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The prescription of addiction medications after implementation of chronic care management for substance dependence in primary care

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Abstract

People with addictive disorders commonly do not receive efficacious medications. Chronic care management (CCM) is designed to facilitate delivery of effective therapies. Using data from the CCM group in a trial testing its effectiveness for addiction (n=282), we examined factors associated with the prescription of addiction medications. Among participants with alcohol dependence, 17% (95%CI 12.0–22.1%) were prescribed alcohol dependence medications. Among those with drug dependence, 9% (95%CI 5.5–12.6%) were prescribed drug dependence medications. Among those with opioids as a substance of choice, 15% (95%CI 9.3–20.9%) were prescribed opioid agonist therapy. In contrast, psychiatric medications were prescribed to 64% (95%CI 58.2–69.4%). Absence of co-morbid drug dependence was associated with prescription of alcohol dependence medications. Lower alcohol addiction severity and recent opioid use were associated with prescription of drug dependence medications. Better understanding of infrequent prescription of addiction medications, despite a supportive clinical setting, might inform optimal approaches to delivering addiction medications.

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Keywords

chronic care management; substance abuse treatment; medications; naltrexone; acamprosate; buprenorphine

1. Introduction

Medications are effective tools in the treatment of substance use disorders. Naltrexone and acamprosate have been shown to reduce short-term alcohol use in those with alcohol use disorders (Jonas et al., 2014). Methadone and buprenorphine have been shown to reduce opioid use in those with opioid use disorders (Mattick et al., 2009). Additionally, methadone has been shown to reduce mortality (Degenhardt et al., 2011) and HIV transmission (MacArthur et al., 2012) in those with opioid use disorders. Despite their effectiveness for alcohol and opioid use disorders, these treatments remain underutilized by patients and under-prescribed by clinicians (Harris et al., 2012; Knudsen, Abraham, Johnson, & Roman, 2009). And some substance use disorders do not have efficacious medication treatments (e.g. cocaine use disorders). In contrast, use of medications in other psychiatric illnesses is common (Pincus et al., 1998; Wu, Wang, Katz, & Farley, 2013). Potential reasons for underutilization of addiction medications include patient and clinician-related barriers, such as doubts about treatment effectiveness by both clinicians and patients, clinicians' lack of knowledge or comfort in delivering the treatment, differing philosophies about the role of addiction medications in assisting addiction recovery, stigma, and patients' reluctance to take them (Friedmann & Schwartz, 2012; Garner, 2009; Roman et al., 2011). Systems-related barriers for underutilization may include separate and uncoordinated systems of medical and addiction care, limitations in access to care, lack of institutional support, and inadequate administrative and personnel infrastructures (McLellan & Meyers, 2004; Samet, Friedmann, & Saitz, 2001; Walley et al., 2008).

Chronic care management (CCM) is a clinical approach designed for use in primary care to increase the delivery of effective therapies (Wagner, Austin, & Von Korff, 1996). By providing coordinated, patient-centered care delivered by a multidisciplinary team, CCM may reduce many of the systems and clinician-related barriers to the delivery of addiction medications to patients. Indeed, in the Addiction Health Evaluation And Disease Management (AHEAD) trial, a randomized clinical trial that tested the effectiveness of CCM for substance dependence in a primary care setting, participants receiving CCM had an increased use of addiction medications compared to those receiving usual primary care (Saitz et al., 2013). Twenty-one percent of participants receiving CCM compared to 15 percent of those in the control group were prescribed an addiction medication at the end of the AHEAD trial, a statistically significant difference. This was a secondary outcome of the trial. There was no statistically significant difference between the CCM intervention group and control in the trial's primary outcome of abstinence from opioids, stimulants or heavy drinking. In a study that examined the feasibility of performance measures for addiction pharmacotherapy using administrative data from multiple health systems, the authors found that the proportion of individuals receiving addiction pharmacotherapy varied between systems due to differences in both the number of people receiving medication and the

number of people with an addiction diagnosis (Thomas et al., 2013). Thus a clinical trial such as the AHEAD trial in which only people with substance dependence were enrolled may provide a better estimate of the rate of prescribing of addiction medications in a clinical setting ideally organized to facilitate the prescription of such treatment.

