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Changes in health outcomes as a function of abstinence and reduction in illicit psychoactive drug use: A prospective study in primary care

Tae Woo Park, MD^{1,2}, Debbie M. Cheng, ScD^{3,7}, Christine A. Lloyd-Travaglini, MPH⁴, Judith Bernstein⁵, Tibor Palfai⁶, and Richard Saitz^{5,7}

¹Division of General Internal Medicine, Department of Medicine, Alpert Medical School and Rhode Island Hospital, Providence, RI

²Department of Psychiatry and Human Behavior; Alpert Medical School and Rhode Island Hospital, Providence, RI

³Department of Biostatistics, Boston University School of Public Health, Boston, MA

⁴Data Coordinating Center, Boston University School of Public Health, Boston, MA

⁵Department of Community Health Sciences, Boston University School of Public Health, Boston, MA

⁶Department of Psychological and Brain Sciences, Boston University, Boston, MA

⁷Clinical Addiction Research and Education (CARE) Unit, Section of General Internal Medicine, Department of Medicine, Boston University School of Medicine and Boston Medical Center, Boston, MA

Abstract

Aims—To test 1) whether abstinence and reduction in illicit psychoactive drug use were associated with changes in health outcomes in primary care patients and 2) whether these associations varied by drug type.

Design—Secondary analysis of data from a randomized controlled trial that tested a brief intervention for drug use in primary care patients (589 enrolled, 574 completed 6-month assessment). Analyses were conducted overall and stratified by the most commonly self-identified main drugs (marijuana, cocaine, and opioids).

Setting and participants—Patients who screened positive for illicit drug use at an urban primary care clinic in Boston, Massachusetts, USA.

Measurements—Differences in past-month main drug use at baseline and 6-month outcome were categorized as continued or increased use, decreased use without abstinence, and abstinence. Primary outcomes were 6-month changes in drug use consequences (Short Inventory of Problems scores [range 0–45]), depressive symptoms, and health-related quality of life (HRQOL).

Findings—Abstinence was associated with a greater decrease in adverse drug use consequences than continued or increased use among the full sample and cocaine and opioids subgroups (adjusted means, full sample: -8.11 vs. -0.05 , $p < 0.001$; cocaine: -13.33 vs. $+1.09$, $p < 0.001$, opioids: -16.84 vs. -2.10 , $p < 0.001$). Differences were not significant between those who decreased use compared with those who continued or increased use. There were no significant associations between drug use and depressive symptoms or HRQOL. Neither abstinence nor decreased use was significantly associated with consequences in the marijuana subgroup.

Conclusions—Among primary care patients in the US who use illicit psychoactive drugs, abstinence but not reduction in use without abstinence appears to be associated with decreased adverse drug use consequences.

INTRODUCTION

Though outcomes of addiction treatment and outcomes in addiction research efficacy studies are often descriptions of drug use frequency and quantity, the desired goal of treatment is improvement in health¹. The U.S. Food and Drug Administration's current definition of treatment response in studies evaluating treatments for drug use disorders is the degree to which study participants achieve abstinence². Abstinence from drug use has been linked with numerous short and long-term benefits including decreased mortality, improved medical status, reduced crime, and increased employment^{3–6}.

Because abstinence can often be a difficult endpoint to achieve by people with substance use disorders, in treatment settings, and in clinical trials testing treatments, the National Institute on Drug Abuse solicited applications to test the hypothesis that reductions in illicit drug use are associated with beneficial health outcomes⁷. Furthermore, studies of interventions for hazardous drug use aim to reduce use^{8,9}. Decreases in use could reduce health risks but the patient-centered and health system goal is that those decreases would translate into improved general health, quality of life, and mental health. Some recent work has been done exploring associations between changes in drug use and health benefits, primarily focusing on definitions of abstinence to determine which definitions best represent clinically meaningful change^{10–12}. Less work has been done exploring the potential health benefits of reductions in use. Furthermore, comparisons between abstinent individuals and those who decrease their drug use short of abstinence have not been well-studied. Finally, to our knowledge, no work has examined these relationships in non-drug-dependent populations, which is the majority of drug users in the population and in general health settings in the United States¹³, to which the focus has shifted to better address drug use and health consequences.

