinence for patients in outpatient treatment was found.

The results from this study suggest that high recovery-oriented social support is positively associated with abstinence, even in the presence of difficult living conditions and homelessness. For patients in outpatient programs, high recovery-oriented social support was more predictive of abstinence than retention, which was not significant in the final model. The diminished effect of retention in treatment after including the social environment predictors was also found in the predictive models for residential treatment. These findings among urban AI/ANs echo those of Chong and Lopez, who found that having more positive life events and attending self-help groups were associated with remission from alcohol use among AI/AN women treated in an urban residential program in Arizona.⁸ Their findings that being around others who used drugs or alcohol and having conflicts with others predicted relapse were also found in the present study for men and women in residential programs.

The strong relationship between not having a difficult living situation and abstinence during residential treatment warrants discussion. The strong protective effect of not having a difficult living situation may speak more about the patients lacking this protection than those who have it. Only 9% of patients in residential reported experiencing difficult living situations in the 30 days prior to discharge, but these patients may constitute a subgroup within residential treatment for which abstinence is difficult to achieve given extremely difficult circumstances. Additional research is needed to better understand the social contexts influencing AI/AN adults' success in treatment and to identify subgroups that require additional services and resources to help them benefit from treatment.

Study Limitations

The results must be interpreted within the context of several limitations. First, the data are based on self-report, which is subject to potential recall and social desirability biases. Second, the data were collected by clerical staff at treatment facilities at admission and discharge. Administrative data are of varying quality, and monitoring of LACPRS data collection procedures is limited. One challenge is missing data at discharge because of client drop-out or inconsistent reporting across treatment staffs. This study found that recovery-oriented social support and difficult living situations, i.e., living with an alcohol/drug user and experiencing family conflict) are highly relevant to whether patients experience progress in treatment; however, missing data on these and other questions can limit statistical power and reduce the accuracy of the statistics. Third, this study is restricted to just one urban area in the United States and may not represent all urban AI/ANs in the country. Los Angeles County, however, has one of the largest concentrations of urban AI/ANs in the country and a highly diverse AI/AN population in terms of ethnic and cultural backgrounds.

Finally, data on the type and number of treatment interventions was not available in LACPRS. For example, the social support measure in LACPRS refers to the number of days in which patients participated in recovery-oriented activities in the past 30 days. Measures such as the number and type of social support activities are more specific and would allow for a dose-response analysis. In addition, it is possible that some of the treatment agencies that served AI/AN patients provided culturally specific services and that these services contributed to some patients' success in treatment. Future evaluations of treatment outcomes for urban AI/ANs in substance abuse treatment should assess the ethnic and cultural backgrounds of AI/AN patients as well as their receipt of culturally specific services. Despite these limitations, administrative data are useful for identifying patient characteristics, assessing progress in treatment, and highlighting service needs. Given the paucity of intervention trials that include sufficient numbers of urban AI/AN adults for analysis, treatment episode data provide a valuable source of information on predictors of successful treatment outcomes among this vulnerable population.^{28,29}

Implications for Behavioral Health

From an evaluation standpoint, it is necessary to examine the role of social environments during treatment because these factors may facilitate or hinder patients' progress in treatment and recovery.^{30,31} Moreover, patients' participation in recovery-oriented social support activities can be modified by treatment programs. Social support through self-help meetings such as Alcoholics Anonymous has been found to be associated with abstinence over time.¹⁹ The current findings suggest that treatment providers should facilitate the participation of AI/ANs in self-help meetings during treatment so that patients build a relationship with at least one member of a self-help group prior to discharge.¹⁹ While abstinence-focused social support may be most helpful in sustaining abstinence over time, such as with ongoing participation in self-help meetings, research suggests that emotional support and tangible support via money, goods, services, or information are most useful in the early phase of recovery.³¹

In addition to recovery-oriented social support, there are other factors that are critical to promoting abstinence among AI/AN patients. Based on the predictors of relapse among AI/AN women identified by Chong and Lopez, current evidence supports the need to address patients' personal conflicts with family and others early in the treatment process.⁸ Considering that AI/ANs often face a number of stressors within their home environments, it is important for treatment counselors to build patients' skills to improve their social relationships, such as learning how to elicit support from family and friends. Treatment providers, however, must be aware of negative social support, namely, the company of others who actively use alcohol and drugs. Engaging patients in discussions about the number of active users in their social networks and the places where alcohol and drug use occurs may illuminate the social contexts that place patients at risk of relapse.

