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Chronic care management for substance dependence in primary care among patients with co-occurring mental disorders

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Abstract

Objective—Co-occurring substance use and mental disorders are associated with worse outcomes than a single disorder alone. In this exploratory subgroup analysis of a randomized trial, we hypothesized that chronic care management (CCM) for substance dependence would have a beneficial effect among people with substance dependence and major depressive disorder or substance dependence and post-traumatic stress disorder (PTSD).

Methods—Participants were adults with alcohol and/or drug dependence. CCM was provided by a nurse care manager, social worker, internist and psychiatrist. Outcomes were clinical (any use of opioids, stimulants or heavy drinking, severity of depressive and anxiety symptoms), and treatment utilization (emergency department use and hospitalization). Longitudinal regression models were used to compare randomized arms within the two subgroups with co-occurring disorders.

Results—Among all participants (n=563), 79% (443/563) met criteria for major depressive disorder and 36% (205/563) for PTSD at baseline. No significant effect of CCM was observed for any outcome within either subgroup including any use of opioids, stimulants or heavy drinking, depressive symptoms, anxiety symptoms, or hospitalizations. Participants with depression receiving CCM had fewer days in the emergency department but was only borderline significant (AOR=0.76, 95%CI=.57–1.02, p=.06).

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Conclusions—Among patients with co-occurring substance dependence and mental disorders, chronic care management was not significantly more effective for improving clinical outcomes or treatment utilization than usual care in this study.

Introduction

Though treatment for substance dependence often leads to reduction of substance use and improvement in substance use-related problems, further improvement in treatment is needed, particularly in more severely ill populations. Other mental disorders are prevalent amongst those with substance dependence (1–5) and those with co-occurring substance dependence and mental disorders often have worse outcomes than those with substance dependence alone (6–10). Treatment models have focused on delivering integrated mental health and substance use disorder care for those with co-occurring disorders, with varying success (11–13). Models for substance dependence and other mental disorders have been evolving, acknowledging that these can be chronic illnesses for some, requiring longitudinal care, perhaps over a lifetime (14–16).

Primary care has been defined as providing integrated and accessible health services involving the development of sustained relationships with patients (17). Improving access to primary care for patients with substance dependence may help provide more comprehensive care and reduce missed opportunities to improve substance dependence care (18). Receipt of primary care has been shown to improve addiction severity in patients with substance use disorders, many of whom reported other mental health symptoms (19, 20). Elements of specialty care delivered in primary care settings have been demonstrated to increase the number of outpatient clinic visits in patients with substance use disorders (21), lower depression severity in elderly patients with depression (22), and reduce alcohol use in elderly at-risk drinkers (23).

Chronic care management (CCM) was conceived of as a treatment model designed to address shortcomings in employing acute care models on patients with chronic illnesses. It is a patient-centered, longitudinal approach that incorporates patient education and self-care, specialty expertise, evidence-based guidelines and clinical information systems so as to improve the receipt of high quality clinical care by assisting patients in recognizing their health-related needs and navigating the available systems of services to meet those needs (24, 29). CCM has been shown to improve outcomes in a diverse group of chronic illnesses including diabetes (25), congestive heart failure (26), and mental illnesses such as depression and anxiety (22, 27).

The Addiction Health Evaluation and Disease Management (AHEAD) study was a randomized clinical trial designed to test whether CCM in a primary care setting improves outcomes in substance dependence. In the full sample of participants, the AHEAD study found that CCM was not effective for improving substance use or other health outcomes in substance dependence (28). Since the intervention utilized in this study addressed prevalent co-occurring mental disorders, we hypothesized that participants who might benefit most from CCM would be those who could take advantage of the breadth of available services. In this subgroup analysis of the AHEAD study, we tested whether CCM improved substance

use, mental health and treatment utilization outcomes compared to usual primary care among patients with co-occurring substance dependence and major depressive disorder or substance dependence and post-traumatic stress disorder (PTSD), two mental disorders that are commonly diagnosed in patients with substance use disorders (3, 29).

