

Chronic Care Management for Substance Dependence in Primary Care Among Patients With Co-Occurring Disorders

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Objective: Co-occurring mental and substance use disorders are associated with worse outcomes than a single disorder alone. In this exploratory subgroup analysis of a randomized trial, the authors hypothesized that providing chronic care management (CCM) for substance dependence in a primary care setting would have a beneficial effect among persons with substance dependence and major depressive disorder or posttraumatic stress disorder (PTSD).

Methods: Adults (N=563) with alcohol dependence, drug dependence, or both were assigned to CCM or usual primary care. CCM was provided by a nurse care manager, social worker, internist, and psychiatrist. Clinical outcomes (any use of opioids or stimulants or heavy drinking and severity of depressive and anxiety symptoms) and treatment utilization (emergency department use and hospitalization) were measured at three, six, and 12 months after enrollment. Longitudinal regression models were used to compare randomized arms within the

subgroups of participants with major depressive disorder or PTSD.

Results: Among all participants, 79% met criteria for major depressive disorder and 36% met criteria for PTSD at baseline. No significant effect of CCM was observed within either subgroup for any outcome, including any use of opioids or stimulants or heavy drinking, depressive symptoms, anxiety symptoms, and any hospitalizations or number of nights hospitalized. Among participants with depression, those receiving CCM had fewer days in the emergency department compared with the control group, but the finding was of only borderline significance ($p=.06$).

Conclusions: Among patients with co-occurring substance dependence and mental disorders, CCM was not significantly more effective than usual care for improving clinical outcomes or treatment utilization.

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

Primary care has been defined as 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 them with more comprehensive care and reduce missed opportunities to treat substance dependence (18). Receipt of primary care has been shown to improve addiction severity among patients with substance use disorders, many of whom reported other mental symptoms (19,20). The delivery of elements of specialty care in primary care settings has been demonstrated to increase the number of outpatient clinic visits by patients with substance use disorders (21), lower depression severity among elderly patients with depression (22), and reduce alcohol use among elderly at-risk drinkers (23).

Chronic care management (CCM) was conceived as a treatment model to address the shortcomings of acute care models for treatment of chronic illnesses. CCM is a patient-centered, longitudinal approach that incorporates patient education and self-care, specialty expertise, evidence-based guidelines, and clinical information systems that improve the receipt of high quality clinical care by assisting patients to recognize their

health-related needs and navigate the available systems of services to meet those needs (24). CCM has been shown to improve outcomes for 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 that tested whether providing CCM in a primary care setting improved outcomes among persons with substance dependence. In the full sample of participants, CCM was not effective for improving substance use or other health outcomes among persons with substance dependence (28). Because CCM has been effective for treatment of some mental disorders, we hypothesized that individuals with co-occurring disorders, who could take advantage of the breadth of services available through CCM, might benefit more than persons without a co-occurring mental disorder. In this subgroup analysis of the AHEAD study, we compared substance use, mental health, and treatment utilization outcomes among patients with substance dependence and co-occurring major depressive disorder or posttraumatic stress disorder (PTSD) who received CCM with those who received usual primary care. Major depressive disorder and PTSD are common among patients with substance use disorders (3,29).

METHODS

Study Design

The AHEAD study was a randomized controlled trial designed to test the effectiveness of CCM for substance dependence in primary care. The rationale and design of the study have been described previously (28,30). Recruitment for the study occurred at a freestanding, residential detoxification unit in Boston, from self- and physician referrals from Boston Medical Center (BMC), and through local advertisements. Eligible participants were adults who had been diagnosed as having alcohol or drug dependence by the Composite International Diagnostic Interview–Short Form [CIDI-SF] (31), who reported heavy alcohol use (consuming ≥ 4 standard drinks for women and ≥ 5 standard drinks for men at least twice or ≥ 15 drinks for women and ≥ 22 drinks for men in an average week) or drug use (psychostimulants or opioids) in the past 30 days, and who were willing to continue or establish primary care at BMC. Patients who were pregnant, had cognitive impairment (Mini-Mental State Examination score < 21), 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 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, 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, a 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 primary care physician at the BMC within approximately two to four weeks if they had not had a previous visit within the past three months and a list of addiction treatment resources.