Previous studies in non-CCM settings have found that receipt of addiction medications varies by patient characteristics. One study reported that being female, less than age 55, not having a co-morbid drug diagnosis, having a co-morbid psychiatric diagnosis and having specialty addiction care contact were all positive predictors of receiving an alcohol medication in the Veterans Health Administration (VHA) (Harris et al., 2012). Both male and female gender (in conflicting studies), being older than 25, not being African-American, and not having a co-morbid psychiatric disorder were factors associated with receiving opioid agonist therapies (OAT) in the VHA and in a Medicaid population (Oliva et al., 2012; Stein et al., 2012). Thus patient demographic characteristics as well as the presence or absence of a co-morbid psychiatric disorder appear to be associated with the receipt of addiction medications in these populations. Notably, those with a co-morbid drug diagnosis were less likely to receive alcohol medications in the Harris study. Due to its opioid receptor antagonism, naltrexone may not be recommended if a patient is taking or considering taking OAT. Similarly, prescribing OAT in patients who are actively drinking may introduce the risk of oversedation and overdose and thus may not be recommended. In this study, we aimed to examine the association between patient characteristics and the receipt of addiction medications in the CCM intervention arm of the AHEAD trial. Because little is known about patient characteristics that are associated with receipt of addiction medications in a CCM setting, where many clinician-level barriers to the delivery of medications are addressed, identifying these patient characteristics may help elucidate unrecognized and suspected barriers.

In this secondary analysis of the AHEAD trial, we aimed to 1) further describe the frequency of prescription of addiction and psychiatric medications in the group randomly assigned to receive CCM and 2) examine patient factors associated with prescription of addiction medications at follow-up in the context of this CCM clinic for substance dependence.

2. Material and methods

2.1. Study participants

This is an exploratory analysis of adults with substance dependence who enrolled in the Addiction Health Evaluation And Disease Management (AHEAD) trial, a randomized clinical trial that tested the effectiveness of chronic care management for substance dependence in a primary care setting. The study design of the AHEAD trial has been described previously (Saitz et al., 2013). The study sample for the current analysis includes only individuals who were randomly assigned to attend the intervention tested in the AHEAD trial. The control participants were excluded from this analysis because this study focuses on the magnitude and predictors of addiction medication prescription within the context of a CCM clinical approach.

Participants in the AHEAD trial were recruited primarily from a residential detoxification unit (73%), as well as by self and physician referral from Boston Medical Center (BMC) (9%), and through bus and newspaper advertisements (16%). Participants were adults with alcohol and/or drug dependence as determined by the Composite International Diagnostic Interview-Short Form (CIDI-SF) (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998) who were willing to establish or continue primary medical care at BMC who had heavy drinking in the past month for those with alcohol dependence or past 30 day drug use (psychostimulants or opioids) for those with drug dependence. Heavy drinking was defined as the number of drinks in an average week in the past month: 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. 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. Interest in substance abuse treatment, addiction pharmacotherapy, or chronic care management was not an eligibility requirement.

Of the 2,029 persons screened for the AHEAD trial, 1,374 were excluded. The most common reasons for exclusion were being unwilling to establish or continue primary care at BMC (600 people), cognitive impairment (389), not meeting alcohol or drug criteria (130), or being unwilling or unable to attend the first clinic visit (118). Eighty-five people declined to be in the study after being deemed eligible. Of the 563 people randomized, 282 were assigned to receive CCM.

Individuals who met eligibility criteria and agreed to participate in the AHEAD trial provided written informed consent prior to enrollment and received compensation for completing study research procedures. Study participants were neither encouraged nor discouraged by research assistants to return to the clinic and no compensation was provided for attendance. The Institutional Review Board at Boston University Medical Campus approved this study, and a Certificate of Confidentiality was obtained from the NIH to further ensure participant confidentiality.

2.2 Chronic Care Management Clinic Protocol

The CCM clinic aimed to provide CCM for alcohol and drug dependent individuals in a primary care setting. It provided longitudinal care and coordinated specialty medical, psychiatric and addiction care with primary care. It included clinical case management, active follow-up, referrals and patient advocacy. Tailored treatment plans were developed collaboratively with the involvement of participants, their primary care physician and other relevant clinicians. A shared electronic medical record with specifically created forms of standardized addiction-related assessments was utilized. The clinic staff was comprised of a multidisciplinary team separate from any primary care staff that included a nurse clinical care manager, a social worker, two internists and a psychiatrist. The nurse clinical care manager and social worker worked full time (nurse available by pager 24 hours/day), and physicians worked in the clinic two half-days per week. All physicians were waived to prescribe buprenorphine and received training in motivational interviewing.