Methods

Study Design

The AHEAD study was a randomized controlled trial designed to test the effectiveness of chronic care management for substance dependence in primary care. The rationale and study design have been described previously (28, 30). Recruitment for the study occurred at a free-standing residential detoxification unit in Boston, MA (74% of enrolled participants), as well as from self and physician referrals from Boston Medical Center (BMC) (10%) and through local advertisements (16%). Eligible participants were adults diagnosed with alcohol and/or drug dependence (determined by the Composite International Diagnostic Interview-Short Form [CIDI-SF]) (31) who had past 30 day heavy alcohol use (defined as ≥4 standard drinks for women and ≥5 standard drinks for men at least twice, or ≥15 drinks per week for women or ≥22 drinks per week for men in an average week in the past month) or past 30 day drug use (psychostimulants or opioids), and were willing to continue or establish primary care at BMC. Patients who were pregnant, had cognitive impairment (score of less than 21 of 30 on the Mini-Mental State Examination), were not fluent in English or Spanish or were unable to provide contact information for tracking purposes were excluded. Participants who met eligibility criteria and agreed to participate in the study provided written informed consent prior to enrollment and received compensation for completing study procedures. The Institutional Review Board at Boston University Medical Campus (BUMC IRB) approved this study.

After baseline assessment, participants were randomly assigned to receive CCM at the AHEAD clinic or usual primary care. The AHEAD clinic was designed to deliver evidence-based treatments for substance dependence including clinical case management, motivational enhancement therapy (MET), relapse prevention counseling, addiction pharmacotherapy, and referral to specialty addiction treatment and mutual help groups. All treatments and referrals were tailored to clinical needs and patient preferences. The AHEAD clinic team consisted of a nurse care manager, social worker, internal medicine physicians and a psychiatrist. All team members were trained in relapse prevention therapy and motivational interviewing and all physicians had waivers to prescribe buprenorphine. Psychiatric evaluation and treatment including psychopharmacology was provided. Participants in the usual primary care group were given an appointment with a named primary care physician (PCP) within approximately 2–4 weeks at BMC if they had not had a previous visit within the last 3 months and a list of addiction treatment resources. Participants were assessed at 3, 6, and 12 months after enrollment which took place between September 2006 and 2008. Two thirds of participants in the trial intervention group attended at least 3 care management visits, and most reported receipt of care consistent with the chronic care management model (28).

In this post hoc analysis, we compared randomized arms within two subgroups of the AHEAD sample categorized based on baseline assessments: those with current major depressive disorder; "current" defined as having symptoms for the past 2 weeks and those with current post-traumatic stress disorder (PTSD); "current" defined as having symptoms for the past month, as determined by the Mini-International Neuropsychiatric Interview (MINI) (32).

Study Outcomes

Major depressive disorder subgroup—The two primary outcomes for the depression subgroup were use of any stimulants, opioids, and heavy drinking in the past 30 days (stimulant and opioid use was measured by the Addiction Severity Index [ASI] (33) and alcohol use was measured by the 30-day timeline follow-back method) and depressive symptom severity (measured by the Patient Health Questionnaire 9 [PHQ-9]) (34). Secondary outcomes were anxiety severity (measured by the Beck Anxiety Inventory [BAI]) (35), alcohol and drug addiction severity (measured by the alcohol and drug composite scores of the ASI), consequences of alcohol and drug use (measured by the Short Inventory of Problems for alcohol use [SIP-2R or SIP-alcohol] and SIP modified for drugs [SIP-drug]) (36) and treatment utilization including any emergency department visits or hospitalizations (questions adapted from the Treatment Services Review and the Form 90) (37, 38), addiction treatment (including mutual help groups, inpatient or outpatient addiction treatment, or addiction medication [eg, buprenorphine, methadone, naltrexone, acamprosate, disulfiram]), and mental health treatment (including inpatient or outpatient mental health treatment and psychiatric medication [eg, antidepressants, antipsychotics, mood stabilizers, anxiolytics and hypnotics). The ASI composite scores were dichotomized (>= 0.17 for alcohol and 0.16 for drug) based on cutoffs for substance dependence (39).