Enrollment took place between September 2006 and 2008. Most (74%) participants were recruited at the detoxification unit, 10% were recruited at BMC, and 16% were recruited through local advertisements. The participants were assessed three, six, and 12 months after enrollment. Two-thirds of participants in the intervention group attended at least three CCM visits over one year, and most reported receipt of care consistent with CCM (28).

In this post hoc analysis, we compared randomized arms within two subgroups of the AHEAD sample: participants with current major depressive disorder (symptoms in the past two weeks) and those with current PTSD (symptoms in the past month). Patients who met these criteria were identified during baseline assessments by using 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 or opioids or heavy drinking in the past 30 days and depressive symptom severity. 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. Depressive symptom severity was 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 a modified version of the SIP 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, such as buprenorphine, methadone, naltrexone, acamprosate, and disulfiram), and mental health treatment (including inpatient or outpatient mental health

treatment and psychiatric medication, such as antidepressants, antipsychotics, mood stabilizers, anxiolytics, and hypnotics). The ASI composite scores were dichotomized on the basis of cutoffs for substance dependence (≥ 17 for alcohol and ≥ 16 for drugs) (39).

PTSD subgroup. The primary outcome for the PTSD subgroup was use of any stimulants or opioids or 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 and SIP-drug), and the same treatment utilization measures used for the depression subgroup.

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 chi square tests for categorical variables. We also used chi square tests to compare the proportion of participants in each group with follow-up.

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, such as substance use, ASI score, any days in an emergency department or hospital, and any addiction and mental health treatment; GEE overdispersed Poisson models for count data (number of days in emergency department or hospital); and GEE negative binomial models for SIP-alcohol and SIP-drug results. For PHQ-9 and BAI results, because the distributions were non-normal and appropriate transformations were not identified, we chose not to dichotomize the outcomes. Instead, we categorized each outcome into multiple ordered categories on the basis of clinical cutoffs and analyzed the data by using GEE proportional odds models in order to increase the power of the analysis. An independence working correlation matrix was used and empirical standard errors are reported for all GEE analyses. Adjusted analyses were conducted to control for the following factors that either appeared imbalanced across randomized arms within any subgroup or that were expected to be strong predictors of outcomes: time, substance of dependence (alcohol, drug, or both), race-ethnicity, sex, baseline PHQ-9 score, baseline BAI score, any outpatient substance treatment in the three months prior to study entry by self-report, and lifetime injection drug use. Odds ratios (ORs) (for logistic and proportional odds models) and incidence rate ratios (for negative binomial and overdispersed Poisson models) were calculated along with corresponding 95% confidence intervals and *p* values. All analyses were completed by using SAS/STAT software, version 9.3.

RESULTS

Among all participants (*N*=563), 443 (79%) met diagnostic criteria for depression at baseline. Of those, 219 (49%) were

randomly assigned to receive the AHEAD intervention and 224 (51%) were assigned to usual primary care. Among all participants, 205 (36%) met diagnostic criteria for PTSD at baseline. Of those, 100 (49%) were randomly assigned to the AHEAD intervention and 105 (51%) were assigned to usual primary care. [A diagram describing screening, enrollment, random assignment, and follow-up is available online as a data supplement to this article.]

The baseline characteristics of the depression and PTSD subgroups are shown in Table 1. In the depression subgroup, mean PHQ-9 scores were significantly lower for those assigned to the intervention versus the control group. In the PTSD subgroup, those assigned to the intervention were significantly less likely than the control group to be male and Hispanic and were more likely than the control group to identify their race-ethnicity as "other." Overall, a majority of participants were male, had both alcohol dependence and drug dependence, had spent at least one night homeless in the past three months, and had been incarcerated at least once in their lifetime. Mean scores on the PHQ-9 for both the depression and PTSD subgroups were indicative of moderately severe depression (15–19), with the PTSD subgroup having slightly higher PHQ-9 scores. On average, both the depression and the PTSD subgroups scored ≥ 26 on the BAI, indicating severe anxiety.