The aim of this cohort study was 1) to test the associations between longitudinal illicit drug use patterns including abstinence and health outcomes and 2) to test whether these associations vary by drug type among illicit drug users in primary care.

METHODS

Study design

This is a secondary analysis of data collected for a randomized controlled trial designed to test the efficacy of a brief intervention for illicit drug use in primary care patients, the Assessing Screening Plus brief Intervention's Resulting Efficacy to stop drug use (ASPIRE) study⁹. The intervention had no efficacy for reducing drug use or health consequences.

Sample

Participants were recruited from the waiting room of an urban safety-net hospital-based primary care clinic. In the current study, participants were those with a drug-specific Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)¹⁴ score of ≥ 2 indicating drug use at least once in the past 3 months. Further eligibility criteria were: age ≥ 18 years, arrived for a visit with a primary care clinician, ability to interview and consent in English, willingness and ability to return for follow-up, and ability to provide two contacts for this purpose. Pregnant participants were excluded. Participants provided written informed consent and received compensation for study procedures. The Institutional Review Board approved the study including follow-up of incarcerated participants, and a Certificate of Confidentiality was obtained from the National Institutes of Health.

Measures

Main independent variable—A categorical variable representing longitudinal patterns of drug use involving the participant's main drug was the main independent variable. The main drug was identified by asking participants which single drug concerned them the most: opioids, cocaine, marijuana, sedatives, amphetamines, hallucinogens or inhalants. The number of days of use of the main drug in the past 30 days was recorded using the calendar-based Timeline Follow-Back¹⁵ assessment at baseline and at 6 months and the difference was calculated. Using the difference in days of main drug use, we created three drug use patterns: 1) continued or increased use (difference in number of days of use greater than or equal to zero), 2) decreased use but not abstinent (difference in number of days of use less than zero but not zero during the 30 days before follow-up), and 3) abstinent at 6 months (no days of use in 30 days before follow-up).

Outcomes—There were three primary outcomes in the study: 1) change in the consequences of drug use [Short Inventory of Problems for drugs (SIP-D), score range 0–45]¹⁶, 2) change in depression symptoms [Patient Health Questionnaire (PHQ-9), range 0–27]¹⁷, and 3) change in HRQOL (EUROQOL visual analogue scale, range 0–100)¹⁸. The primary outcomes were the differences between scores at 6 months and baseline (6 month minus baseline). Higher scores on the SIP-D and PHQ-9 indicate worse drug use consequences and depression symptoms respectively, and a higher score on the EUROQOL indicates better health-related quality of life. Thus, a negative change score indicates an improvement for the SIP-D and the PHQ-9, and a positive change score indicates an improvement for the EUROQOL. Secondary outcomes we examined at 6 months were: current part- or full-time employment, any arrests in the past 6 months, and any emergency

department (ED) visits for substance use or mental health-related reasons in the past 6 months.

Covariates—Potential confounders included in this study were age, gender, race, marital status, homelessness (at least one night spent on the street or in an overnight shelter in the past 3 months), the randomization group in the parent trial, and baseline ASSIST score for the main drug at baseline. We also assessed for medical comorbidities using the Charlson Comorbidity Index¹⁹ (Deyo modification)²⁰ and any Axis I psychiatric disorder²¹. Medical and psychiatric diagnoses were obtained using ICD-9 (International Classification of Diseases, ninth edition) codes obtained from the participants' outpatient electronic medical record.