PTSD subgroup—The primary outcome for the PTSD subgroup was use of any stimulants, opioids and heavy drinking in the past 30 days. Secondary outcomes were anxiety severity (BAI), depression severity (PHQ-9), alcohol and drug addiction severity (ASI), and alcohol and drug problems (SIP-alcohol & SIP-drug), and the same treatment utilization measures.

Statistical Analysis

We conducted all analyses on an intention-to-treat basis. To test for differences in baseline characteristics between intervention and control groups, we carried out two-sample t-tests for continuous variables and χ^2 tests for categorical variables. We also used χ^2 tests to compare whether the proportion of participants with follow-up differed between groups.

Longitudinal regression models were used to incorporate multiple observations from the same participant. We fit generalized estimating equation (GEE) logistic regression models for binary outcomes (e.g., substance use, ASI, any days in emergency department or hospital, addiction and mental health treatment), GEE overdispersed Poisson models for count data (i.e., number of days in emergency department or hospital), and GEE negative binomial models for SIP-alcohol and SIP-drug. For PHQ-9 and BAI, because the distributions were non-normal and appropriate transformations were not identified, we

categorized each outcome into multiple ordered categories based on clinical cutoffs and analyzed the data using GEE proportional odds models in order to increase the power of the analysis compared to dichotomizing the outcomes. An independence working correlation was used and empirical standard errors are reported for all GEE analyses. Adjusted analyses were conducted controlling for factors that either appeared imbalanced across randomized arms within any subgroup or were expected to be strong predictors of outcomes: time, dependence type (alcohol, drug or both), race, sex, baseline PHQ-9 score, baseline BAI score, any outpatient substance treatment in the past 3 months prior to study entry by self-report, and lifetime injection drug use. Odds ratios (for logistic and proportional odds models) and incidence rate ratios (for negative binomial and overdispersed Poisson models) were calculated along with corresponding 95% CIs and p values. All analyses were completed using SAS/STAT software, Version 9.3, SAS Institute Inc. Cary, NC.

Results

Among all participants (n=563), 79% (443/563) met diagnostic criteria for depression at baseline (Figure 1 in online-only appendix). Among the depression subgroup participants, 49% (219/443) were randomized to receive the AHEAD intervention and 51% (224/443) to usual primary care. Among all participants, 36% (205/563) met diagnostic criteria for PTSD at baseline. Among the PTSD subgroup participants, 49% (100/205) were randomized to receive the AHEAD intervention and 51% (105/205) to usual primary care.

The baseline characteristics of the depression and PTSD subgroups are shown in Table 1. In the depression subgroup, those assigned to the AHEAD intervention had significantly lower mean PHQ-9 scores. In the PTSD subgroup, those assigned to the AHEAD intervention were significantly less likely to be male and Hispanic and more likely to identify themselves as “other” race compared to controls. Overall, the majority of participants was male, had both alcohol dependence and drug dependence, had spent at least one night homeless in the past 3 months and had been incarcerated at least once in their lifetime. Both depression and PTSD subgroups had mean scores on the PHQ-9 consistent with major depression, with the PTSD subgroup having slightly higher PHQ-9 scores. Both depression and PTSD subgroups on average scored greater than 20 on the BAI indicating a level of severe anxiety.