Within both subgroups, participation in the intervention or the control condition had no significant effect on substance use or mental health outcomes, according to adjusted analyses. In the depression subgroup (Table 2), no significant difference was found between the intervention and control groups in the use of any stimulants or opioids or in heavy drinking in the past 30 days, depressive symptoms, or anxiety symptoms. In the PTSD subgroup (Table 3), no significant difference was found between the groups in the use of any stimulants and opioids or in heavy drinking in the past 30 days, anxiety symptoms, or depressive symptoms. The AHEAD intervention did not have an impact on any days in an emergency department or any nights in the hospital in either subgroup. An association between reduction in the number of days in an emergency department and participation in the intervention (*OR*=.76, *p*=.06) was of borderline significance in the depression subgroup.

Compared with the control condition, 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). Similar results were found for 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 PTSD, enrollment in CCM 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 with enrollment in usual primary care. Across all participants, substance use outcomes tended to improve over time, but depression and anxiety measures did not. However, despite this improvement, there was still substantial room for improvement of substance use outcomes among CCM participants. Although CCM was not effective in reducing any use of an emergency department or a hospital, the intervention had a borderline significant effect on days in the emergency department in the depression subgroup. Because numerous outcomes were examined in this study, which introduced the problem of multiple comparisons, and because we found no effect on the proportion with any emergency department use, the emergency department results should be considered hypothesis generating rather than hypothesis testing.

There are no previous randomized controlled studies that tested the use of CCM for co-occurring disorders. However, 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 care, substance use care, or both into primary care and compared it with a model of enhanced referral to specialty mental health or substance use disorder care that involved multiple interventions to increase follow-up (40). The main trial found no difference in alcohol abstinence between participants in the two models. In a subgroup analysis of participants with depression, participants in the enhanced-referral model had a greater decrease in depression severity than participants in the integrated care model (41). Other studies that used elements of CCM and integrated 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 increased 30-day abstinence from substance use among those with alcohol-related general medical illnesses (43) and those with

TABLE 1. Baseline characteristics of patients who received usual primary care or chronic care management (CCM) for substance dependence, by co-occurring mental health diagnosis

Characteristic	Depression				PTSD			
	Usual care (N=224)		CCM (N=219)		Usual care (N=105)		CCM (N=100)	
	N	%	N	%	N	%	N	%
Substance of dependence								
Alcohol only	30	13	16	7	10	10	7	7
Other drug only	53	24	56	26	22	21	23	23
Alcohol and other drug	141	63	147	67	73	69	70	70
Male	167	75	156	71	82	78*	65	65*
Age (M±SD)	37.9±10.6		38.0±10.1		38.6±10.4		38.4±10.0	
Race-ethnicity								
White	109	49	108	49	42	40*	42	42*
Black	61	27	61	29	36	34*	30	30*
Hispanic	40	18	25	11	24	23*	12	12*
Other	14	6	25	11	3	3*	16	16*
Homeless ≥1 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-9 (M±SD score) ^a	18.7±4.8*		17.7±5.6*		19.3±5.4		19.1±4.6	
Beck Anxiety Inventory (M±SD score) ^b	30.6±13.7		29.0±14.1		33.8±12.8		34.3±13.4	
Addiction Severity Index-alcohol (M±SD score) ^c	.5±.4		.5±.3		.5±.3		.5±.3	
Addiction Severity Index-drug (M±SD score) ^c	.3±.2		.3±.2		.3±.1		.3±.2	
Short Inventory of Problems-alcohol (M±SD score) ^d	21.5±15.9		20.6±15.6		22.9±16.4		22.8±15.5	
Short Inventory of Problems-drug (M±SD score) ^d	30.2±13.6		30.8±12.5		32.2±12.4		31.2±13.2	
No outpatient substance abuse treatment in past 3 months ^e	167	75	181	83	76	72	78	78
Ever injected drugs	133	60	135	63	61	58	59	60

^a Possible scores range from 0 to 27, with scores between 15 and 19 indicating moderately severe depression.