Statistical analysis

We compared baseline participant characteristics across the three different categories of main drug use pattern by chi-square or Fisher's exact test for categorical variables and analysis of variance (ANOVA) or Kruskal-Wallis for continuous variables. Correlation between variables was assessed using Spearman correlation (no pair of variables had $r > 0.40$). Separate multivariable linear regression models were used to examine associations between the main drug use pattern and each of the three continuous primary outcomes. Multivariable logistic regression models were used for the three dichotomous secondary outcomes. The primary analyses were conducted on the full sample (includes also those who chose sedatives, amphetamines, hallucinogens or inhalants as main drug). Secondary analyses were performed stratifying by the three most frequently identified main drugs (marijuana, cocaine and opioids). Another secondary analysis involved examining the association between the magnitude of the change in main drug use and the three primary outcomes in the full sample. This analysis involved categorizing the difference in the number of days of past 30 day main drug use at the 6 month and baseline time points categorized into quartiles in order to avoid the linearity assumption. Secondary outcomes were only assessed in the full sample as the number of outcome events was small after stratification by main drug. Exploratory analyses were also conducted assessing potential interactions between main drug use pattern, the main independent variable, and the baseline drug-specific ASSIST score of ≥ 7 (consistent with drug dependence) in the full sample. Subsequent analyses stratified by ASSIST ≥ 7 were performed when there were statistically significant interactions ($p < 0.05$). Due to the exploratory nature of this study, no adjustments were made for multiple testing. Two-sided tests were used and p -values < 0.05 were considered statistically significant. All analyses adjusted for baseline age, gender, race, marital status, homelessness, Charlson Comorbidity Index ≥ 1 , any Axis I psychiatric disorder, Alcohol, Smoking and Substance Involvement Screening Test score for main drug, and randomization group. All analyses were conducted using SAS 9.2 (SAS Institute Inc., Cary, NC, USA).

RESULTS

Of the 589 participants enrolled in the study, 574 completed the 6-month assessment and were included in this study. Of these 574 participants, 363 identified marijuana as their main

drug, 106 cocaine, 94 opioids, and 11 sedatives, amphetamines, hallucinogens or inhalants. Approximately half (50% [285/574]) of all participants were either abstinent (18%: 102/574) or decreased use (32%: 183/574). In the full sample of participants, when comparing past 30 day drug use at 6 months and at baseline, those who were abstinent decreased their use by a median of 2 days (interquartile range, 1–12), those who decreased use but were not abstinent decreased their use by a median of 5 days (interquartile range 2–10), and those who continued or increased their use, increased their use by a median of 3 days (interquartile range, 0–11 days). In the full sample of participants, those who were abstinent at the end of the study were on average older and more likely to be white compared to the other groups, and had more drug use consequences (greater mean SIP-D score) at baseline (Table 1). Within each of the main drug subgroups (cocaine, marijuana, or opioids), there were no significant differences in baseline characteristics across the three drug use patterns: 1) those who continued or increased their use, 2) those who decreased their use but were not abstinent at the end of the study, or 3) those who were abstinent (Supporting information, Table S1).

In adjusted analyses, those who were abstinent at the end of the study had greater reductions in drug use consequences (larger decreases in mean adjusted SIP scores), compared to those who continued or increased their drug use (adjusted means, full sample: -8.11 vs. -0.05 , $p < 0.001$; cocaine: -13.33 vs. $+1.09$, $p < 0.001$, opioids: -16.84 vs. -2.10 , $p < 0.001$) (Table 2 and Supporting information, Table S2). Those who had decreased use but were not abstinent at the end of the study did not have significantly different changes in drug use consequences (mean adjusted SIP scores) compared to those who continued or increased their use. Among those with marijuana as their main drug, there were no significantly different changes in drug use consequences in the abstinent or decreased use groups compared with those who continued or increased their use. No significant associations were found between abstinence or decreased use and any changes in depressive symptoms or HRQOL.