At the initial clinic encounter, addiction, medical, social, and psychological assessments were conducted by clinicians. These results were separate from assessments conducted by research associates for the AHEAD trial. The latter assessments were made available for review by clinical staff to avoid repetition for participants. After assessment, all participants were offered motivational enhancement therapy (4 sessions with the social worker), relapse prevention counseling (all staff at each contact), and referral (as appropriate and clinically indicated) to specialty addiction treatment including methadone maintenance treatment and mutual help groups. Treatment plans were discussed during weekly treatment team meetings. Primary care physicians did not participate in treatment team meetings but were contacted separately by CCM staff through messages via the electronic medical record and communication in-person and by phone. Continuing care was provided during follow-up. This consisted of nurse clinical care manager and social work contacts, ongoing facilitated referrals, and availability for drop-in care. Participants were contacted proactively for re-engagement when loss to follow-up occurred for any reason. Abstinence or involvement in specialty addiction treatment was not a requirement for attendance at the clinic, and participants could return to re-establish care at any time.

Addiction and psychiatric medications were offered when appropriate. All physicians in the CCM clinic were trained to offer and prescribe addiction medications to those with dependence including opioid agonists for opioid dependence and naltrexone, acamprosate and disulfiram for alcohol dependence. Weekly research meetings were held in which clinicians received feedback on the number of participants in the clinic prescribed addiction medications. No insurance barriers to medications were present (medications were covered by insurance plans or, most often, by free medication provided by the hospital pharmacy).

Further detail of the CCM intervention is available in the main AHEAD trial publication (Saitz et al., 2013).

2.3 Dependent variables

The dependent variable was the presence of addiction pharmacotherapy prescription during the 90 days after the first clinical visit. This was assessed by prescriptions abstracted from participants' electronic health records (EHR), which represented all records for care received at BMC (all prescription was electronic with the exception of rare computer downtime procedures). Though prescribing may have occurred after the 90 day period, follow-up visits noticeably decreased after the first visit (99.6% attended at least one CCM clinic visit, 75.9% attended at least 2, and 64.5% attended 3 or more), making prescription after 90 days less likely. Addiction medications included only the following: acamprosate, oral naltrexone, and disulfiram for alcohol dependence and buprenorphine and methadone for opioid dependence. One patient received amantadine to treat cocaine dependence based on limited evidence of efficacy at the time of the study (Shoptaw, Kintaudi, Charuvastra, & Ling, 2002). Methadone was not prescribed or administered on site, but was recorded in the EHR after it was confirmed that participants initiated treatment at a methadone maintenance clinic. Disulfiram was not prescribed for cocaine dependence and naltrexone was not prescribed for opioid dependence due to limited or unavailable efficacy data at the time the study was conducted (2006–2008). Psychiatric medications were also measured for

comparison purposes and consisted of antidepressants (amitriptyline, bupropion, citalopram, doxepin, escitalopram, fluoxetine, mirtazapine, nortriptyline, paroxetine, sertraline, trazodone, venlafaxine), mood stabilizing agents (lamotrigine, lithium, oxcarbazepine, valproic acid), antipsychotics (aripiprazole, olanzapine, quetiapine, risperidone, ziprasidone), stimulants for attention deficit hyperactivity disorder (dextroamphetamine/amphetamine, methylphenidate), anxiolytics (buspirone, clonidine, clonazepam, diazepam, gabapentin, hydroxyzine, lorazepam), and hypnotics (zolpidem, diphenhydramine).

2.4 Independent variables

The independent variables examined included baseline participant characteristics assessed in standardized in-person interviews administered by trained research associates: 1) self-reported demographic characteristics including age, gender, race/ethnicity, homelessness (at least one night homeless in the past 3 months), and insurance status, 2) alcohol and drug dependence, assessed by the CIDI-SF, 3) past 30 day opioid, cocaine, or marijuana use or heavy drinking assessed by the 30-day timeline follow-back method, 4) addiction treatment utilization by self-report consisting of inpatient and outpatient treatment (residential programs, halfway houses and holding programs), addiction medication usage in the 3 months prior to study entry (naltrexone, acamprosate, disulfiram, methadone, and buprenorphine), and 12-step program participation (Alcoholics Anonymous, Narcotics Anonymous, Cocaine Anonymous, self-help, mutual-help, or another 12-step program) with questions adapted from the Treatment Services Review and the Form 90 (McLellan et al., 1992; Miller, 1996), 5) alcohol and drug addiction severity and substance of choice assessed by the Addiction Severity Index (ASI) (McLellan et al., 1992), 6) major depressive disorder (MDD) and post-traumatic stress disorder (PTSD) assessed by the Mini International Neuropsychiatric Interview (MINI) (Sheehan et al., 1998), 7) psychotic symptoms assessed by the Behavior and Symptom Identification Scale (BASIS-24) (Eisen et al., 2004), and 8) and physical and mental health-related quality of life [12-item Short Form health survey (SF-12) Physical Component Summary (PCS) and Mental Component Summary (MCS) scale] (Ware, Kosinski, & Keller, 1996).