^b Possible scores range from 0 to 63, with scores ≥26 indicating severe anxiety.

^c Possible scores range from 0 to 1, with higher scores indicating greater alcohol-related or drug-related addiction severity.

^d Possible scores range from 0 to 48, with higher scores indicating greater alcohol-related or drug-related problems.

^e Includes counseling, therapy, or detoxification for alcohol or other drug problems but not 12-step programs

*p<.05, for comparisons of usual care versus CCM by subgroup

substance abuse-related conditions, including psychiatric disorders (44).

Our study adds to the literature by comparing outcomes of an intervention that employed CCM principles in a primary care setting and usual primary care among patients who met criteria for both substance dependence and major depressive disorder, PTSD, or both. Previous studies have examined substance use and mental health outcomes of models that are similar to CCM, but they have not explicitly described the level of psychiatric comorbidity of the participants or the interventions developed to treat the comorbid illnesses (43) nor have they had a usual care comparison arm (45). Furthermore, the participants in this study were more severely ill than the sample of participants in previous studies. In this study, the baseline level of psychiatric illness and socioeconomic disadvantage, particularly homelessness, of the study sample was more severe than in other studies of

TABLE 2. Effects of chronic care management (CCM) for substance dependence versus usual primary care among 443 patients with major depressive disorder over a 12-month follow-up period

Variable	Baseline (N=443)				12-month follow-up (N=418) ^a				Parameter ^b	95% CI	p
	CCM (N=219)		Usual care (N=224)		CCM (N=209)		Usual care (N=209)				
	N	%	N	%	N	%	N	%			
Use of any stimulants or opioids or drinking in past 30 days	219	100	224	100	113	54	120	57	OR=1.14 ^c	.84–1.55	.40
PHQ-9 score ≥20 ^d	92	42	104	47	89	43	96	47	OR=1.00 ^e	.75–1.33	.99
BAI score ≥26 ^f	126	58	136	63	120	58	129	64	OR=.99 ^e	.73–1.32	.92
ASI-alcohol score ≥17 ^g	160	73	163	73	153	73	153	73	OR=1.11 ^c	.78–1.59	.56
ASI-drug score ≥16 ^g	187	85	184	82	180	86	171	82	OR=1.16 ^c	.85–1.58	.35
SIP-A score (M±SD) ^h	20.6±15.6		21.5±15.9		7.9±12.8		10.7±14.4		IRR=.92 ⁱ	.70–1.21	.55
SIP-D score (M±SD) ^h	30.8±12.5		30.2±13.6		14.6±15.8		14.7±16.0		IRR=1.01 ⁱ	.85–1.19	.94
Any days in emergency department	113	52	128	57	63	30	66	32	OR=.97 ^c	.72–1.29	.82
Days in emergency department (M±SD)	1.1±1.5		1.3±2.0		.5±.9		.6±1.6		IRR=.76 ^j	.57–1.02	.06
Any nights hospitalized	64	29	68	30	35	17	32	15	OR=1.03 ^c	.73–1.45	.89
Nights hospitalized (M±SD)	1.9±8.1		2.5±7.6		1.9±8.1		1.6±6.4		IRR=.82 ^j	.52–1.29	.39

^a Patient Health Questionnaire–9 (PHQ-9), Short Inventory of Problems–alcohol (SIP-A), and Short Inventory of Problems–drug (SIP-D) outcomes were available for 415 patients.

^b Generalized estimating equation (GEE) models were adjusted for time, substance of dependence, race-ethnicity, sex, baseline PHQ-9 score, baseline Beck Anxiety Inventory (BAI) score, any outpatient substance treatment in the past 3 months prior to study entry, and lifetime injection drug use. IRR, incidence rate ratio.

^c GEE logistic model.

^d Scores ≥ 20 indicate severe depression which represents the top 1 of 5 ordered categories used for analysis. The OR is for a 1-category increase in depression severity.

^e GEE proportional odds model, modeling odds of higher (worse) score.