When the change in drug use was categorized into quartiles, decreased use (quartiles 1 and 2) was associated with greater reductions in drug use consequences compared to those with the greatest increase in drug use (quartile 4) (Table 3). The magnitude of association is similar for both those with large and small decreases in drug use and these magnitudes are smaller than what was observed for the group who decreased to abstinence in the primary analyses. No significant associations were found between decreased use and any changes in depressive symptoms or HRQOL in the quartile analysis.

Decreased drug use was associated with a *higher* odds of having been arrested by the end of the study and a lower odds of visiting the emergency department (ED) for a substance or mental health-related problem in the full sample compared with those who continued or increased their use (Table 4). Decreased drug use was not significantly associated with employment. Abstinence was not significantly associated with employment or with visiting an ED for a substance use or mental health problem, though an association between abstinence and *increased* risk of arrest was borderline significant ($p = 0.05$).

When testing for interactions between changes in drug use and baseline drug-specific ASSIST score of ≥ 7 among the full sample of participants, significant interactions were

observed for the outcomes change in drug use consequences ($p<0.001$) and HRQOL ($p<0.001$) (Table 5). The magnitude of association between abstinence (compared to continued or increase in drug use) and changes in drug use consequences was greater in the higher risk group than in the lower risk group. Additionally, there was a strong positive association between abstinence and change in HRQOL in those with ASSIST ≥ 27 , but not among those with ASSIST <27 .

DISCUSSION

In this study of illicit drug users in primary care, we found that abstinence, but not decreased drug use without abstinence, was associated with improvement in drug use consequences, compared to those with continued or increased drug use. This relationship was found among those whose main drug was cocaine and opioids but not marijuana. The association appeared to be greater among those with baseline ASSIST scores ≥ 27 , the range associated with dependence. Decreased use but not abstinence was associated with *more* arrests, but fewer addiction or mental health-related emergency department visits in the full sample of participants. Abstinence appeared to be associated with improvements in health-related quality of life among those with baseline ASSIST scores ≥ 27 but not among those with ASSIST scores <27 . Of note, drug use outcomes were not associated with changes in depressive symptoms.

Similar work examining associations between drug use and health outcomes has been done previously. In a study by Sheehan et al. of treatment-seeking opiate users, participants were asked how long they had been abstinent prior to follow-up⁶. They were then categorized by the proportion of total time in the study that they had maintained abstinence prior to follow-up. In an unadjusted analysis, those with greater proportions of abstinence had fewer numbers of convictions, more employment, and improved depression symptoms compared to those with lesser proportions of abstinence at follow-up. In a study by Siegal et al. of treatment-seeking cocaine users, participants with sustained abstinence of 18 months had better Addiction Severity Index (ASI) legal, employment, family, and psychiatric composite scores than those with inconsistent or lack of abstinence²². Those with inconsistent abstinence, defined as cycling between abstinence and return to use during the study's three time points, had better ASI legal composite scores than those who were not abstinent at any of the time points.

Although our study also supports the view that abstinence is associated with improved health outcomes, there were differences in these studies compared to ours. In the Sheehan et al. and Siegal et al. studies, longer continuous periods of abstinence were associated with improvements in legal, employment, and psychiatric outcomes, associations we did not find in our study. The Siegal study found that those with inconsistent abstinence had some improvements compared to those without abstinence at any of the time points. This might suggest that decreased use without abstinence is associated with benefits, a finding that we did not confirm. Differences between these studies and ours may be explained by differences in the definition of drug use changes, utilization of unadjusted analyses, longer follow-up times, and different study samples. A key difference is that our sample consisted of primary care patients largely with hazardous (i.e. not high risk or dependent) drug use and

that we were able to study decreases in use without abstinence. It may be that the impact of abstinence or decreased use would be different among hazardous users than it would be among treatment-seeking people with drug use disorders.