Within both subgroups, the AHEAD intervention compared with controls had no significant effect on substance use or mental health-related outcomes in adjusted analyses. In the depression subgroup (Table 2), no significant difference was found between intervention and control in the use of any stimulants, opioids, and heavy drinking in the past 30 days, depressive symptoms, or anxiety symptoms. In the PTSD subgroup (Table 3), no significant difference was found between intervention and control in the use of any stimulants, opioids, and heavy drinking in the past 30 days, anxiety symptoms, or depressive symptoms. The AHEAD intervention did not have an impact on any days in the emergency department or any nights in the hospital in either subgroup. There was a borderline significant reduction in number of days in an emergency department associated with the intervention in the depression subgroup (OR=.76, p=.06) and a non-significant reduction in emergency department days in the PTSD subgroup.

The intervention was significantly associated with greater receipt of addiction treatment, addiction medication, mental health treatment and psychiatric medication in the depression subgroup (Table 4). The results were similar in the PTSD subgroup, except the intervention was not significantly associated with greater receipt of addiction treatment.

Discussion

For individuals with co-occurring substance dependence and major depressive disorder or post-traumatic stress disorder, chronic care management for substance dependence did not have a significant effect on substance use, measures of depression and anxiety, substance use severity, or substance use problems compared to usual primary care. Across all participants, substance use outcomes tended to improve over time while depression and anxiety measures did not. However, despite this improvement, there was still substantial room for CCM to improve substance use outcomes. Though CCM was not effective in reducing any emergency department or hospital use, the intervention had a borderline significant effect on days in the emergency department among the depression subgroup. In the context of multiple comparisons and no effect on the proportion with any emergency department use, the emergency department results should be considered hypothesis-generating.

Though there are no previous randomized controlled studies testing CCM for co-occurring disorders, models similar to CCM have been implemented in treatment studies of patients with substance use disorders and mental illnesses. One trial involving elderly at-risk drinkers tested a model that integrated mental health and/or substance use care into primary care and compared it with a model of enhanced referral to specialty mental health or substance use disorder care, involving multiple interventions to increase follow-up (40). The main trial found no difference in alcohol abstinence between the two models. In a subgroup analysis, those participants with depression had a greater decrease in depression severity in the enhanced referral model than the integrated care model (41). Other studies that use elements of CCM and integrate specialty substance use disorder care and primary medical care for patients with substance use disorders have found increased initial treatment retention (42) as well as 30-day abstinence in substance use in those with alcohol-related medical illnesses (43) and in those with substance abuse-related conditions, including psychiatric disorders (44).

Our study adds to the literature by explicitly testing an intervention that employed CCM principles in a primary care setting in patients who met criteria for both substance dependence and major depressive disorder and/or PTSD and comparing it to usual primary care. Previous studies that have employed CCM-like models examining substance use and mental health outcomes have not explicitly described the level of psychiatric co-morbidity or the interventions developed for those co-morbidities (43) or did not have a usual care comparison arm (45). Furthermore, previous studies have not had such a severely ill study sample. The baseline level of psychiatric and socioeconomic severity, particularly the level of homelessness, of our study sample was more severe than in other substance use disorder treatment samples (5, 46). Other studies that have explored CCM for depression or anxiety excluded substance dependence (27, 47, 48). While including patients with greater illness

severity may have weakened any treatment effect of the intervention, CCM is a comprehensive care model that is designed to accommodate the full spectrum of chronic illness severity. Additionally, it is not clear that those with lower illness severity would greatly benefit from CCM because they are likely more able to navigate the existing system of services.