^f Scores ≥ 26 indicate severe anxiety which represents the top 1 of 5 ordered categories used for analysis. The OR is for a 1-category increase in anxiety severity.

^g Scores ≥ 17 on the Addiction Severity Index (ASI)–alcohol are consistent with alcohol dependence and scores ≥ 16 on the ASI–drug are consistent with drug dependence.

^h Possible scores range from 0 to 48, with higher scores indicating greater alcohol-related (SIP-A) or drug-related (SIP-D) problems.

ⁱ GEE negative binomial model.

^j GEE Poisson model.

substance use disorder treatment (5,46). Other studies that have explored CCM for depression or anxiety excluded substance dependence (27,47,48). Although the inclusion of patients with greater illness severity may have weakened any treatment effect of the intervention, it is important to remember that CCM is a comprehensive care model that is designed to accommodate the full spectrum of chronic illness severity. In addition, it is not clear that persons with less severe illnesses 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 a majority of baseline psychiatric assessments occurred during detoxification, the results may be generalizable only to patients assessed while in detoxification and not to patients with psychiatric diagnoses that are later determined to be unrelated to substance use. Because it is not uncommon for individuals to experience depression and anxiety during substance withdrawal, we may have overestimated the rate of depression and PTSD in the sample. In doing so, we introduced participants who would be expected to have improved mental health outcomes regardless of whether they received the intervention, possibly weakening a treatment effect of the intervention. But because referral decisions are often made

during detoxification, the assessment of patients during detoxification may have better replicated real-world conditions.

Because this was a subgroup analysis, the analysis may have been underpowered, given that the clinical trial was not designed to detect differences within subgroups. For example, among patients with PTSD, those in the intervention group had .86 times the odds of any substance use compared with the control group. In a post hoc power calculation, assuming 63% of the control group reported substance use (based on data at 12 months), the study would have approximately 80% power to detect an OR as small as .42. This study was, therefore, likely underpowered to detect an association of the observed magnitude. Finally, although not necessarily a limitation, it is important to note that although psychiatric comorbidity is common in the substance-dependent population, the current study intervention was designed to treat substance dependence (30). A treatment model that focused more on co-occurring disorders may have incorporated additional therapies, particularly integrated psychotherapies aimed at reducing substance use and mental symptoms.

Despite the negative findings, it is difficult to conclude that CCM cannot be effective for persons with co-occurring disorders. This study's participants, many of whom were not

TABLE 3. Effects of chronic care management (CCM) for substance dependence versus usual primary care among 205 patients with posttraumatic stress disorder over a 12-month follow-up period

Variable	Baseline (N=205)				12-month follow-up (N=195) ^a				Parameter ^b	95% CI	p
	CCM (N=100)		Usual care (N=105)		CCM (N=97)		Usual care (N=98)				
	N	%	N	%	N	%	N	%			
Use of any stimulants or opioids or heavy drinking in past 30 days	100	100	105	100	53	55	62	63	OR=.86 ^c	.52–1.41	.55
PHQ-9 score ≥20 ^d	48	48	56	53	47	48	51	52	OR=1.02 ^e	.66–1.55	.94
BAI score ≥26 ^f	71	73	69	70	68	72	65	70	OR=.88 ^e	.57–1.38	.58
ASI-alcohol score ≥17 ^g	78	78	78	74	76	78	73	74	OR=1.01 ^c	.57–1.80	.97
ASI-drug score ≥16 ^g	83	83	91	87	81	84	84	86	OR=1.30 ^c	.81–2.07	.28
SIP-A score (M±SD) ^h	22.8±15.5		22.9±16.4		9.4±14.4		10.9±14.3		IRR=1.08 ⁱ	.76–1.52	.68
SIP-D score (M±SD) ^h	31.2±13.2		32.2±12.4		16.9±16.4		15.8±16.1		IRR=.91 ⁱ	.71–1.16	.44
Any days in emergency department	56	56	66	63	31	32	43	44	OR=.87 ^c	.56–1.34	.53
Days in emergency department (M±SD)	1.2±1.6		1.5±1.9		.6±1.0		.7±1.1		IRR=.68 ^j	.44–1.07	.10
Any nights hospitalized	35	35	42	40	21	22	16	16	OR=.90 ^c	.54–1.52	.70
Nights hospitalized (M±SD)	2.6±6.4		3.6±9.5		3.3±11.3		1.3±5.7		IRR=.86 ^j	.49–1.51	.60

^a Short Inventory of Problems–alcohol (SIP-A) and Short Inventory of Problems–drug (SIP-D) outcomes were available for 193 patients.