Several studies have examined different measures of abstinence (i.e. percent days abstinent or maximum consecutive days of abstinence) with the aim of finding clinically meaningful treatment outcomes for use in clinical trials. These studies examined relationships between within-treatment measures of abstinence and long-term follow-up drug use outcomes in those with cocaine dependence^{10,11} and marijuana dependence¹². They also examined the relationship between these abstinence measures and psychosocial outcomes utilizing psychiatric scales or the ASI subscales in unadjusted analyses. Of the statistically significant correlations between abstinence measures and psychosocial outcomes, most were weak or negligible aside from the Marijuana Problems Scale (MPS), which measures problems related to marijuana use. Specifically, number of days of marijuana use, number of days of marijuana abstinence, and number of consecutive days of marijuana abstinence were robustly correlated with MPS scores indicating that improvements in marijuana use were correlated with improvements in marijuana use problems¹². This finding is similar to our finding that abstinence is associated with greater improvements in drug use problems.

When evaluating the effect of the magnitude of change in drug use, regardless of abstinence, we found that those with any decrease in drug use had significantly greater decreases in consequences compared to those with the greatest increase in drug use. However, the magnitudes of association which were similar for those with small and large decreases in use, appeared smaller than that observed for abstinence in the primary analyses. This is likely due to the fact that those who were abstinent are included in both groups of participants with decreases in drug use. Overall, these results suggest that abstinence is independently associated with improvements in drug use problems, and that the strength of the association does not otherwise appear to depend on the magnitude of the decrease in drug use.

Changes in marijuana use were not found to be significantly associated with any health outcomes in this study. Marijuana use has been associated with numerous adverse health effects^{23,24} and a prior study found that decreases in marijuana use among dependent patients was correlated with improvements in problems caused by marijuana use¹² and was weakly correlated with several psychiatric measures. A previous cross-sectional analysis of our cohort found that frequency of marijuana use was not associated with medical comorbidities or HRQOL²⁵. Baseline ASSIST scores were lower in marijuana users than in cocaine or opioid users in our study. It is possible that our finding can be explained by lower drug use severity, indicated by lower ASSIST scores in marijuana users compared to cocaine and opioid users.

There were several unexpected findings in our study. First, decreased drug use was associated with *greater* odds of being arrested than increased or maintained drug use. Second, we did not find an association between abstinence and improved employment. Abstinence has previously been associated with fewer legal problems^{26,27} and improved employment^{6,22}. There are several possible reasons for these unexpected findings. The

majority of our sample had ASSIST scores less than 27, indicating they likely did not have drug dependence. In less severe drug-using populations, being arrested may increase motivation to decrease drug use or may have little impact on employment status compared to more severe drug-using populations. Another explanation for the arrest finding may be due to the large number of statistical tests conducted in this study. We may have erroneously rejected a true null hypothesis due to the large number of tests²⁸. Finally, compared to previous studies that looked at relationships between abstinence and employment, our study had a shorter follow-up time and thus may not have been adequate to capture the effects of drug use on employment status.

There are several limitations in this study. Because of a small number of events in the secondary outcomes, our analysis was limited to examining the full sample of participants only, the majority of whom were marijuana users. Thus, associations in cocaine and opioid users may have been obscured in analysis of employment, arrests and ED visits. On the other hand, the study does inform us about how changes in drug use among those identified as using any drugs by screening (as in “SBIRT” programs being implemented across the US) are associated with health benefits (or lack thereof). Another limitation involves the method of measuring change in our analysis. With our measures taken to the extreme, abstinence could have represented a 29 day decrease in drug use, while decreased use could have represented only a one day decrease in use or vice versa. We found that the median change in drug use among those who were abstinent and those who decreased use were actually larger for those who decreased use than those who were abstinent for each drug. Also, our main independent variable was limited to use of the self-identified main drug and the drug use consequences measure was not substance-specific. However, this consequences measure, not being drug specific, is a measure of great clinical relevance since consequences are important regardless of which drug might cause them.