Several limitations were present in our study. Because the majority of baseline psychiatric assessments were done during detoxification, the results may only be generalizable to patients assessed while in detoxification and not in those with psychiatric diagnoses that are later determined to be unrelated to substance use. Because depression and anxiety is not uncommon during substance withdrawal, we may have overestimated the rate of depression and PTSD and weakened a treatment effect of the intervention by introducing participants expected to have improved mental health outcomes regardless of whether they received the intervention. But because referral decisions are often made from detoxification, assessment during detoxification may have better replicated real-world conditions. Because this was a subgroup analysis, the analysis may have been underpowered as the clinical trial was not designed to detect differences within subgroups. For example, among patients with PTSD, those in the intervention group had 0.86 times the odds of any substance use compared to controls. In a post-hoc power calculation, assuming 63% of controls reported substance use (based on data at 12 months) the study would have approximately 80% power to detect an odds ratio as small as 0.42. This study was therefore likely underpowered to detect an association of the smaller observed magnitude. Finally, though not necessarily a limitation, it is important to note that the current study intervention was designed to treat substance dependence with the understanding that psychiatric co-morbidity is common in the substance dependence population (29). A more co-occurring disorder-focused treatment model may have incorporated additional therapies, particularly integrated psychotherapies aimed at reducing substance use and mental health symptoms in co-occurring disorders.

Though CCM for substance dependence did not significantly improve substance use and mental health outcomes in patients with co-occurring substance dependence and depression and/or PTSD compared to usual care in this study, it is difficult to conclude that CCM cannot be effective for those with co-occurring disorders. This study’s participants, many not treatment-seeking, had high illness severity with regards to substance use, mental health and homelessness. Though CCM was designed to facilitate access to efficacious treatments, because of the high degree of co-morbidity observed in this study’s participants, any beneficial effects may have been too small to be measured. Furthermore, the CCM intervention relied on the existing healthcare system, a system with long-standing access problems and fragmentation in which highly effective treatments are often not available or accessible. Finally, because this study was a post-hoc subgroup analysis, this particular intervention was not specifically designed to target those with co-occurring disorders and therefore may be improved by adding services that better meet the needs of those patients.

Conclusions

Although chronic care management appears to address many of the shortcomings of currently available health services for patients with co-occurring disorders, these results

indicate that CCM should not be presumed to be effective. CCM's effectiveness may be limited to subgroups of patients with a particular set of needs or conditions. In order to improve outcomes in those with co-occurring disorders, care models and content may need to be modified in order to better address current deficiencies in care for patients with co-occurring disorders.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Baseline characteristics of participants with substance dependence and co-occurring disorders by mental disorder diagnosis and treatment condition

	Depression subgroup				PTSD subgroup			
	Control (n=224)		Intervention (n=219)		Control (n=105)		Intervention (n=100)	
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Substance dependence type								
Alcohol only	30	13	16	7	10	10	7	7
Other drug only	53	24	56	26	22	21	23	23
Both	141	63	147	67	73	69	70	70
Sex								
Male	167	75	156	71	82[a]	78[a]	65[a]	65[a]
Age (M±SD)	37.9±10.6		38.0±10.1		38.6±10.4		38.4±10.0	
Race								
White	109	49	108	49	42[a]	40[a]	42[a]	42[a]
Black	61	27	61	29	36[a]	34[a]	30[a]	30[a]
Hispanic	40	18	25	11	24[a]	23[a]	12[a]	12[a]
Other	14	6	25	11	3[a]	3[a]	16[a]	16[a]
Homeless (1 or more nights in past 3 months)	138	62	126	57	71	68	62	62
Lifetime incarceration	175	78	174	79	84	80	80	80
Patient Health Questionnaire score (M±SD) [b]	18.7±4.8[a]		17.7±5.6[a]		19.3±5.4		19.1±4.6	
Beck Anxiety Inventory score (M±SD) [c]	30.6±13.7		29.0±14.1		33.8±12.8		34.3±13.4	
Addiction Severity Index - alcohol score (M±SD)[d]	.5±.4		.5±.3		.5±.3		.5±.3	
Addiction Severity Index - drug score (M±SD)[e]	.3±.2		.3±.2		.3±.1		.3±.2	
Short Inventory of Problems - alcohol score (M±SD)[f]	21.5±15.9		20.6±15.6		22.9±16.4		22.8±15.5	
Short Inventory of Problems - drug score (M±SD)[g]	30.2±13.6		30.8±12.5		32.2±12.4		31.2±13.2	
Outpatient substance abuse treatment[h] in past 3 months								
No	167	75	181	83	76	72	78	78
Ever injected drugs								

	Depression subgroup				PTSD subgroup			
	Control (n=224)		Intervention (n=219)		Control (n=105)		Intervention (n=100)	
Characteristic	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Yes	133	60	135	63	61	58	59	60

[a] p<.05 (intervention vs. treatment as usual within depression or PTSD subgroups)

[b] Possible scores range from 0 to 27, with higher scores indicating greater depression severity.