^b Generalized estimating equation (GEE) models were adjusted for time, substance of dependence, race-ethnicity, sex, baseline Patient Health Questionnaire–9 (PHQ-9) score, baseline Beck Anxiety Inventory (BAI) score, any outpatient substance treatment in the past 3 months prior to study entry, and lifetime injection drug use. IRR, incidence rate ratio.

^c GEE logistic model.

^d Scores ≥ 20 indicate severe depression which represents the top 1 of 5 ordered categories used for analysis. The OR is for a 1-category increase in depression severity.

^e GEE proportional odds model, modeling odds of higher (worse) score.

^f Scores ≥ 26 indicate severe anxiety which represents the top 1 of 5 ordered categories used for analysis. The OR is for a 1-category increase in anxiety severity.

^g Scores ≥ 17 on the Addiction Severity Index (ASI)–alcohol are consistent with alcohol dependence and scores ≥ 16 on the ASI–drug are consistent with drug dependence.

^h Possible scores range from 0 to 48, with higher scores indicating greater alcohol-related (SIP-A) or drug-related (SIP-D) problems.

ⁱ Negative binomial model.

^j GEE Poisson model.

seeking treatment, had high illness severity with regard to substance use, mental health, and homelessness. Although CCM was designed to facilitate access to efficacious treatments, because of the high degree of comorbidity among this study's participants, any beneficial effects may have been too small to be measured. Furthermore, the CCM intervention relied on the existing health care 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 treat those with co-occurring disorders and, therefore, may be improved by adding services that better meet the needs of those patients.

CONCLUSIONS

Although CCM 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 among those with co-occurring disorders, it may be necessary

to modify care models and content to better address current deficiencies in care for patients with co-occurring disorders.

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TABLE 4. Effects of chronic care management (CCM) for substance dependence versus usual primary care on use of addiction and mental health treatment by patients with co-occurring disorders over a 12-month follow-up period^a

Variable	Depression			PTSD		
	OR	95% CI	p	OR	95% CI	p
Mutual-help meeting	1.02	.74–1.40	.93	1.14	.70–1.87	.59
Addiction treatment	1.52	1.12–2.06	.01	1.42	.90–2.23	.13
Inpatient addiction treatment	1.07	.76–1.50	.70	.86	.51–1.45	.58
Addiction medication	2.03	1.31–3.17	.002	2.51	1.20–5.26	.01
Mental health treatment	2.64	1.82–3.85	<.001	3.16	1.78–5.63	<.001
Psychiatric medication	1.95	1.35–2.82	<.001	1.92	1.12–3.29	.02

^a Generalized estimating equation models were adjusted for time, substance of dependence, race-ethnicity, sex, baseline Patient Health Questionnaire–9 score, baseline Beck Anxiety Inventory score, any outpatient substance treatment in the 3 months prior to study entry, and lifetime injection drug use.

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Short Descriptions of Novel Programs Invited

Psychiatric Services invites contributions for Frontline Reports, a column featuring short descriptions of novel approaches to mental health problems or creative applications of established concepts in different settings.

Text should be 350 to 750 words. A maximum of three authors, including the contact person, can be listed; one author is preferred. References, tables, and figures are not used. Any statements about program effectiveness must be accompanied by supporting data within text.

Material to be considered for Frontline Reports should be sent to one of the column editors: Francine Cournois, M.D., New York State Psychiatric Institute (e-mail: fc15@columbia.edu), or Stephen M. Goldfinger, M.D., Department of Psychiatry, SUNY Downstate Medical Center (e-mail: smgoldfingermd@aol.com).