Should future trials of interventions for drug use continue to use abstinence as the primary outcome and should abstinence be the primary clinical goal for patients? Our results suggest that abstinence is associated with greater benefits than decreased use alone in a largely non-dependent, non-treatment-seeking population. This population is an important target population for screening and brief intervention efforts in the United States²⁹. Because the aim of brief interventions for illicit drug use is often to decrease use, our finding that decreases in drug use may be associated with fewer (if any) health improvements than abstinence may inform the development of brief interventions and the goals of these interventions for this population. Though it is possible that decreased use has benefits for individuals, this study’s results suggest that abstinence should be recommended (i.e. as the best goal) both for patients as a clinical goal and in trials testing treatments for drug use in primary care populations as a research outcome.

CONCLUSIONS

In this study, we found that abstinence, but not decreased use without abstinence, was associated with decreased drug use consequences among primary care patients identified by screening as using illicit drugs (particularly cocaine and opioids), largely without dependence. Abstinence may be associated with better quality of life among those with

higher risk use. Changes in drug use in this population were not associated with improvements in depressive symptoms. Decreases in drug use may be associated with fewer substance use or mental health-related emergency department visits.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Baseline characteristics of full sample of participants by drug use change pattern

Characteristic	Continued or increased use n=289	Decreased use n=183	Abstinent n=102
Sex			
Male % (n)	69 (200)	63 (116)	73 (74)
Age			
Mean (SD)	41.2 (12.2)*	43.2 (12.2)*	39.4 (12.6)*
Race			
White % (n)	17 (48)*	18 (32)*	33 (34)*
Married			
Yes % (n)	9 (27)	13 (23)	10 (10)
Homeless (1 or more nights past 3 months)			
Yes % (n)	17 (49)	14 (26)	14 (14)
Baseline ASSIST score for main drug			
Mean (SD)	15.0 (9.4)	15.8 (9.6)	15.5 (12.0)
Charlson Comorbidity Index			
1 % (n)	37 (106)	41 (75)	29 (30)
Any Axis I psychiatric disorder			
Yes % (n)	51 (148)	50 (91)	58 (59)
Short Inventory of Problems-Drug			
Mean (SD)	10.2 (12.3)*	10.5 (13.3)*	14.7 (15.0)*
Patient Health Questionnaire-9			
Mean (SD)	7.5 (6.3)	7.7 (7.0)	8.4 (6.6)
EUROQOL-Visual Analogue Scale			
Mean (SD)	70.7 (19.9)	70.4 (19.5)	68.4 (22.1)

* p<0.05 for comparison of baseline characteristics across the three change in drug use groups

SD: standard deviation

ASSIST: Alcohol, Smoking and Substance Involvement Screening Test

Table 2

Adjusted associations between drug use patterns and drug use consequences, depressive symptoms, and health-related quality of life in full sample of participants¹

Outcome	Continued or increased use		Abstinent	Decreased use vs. continued or increased use		Abstinent vs. continued or increased use	
	Adjusted mean change scores ²	Decreased use		Beta ³	p-value	Beta ³	p-value
Change in Drug SIP	-0.05	-0.66	-8.11	-0.61	0.49	-8.07	<0.001
Change in PHQ-9	-0.17	-0.88	-1.28	-0.72	0.17	-1.11	0.08
Change in EQ-VAS	-2.55	-1.83	-1.24	0.71	0.70	1.30	0.57

¹ Adjusted for baseline age, gender, race, marital status, homeless 1 or more nights, Charlson Comorbidity Index 1, any Axis I psychiatric disorder, Alcohol, Smoking and Substance Involvement Screening Test score for main drug and randomization group of parent trial.