[c] Possible scores range from 0 to 63, with higher scores indicating greater anxiety severity.

[d] Possible scores range from 0 to 1, with higher scores indicating greater alcohol-related addiction severity.

[e] Possible scores range from 0 to 1, with higher scores indicating greater drug-related addiction severity.

[f] Possible scores range from 0 to 48, with higher scores indicating greater alcohol-related problems.

[g] Possible scores range from 0 to 48, with higher scores indicating greater drug-related problems.

[h] Any treatment, including counseling, therapy, or detox for alcohol or other drug problems (not including 12-step programs)

SD: standard deviation

Table 2

Effects of chronic care management intervention in patients with current major depressive disorder at study entry on substance use and mental health outcomes over the subsequent year (3, 6 and 12 months)

	Baseline				12-Month Follow-up						
	Intervention		Control		Intervention		Control				
Variable	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**Parameter[a]**	**95% CI**	**p**
Use of any stimulants, opioids, and heavy drinking, past 30 days	219	100	224	100	113	54	120	57	1.14[b]	.84–1.55	.40
Patient Health Questionnaire-9 (PHQ-9), ≥ 20	92	42	104	47	89	43	96	47	1.00[c]	.75–1.33	.99
Beck Anxiety Inventory (BAI), ≥ 26	126	58	136	63	120	58	129	64	.99[c]	.73–1.32	.92
Addiction Severity Index – alcohol	160	73	163	73	153	73	153	73	1.11[b]	.78–1.59	.56
Addiction Severity Index - drug	187	85	184	82	180	86	171	82	1.16[b]	.85–1.58	.35
Short Inventory of Problems – alcohol (SIP-A) (M±SD)[f]	20.6±15.6		21.5±15.9		7.9±12.8		10.7±14.4		.92[d]	.70–1.21	.55
Short Inventory of Problems – drug (SIP-D) (M±SD)[g]	30.8±12.5		30.2±13.6		14.6±15.8		14.7±16.0		1.01[d]	.85–1.19	.94
Any days in emergency department	113	52	128	57	63	30	66	32	.97[b]	.72–1.29	.82
Number of days in emergency department (M±SD)	1.1±1.5		1.3±2.0		.5±0.9		.6±1.6		.76[e]	.57–1.02	.06
Any nights hospitalized	64	29	68	30	35	17	32	15	1.03[b]	.73–1.45	.89
Number of nights hospitalized (M±SD)	1.9±8.1		2.5±7.6		1.9±8.1		1.6±6.4		.82[e]	.52–1.29	.39

[a] N=416 except for PHQ-9, SIP-A, and SIP-D outcomes for which N=415; adjusted for time, dependence type, race, sex, baseline PHQ-9 score, baseline BAI score, any outpatient substance treatment in the past 3 months prior to study entry, and lifetime injection drug use

[b] OR (95%CI) from GEE Logistic Model

[c] OR (95% CI) from GEE Proportional Odds Model, modeling odds of higher (worse) score

[d] IRR (95% CI) from GEE Negative Binomial Model

[e] IRR (95%CI) from GEE Poisson model

[f] Possible scores range from 0 to 1, with higher scores indicating greater alcohol-related addiction severity.

[g] Possible scores range from 0 to 1, with higher scores indicating greater drug-related addiction severity.