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Table 1

Characteristics of Outpatient and Residential Samples of American Indians and Alaska Natives (N=811)[†] Los Angeles County Participant Reporting System (2004–2008)

Variable, % or mean (sd)	Outpatient (n=400)	Residential (n=411)	Total (N=811)
Age at admission*	38.0 (10.1)	35.6 (10.1)	36.8 (10.2)
Male*	51.7	65.7	58.8
High school education	59.2	61.6	60.4
Employed full/part time*	17.0	2.7	9.7
Have children under 18 years	42.2	42.8	42.5
Criminal justice involvement at admission	52.8	49.4	51.0
Ever diagnosed with mental illness*	33.0	21.7	27.3
Homeless at admission*	12.3	47.3	30.0
Age at first use of primary drug*	20.5 (9.0)	17.1 (7.1)	18.8 (8.2)
Alcohol as primary drug*	21.8	47.0	34.5
Heroin as primary drug	9.8	7.1	8.4
Methamphetamine as primary drug*	36.2	26.0	31.1
Cocaine as primary drug	16.0	11.2	13.6
Marijuana as primary drug*	14.2	6.1	10.1
Number of days used primary drug at admission*	4.6 (8.4)	7.3 (10.1)	6.0 (9.4)
Retention 1–2 months (30–59 days)	16.2	17.8	17.0
Retention 2–3 months (60–89 days)*	8.8	13.9	11.3
Retention 3+ months (90+ days)*	45.8	38.0	41.8
High social support at discharge (13+ days past 30 days)*	24.8	72.8	50.3
Experienced difficult living situations, past 30 days	14.0	9.4	11.5

[†] Missing data for homeless status, social support, and difficult living situation ranged between 49 and 109 cases.

**
p<.05

Table 2

Predictors of Abstinence at Discharge from Outpatient Treatment for American Indians and Alaska Natives (n=400)[†] Los Angeles County Participant Reporting System (2004–2008)

	Model 1: Individual OR (95% CI)	Model 2: Treatment duration OR (95% CI)	Model 3: Inter-personal OR (95% CI)
Age at admission	1.04 (1.01, 1.08)	1.03 (1.0, 1.07)	1.02 (.98, 1.06)
Male (vs. female)	.66 (.35, 1.26)	.64 (.33, 1.24)	.54 (.25, 1.19)
High school education (vs. less)	.64 (.33, 1.21)	.66 (.35, 1.27)	.78 (.38, 1.60)
Have children under 18 years (vs. none)	1.23 (.65, 2.31)	1.23 (.65, 2.34)	1.32 (.62, 2.80)
Has criminal justice involvement at admission (vs. no)	.63 (.32, 1.25)	.65 (.32, 1.29)	.73 (.33, 1.59)
Ever diagnosed with mental illness (vs. no)	.52 (.27, .99)	.55 (.29, 1.06)	.62 (.29, 1.33)
Homeless at admission (vs. no)	1.23 (.47, 3.22)	1.31 (.50, 3.45)	.98 (.36, 2.69)
Age at first use of primary drug	.99 (.95, 1.03)	1.0 (.95, 1.04)	.99 (.95, 1.04)
Alcohol as primary drug (vs. marijuana)	.76 (.23, 2.50)	.76 (.22, 2.59)	1.09 (.28, 4.18)
Heroin as primary drug (vs. marijuana)	.81 (.20, 3.34)	.80 (.19, 3.37)	.91 (.19, 4.46)
Methamphetamine as primary drug (vs. marijuana)	.35 (.12, 1.04)	.35 (.11, 1.10)	.48 (.14, 1.64)
Cocaine as primary drug (vs. marijuana)	.39 (.12, 1.31)	.35 (.10, 1.24)	.31 (.08, 1.12)
Number of days used primary drug at admission	.98 (.94, 1.02)	.98 (.95, 1.02)	1.0 (.95, 1.04)
Retention 1–2 months (30–59 days vs. <30 days)		.69 (.29, 1.63)	.60 (.23, 1.56)
Retention 2–3 months (60–89 days vs. <30 days)		.82 (.29, 2.32)	1.09 (.31, 3.84)
Retention 3+ months (90+ days vs. <30 days)		1.98 (.91, 4.32)	1.82 (.74, 4.43)
High social support (vs. low social support)			3.52 (1.16, 10.71)
Did not experience difficult living situation, past 30 days (vs. yes)			1.57 (.64, 3.88)