² Six-month score minus baseline score

³ Difference in adjusted mean change scores

SIP: Short Inventory of Problems measure of drug use consequences

PHQ-9: Patient Health Questionnaire-9 measure of depressive symptoms

EQ-VAS: EUROQOL-visual analogue scale

Table 3

Adjusted associations between changes in main drug use (quartiles) and drug use consequences, depressive symptoms, and health-related quality of life in full sample of participants¹

Outcome	1 st Quartile ²	2 nd Quartile ²	3 rd Quartile ²	4 th Quartile ²	1 st vs. 4 th Quartile		2 nd vs. 4 th Quartile		3 rd vs. 4 th Quartile	
					Beta ⁴	p-value	Beta ⁴	p-value	Beta ⁴	p-value
Change in Drug SIP	-2.43	-3.20	-1.86	-0.02	-2.41	0.03	-3.17	0.01	-1.84	0.10
Change in PHQ- 9	-1.13	-0.69	-0.62	0.00	-1.13	0.08	-0.69	0.32	-0.61	0.32
Change in EQ- VAS	-0.11	-3.66	-3.67	-1.91	1.80	0.43	-1.75	0.48	-1.76	0.43

¹ Models adjusted for baseline age, gender, race, marital status, homeless 1 or more nights, Charlson Comorbidity Index >= 1, any Axis I psychiatric disorder, ASSIST for DOMC and randomization group

² Change in past 30 day main drug use between 6 months and baseline: 1st quartile (-30 to -4 days); 2nd quartile (-3 to -1 days); 3rd quartile (zero to 2 days); 4th quartile (3 to 30 days)

³ Six-month score minus baseline score

⁴ Difference in adjusted mean change scores

SIP: Short Inventory of Problems measure of drug use consequences

PHQ-9: Patient Health Questionnaire-9 measure of depressive symptoms

EQ-VAS: EUROQOL-visual analogue scale

Table 4

Adjusted associations of drug use patterns and any employment, arrests and mental health and substance use-related emergency department visits during the 6 month study period[/]

Outcome	Continued or increased use %	Decreased use %	Abstinent %	Decreased vs. continued or increased use		Abstinent vs. continued or increased use	
				OR (CI)	p-value	OR (CI)	p-value
Any full/part-time employment	33	32	31	1.06 (0.69,1.62)	0.79	0.79 (0.47,1.34)	0.38
Any arrests	7	13	17	2.18 (1.14,4.16)	0.02	2.07 (1.00,4.28)	0.05
Any addiction or mental health-related emergency department visits	34	25	26	0.64 (0.42,0.98)	0.04	0.71 (0.42,1.20)	0.20

[/] Adjusted for baseline age, gender, race, marital status, homeless 1 or more nights, Charlson Comorbidity Index 1, any Axis I psychiatric disorder, Alcohol, Smoking and Substance Involvement Screening Test score for main drug and randomization group of parent trial.

OR: odds ratio

CI: confidence interval

Table 5

Associations between drug use patterns and drug use consequences and health-related quality of life stratified by Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) score[/]

Outcome	Continued or increased use	Decrease in drug use	Abstinent	Decrease vs. continued or increased use	Abstinent continued or increased use	p-value
	Adjusted mean change scores			Beta	Beta	p-value
	ASSIST 27 (N=93)					
Change in Drug SIP	-5.71	-8.03	-24.95	-2.32	-19.24	<0.001
Change in EQ- VAS	-11.54	-5.34	7.58	6.20	19.12	0.01
	ASSIST < 27 (N=481)					
Change in Drug SIP	0.97	0.36	-3.94	-0.61	-4.91	<0.001
Change in EQ- VAS	-1.62	-1.86	-4.22	-0.24	-2.60	0.29

[/] Adjusted for baseline age, gender, race, marital status, homeless 1 or more nights, Charlson Comorbidity Index 1, any Axis I psychiatric disorder, ASSIST score for main drug and randomization group of parent trial.

SIP: Short Inventory of Problems measure of drug use consequences

PHQ-9: Patient Health Questionnaire-9 measure of depressive symptoms

EQ-VAS: EUROQOL-Visual Analogue Scale measure of health-related quality of life