2.5 Statistical Analysis

Descriptive statistics were used to characterize participant demographics, mental health diagnoses, addiction severity, addiction treatment utilization, and prior use of addiction medications. We then examined the association between baseline characteristics and prescription of addiction medications. Baseline characteristics were chosen based on availability and literature review of identified predictors of receipt of addiction medications. Because a relatively small number of participants had alcohol dependence or drug dependence alone, we examined this association in two overlapping subgroups: 1) those with alcohol dependence with or without drug dependence and 2) drug dependence with or without alcohol dependence. Due to the relatively small number of events (i.e. X participants prescribed alcohol addiction medications; Y participants prescribed drug addiction medications), we explored potential predictors in separate logistic regression models, each adjusting for a core set of covariates (age, race, gender, insurance status, and homelessness) expected to be potential confounders based on clinical experience and literature review. First, unadjusted bivariate analyses were conducted evaluating the

association between each baseline characteristic and prescription of addiction medications. Next, baseline characteristics were selected for inclusion in models if the variable had a p-value < 0.15 in bivariate analyses. The criterion of 0.15 was used in order to include a potentially larger number of factors in the multivariable analyses, however a two-sided alpha level of 0.05 was used for hypothesis testing. Each of the factors identified from bivariate analyses was then examined in separate logistic regression models which included adjustment for the potential confounders age, race, gender, insurance status, and homelessness. All analyses were completed using SAS/STAT software, Version 9.3, SAS Institute Inc. Cary, NC.

3. Results

3.1. Participant characteristics

Baseline participant characteristics are displayed in Table 1. The majority of participants was male, had both alcohol and drug dependence, and had major depressive disorder. A majority also had spent one or more nights homeless in the past 3 months.

3.2. Prescription of addiction medications

In the 90 day period following the initial CCM clinic visit, 21% (59/282) of participants were prescribed addiction medications (Table 2). Among those with alcohol dependence, 17% (36/211; 95%CI 12.0–22.1%) of participants were prescribed alcohol dependence medications. Among those with drug dependence, 9% (23/253; 95%CI 5.5–12.6%) of participants were prescribed drug dependence medications. Among those who reported an opioid as their first or second substance of choice, 15% (22/146; 95%CI 9.3–20.9%) were prescribed buprenorphine or received methadone maintenance treatment. In contradistinction to the prescription of addiction medications, most, 64% (180/282; 95%CI 58.2–69.4%), were prescribed psychiatric medications.

3.3. Predictors of prescription of addiction pharmacotherapy

Among those with alcohol dependence, having alcohol dependence alone compared to both alcohol and drug dependence (AOR=3.49; 95% CI 1.39–8.75) was associated with a greater odds of prescription of alcohol dependence medications during the 90 day period after the first CCM clinic visit, while baseline past 30 day opioid (AOR=0.34, 95%CI 0.12–0.97) or cocaine use (AOR=0.35, 95% CI 0.16–0.76), and a higher PCS score, indicating better physical health-related quality of life, (AOR=0.96, 95%CI 0.91–1.00), was associated with a lower odds of subsequent prescription (Table 3).

Among those with drug dependence, greater drug addiction severity (ASI drug score middle vs. lowest tertile: adjusted odds ratio [AOR]=8.14, 95% CI 1.67–39.62, highest vs. lowest tertile: AOR=6.36, 95% CI 1.21–33.47) and past 30 day opioid use (AOR=3.38, 95% CI 1.32–8.66) were associated with a greater odds of subsequent prescription of drug dependence medications. However, greater alcohol addiction severity (ASI alcohol score middle vs. lowest tertile: adjusted odds ratio [AOR]=0.33, 95% CI 0.11–0.97, highest vs. lowest tertile: AOR=0.17, 95% CI 0.04–0.68) was associated with a lower odds of subsequent prescription of drug dependence medications (Table 4).