[†] Due to missing data, the analytical sample was reduced in Models 1 and 2 to 361 and in Model 3 to 321.

Table 3

Predictors of Abstinence at Discharge from Residential Treatment for American Indians and Alaska Natives (n=411)[†] Los Angeles County Participant Reporting System (2004–2008)

	Model 1: Individual OR (95% CI)	Model 2: Treatment duration OR (95% CI)	Model 3: Inter-personal OR (95% CI)
Age at admission	1.01 (.98, 1.04)	1.00 (.97, 1.04)	.99 (.95, 1.02)
Male (vs. female)	1.19 (.57, 2.46)	1.13 (.51, 2.48)	.94 (.39, 2.26)
High school education (vs. less)	1.67 (.9, 3.12)	1.86 (.94, 3.67)	1.64 (.79, 3.43)
Have children under 18 years (vs. none)	1.26 (.67, 2.37)	1.2 (.60, 2.38)	1.2 (.57, 2.53)
Has criminal justice involvement at admission (vs. no)	1.72 (.92, 3.2)	1.48 (.75, 2.91)	1.3 (.62, 2.69)
Ever diagnosed with mental illness (vs. no)	.97 (.46, 2.03)	1.14 (.52, 2.53)	1.0 (.42, 2.34)
Homeless at admission (vs. no)	.72 (.39, 1.31)	.77 (.4, 1.49)	.8 (.39, 1.61)
Age at first use of primary drug	1.01 (.97, 1.1)	1.03 (.97, 1.1)	1.04 (.97, 1.11)
Alcohol as primary drug (vs. marijuana)	.32 (.06, 1.61)	.22 (.04, 1.25)	.25 (.04, 1.51)
Heroin as primary drug (vs. marijuana)	.37 (.05, 2.59)	.28 (.04, 2.29)	.34 (.04, 3.03)
Methamphetamine as primary drug (vs. marijuana)	.37 (.07, 2.01)	.31 (.05, 1.93)	.34 (.05, 2.25)
Cocaine as primary drug (vs. marijuana)	.50 (.08, 3.34)	.43 (.06, 3.21)	.5 (.06, 4.21)
Number of days used primary drug at admission	.96 (.93, .98)	.97 (.95, .99)	.98 (.95, .1.01)
Retention 1–2 months (30–59 days vs. <30 days)		4.93 (1.9, 13.02)	2.7 (.93, 7.88)
Retention 2–3 months (60–89 days vs. <30 days)		5.91 (2.06, 16.94)	3.4 (1.1, 10.54)
Retention 3+ months (90+ days vs. <30 days)		10.29 (4.43, 23.93)	4.6 (1.79, 11.81)
High social support (vs. low social support)			2.61 (1.22, 5.58)
Did not experience difficult living situation, past 30 days (vs. yes)			7.54 (2.74, 20.70)

[†] Due to missing data, the analytical sample was reduced in Models 1 and 2 to 365 and in Model 3 to 359.