Table 3

Effects of chronic care management intervention in patients with current post-traumatic stress disorder at baseline on substance use and mental health outcomes over the subsequent year (3, 6 and 12 months)

	Baseline				12-Month Follow-up						
	Intervention		Control		Intervention		Control				
Variable	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**Parameter[a]**	**95% CI**	**p**
Use of any stimulants, opioids, and heavy drinking, past 30 days	100	100	105	100	53	55	62	63	.86[b]	.52–1.41	.55
Patient Health Questionnaire-9 (PHQ-9), ≥ 20	48	48	56	53	47	48	51	52	1.02[c]	.66–1.55	.94
Beck Anxiety Inventory (BAI), ≥ 26	71	73	69	70	68	72	65	70	.88[c]	.57–1.38	.58
Addiction Severity Index – alcohol	78	78	78	74	76	78	73	74	1.01[a]	.57–1.80	.97
Addiction Severity Index - drug	83	83	91	87	81	84	84	86	1.30[a]	.81–2.07	.28
Short Inventory of Problems – alcohol (SIP-A) (M±SD)[f]	22.8±15.5		22.9±16.4		9.4±14.4		10.9±14.3		1.08[d]	.76–1.52	.68
Short Inventory of Problems – drug (SIP-D) (M±SD)[g]	31.2±13.2		32.2±12.4		16.9±16.4		15.8±16.1		.91[d]	.71–1.16	.44
Any days in emergency department	56	56	66	63	31	32	43	44	.87[b]	.56–1.34	.53
Number of days in emergency department (M±SD)	1.2±1.6		1.5±1.9		.6±1.0		.7±1.1		.68[e]	.44–1.07	.10
Any nights hospitalized	35	35	42	40	21	22	16	16	.90[b]	.54–1.52	.70
Number of nights hospitalized (M±SD)	2.6±6.4		3.6±9.5		3.3±11.3		1.3±5.7		.86[e]	.49–1.51	.60

[a] N=194 except for SIP-A, and SIP-D outcomes for which N=193; adjusted for time, dependence type, race, sex, baseline PHQ-9 score, baseline BAI score, any outpatient substance treatment in the past 3 months prior to study entry, and lifetime injection drug use

[b] OR (95%CI) from GEE Logistic Model

[c] OR (95% CI) from GEE Proportional Odds Model, modeling odds of higher (worse) score

[d] IRR (95% CI) from GEE Negative Binomial Model

[e] IRR (95%CI) from GEE Poisson model

[f] Possible scores range from 0 to 1, with higher scores indicating greater alcohol-related addiction severity.

[g] Possible scores range from 0 to 1, with higher scores indicating greater drug-related addiction severity.

Table 4

Effects of chronic care management intervention on addiction and mental health treatment utilization

	Depression subgroup[a]			PTSD subgroup[b]		
	Intervention vs. control			Intervention vs. control		
Variable	**OR[c]**	**95% CI**	**p**	**OR[c]**	**95% CI**	**p**
Any mutual help meeting attendance	1.02	.74–1.40	.93	1.14	.70–1.87	.59
Any addiction treatment	1.52	1.12–2.06	.01	1.42	.90–2.23	.13
Any inpatient addiction treatment	1.07	.76–1.50	.70	.86	.51–1.45	.58
Any addiction medications	2.03	1.31–3.17	.002	2.51	1.20–5.26	.01
Any mental health treatment	2.64	1.82–3.85	<.001	3.16	1.78–5.63	<.001
Any psychiatric medications	1.95	1.35–2.82	<.001	1.92	1.12–3.29	.02

[a] N=209 for intervention group and 209 for control group

[b] N=97 for intervention group and 98 for control group

[c] Adjusted for time, dependence type, race, sex, baseline PHQ-9 score, baseline BAI score, any outpatient substance treatment in the past 3 months prior to study entry, and lifetime injection drug use

PTSD: Post-traumatic stress disorder