4. Discussion

This study found that despite an intervention that mitigated some barriers to treatment, only a minority of patients with alcohol and/or drug dependence was prescribed addiction medications. Seventeen percent of alcohol dependent participants were prescribed alcohol dependence medications and 9% of drug dependent participants were prescribed drug dependence medications. In comparison, even though all did not have psychiatric diagnoses, the number of participants prescribed psychiatric medications was roughly three times the number prescribed addiction medications. Furthermore, the proportion of participants prescribed psychiatric medications increased by 41% from baseline, while those receiving addiction medications only increased by 16%. The absence of recent use of opioids or cocaine, the absence of co-occurring drug dependence, and worse physical health-related quality of life were associated with receiving an alcohol dependence medication prescription. Greater drug addiction severity and recent opioid use were associated with receiving a drug dependence medication prescription but lower alcohol addiction severity was associated with receiving drug dependence medication prescription.

4.1. Comparisons with other studies

Since CCM is designed to reduce barriers to the delivery of efficacious treatments, one might have expected greater numbers of participants to be prescribed addiction medications. The Washington Circle convened a panel to discuss the advancement of performance measures for the use of addiction medications and listed key challenges to the adoption of addiction medication prescription (Thomas et al., 2011). This list included barriers related to payment, physician education, program resistance to change, poor linkages between primary and specialty care, and limited access to information about addiction medications for patients and providers. Each of these barriers was addressed by the CCM intervention employed in this study. Despite a seemingly low proportion of participants being prescribed addiction medications overall, this proportion was an increase when compared to the baseline proportion of participants receiving addiction medications. Furthermore, this proportion may represent an improvement compared to national estimates of addiction medication prescribing, particularly for treatment of alcohol dependence. An increase would be expected given the ideal clinical scenario, chronic care management in primary care, in which these patients received medical care. Comparisons with other studies are limited by differences in methodology and sample populations. Other studies have looked at prescribing over a year or longer, while we looked over 90 days. Additionally, other studies have relied on claims data to identify individuals with addiction disorders who are appropriate candidates to receive addiction medications. Addiction disorders may be underdiagnosed among those in private health plans leading to an inflated addiction medication prescribing rate in those settings (Thomas et al., 2013). Because we only included participants who screened positive for substance dependence in the current study, the prescribing rate in this study may be more accurate.

Estimates of addiction medication prescribing rates over a year have ranged from 3.9% in the VHA to 16.4% in private health plans for alcohol dependence medications (Harris, Kivlahan, Bowe, & Humphreys, 2010; Thomas et al., 2013). In a survey of addiction

treatment program leaders in the VA, 46.5% of participants identified lack of confidence in naltrexone's effectiveness as a barrier to its implementation (Willenbring et al., 2004). In a survey of staff members of community addiction programs, 46.1% were unsure if naltrexone should be used more, while support for psychiatric medications and methadone were greater (Forman, Bovasso & Woody, 2001). A greater confidence in the effectiveness of naltrexone among AHEAD clinic staff members may have contributed to a higher rate of prescription of alcohol dependence medications in the current study. Estimates of addiction medication prescribing rates over a year have ranged from 5.4% in Medicaid to 34.2% in private health plans for opioid dependence medications (Thomas et al., 2013). Only 15% of patients who described an opioid as their first or second substance of choice were prescribed an opioid agonist therapy (OAT) in this study. This may be explained by the shorter timeframe of this study and a different sample population with comorbidities such as co-morbid alcohol dependence that deterred prescribing.

What is an appropriate amount of prescribing of addiction medications? Not all patients with substance use disorders are appropriate for or require addiction medications. Of those who are eligible for treatment, many may not want it. As a point of comparison in this study, a much greater proportion, 63% of participants, were prescribed a medication for a psychiatric disorder, though the proportion of participants with indications for psychiatric medications may have differed from those with indications for addiction medications in our sample. Furthermore, those with psychiatric disorders have a broader array of medications that might be prescribed for them. Another comparison to the prescription of alcohol medications might be the medications for hypertension, a chronic medical illness in which there are efficacious treatments with small effects. Data from the National Health and Nutrition Examination Survey (NHANES) indicate that 76.4% of patients with hypertension took an anti-hypertensive medication in 2009–2010 (Yoon, Burt, Louis, & Carroll, 2012). This figure is clearly substantially greater than current prescribing of addiction medications even in the most optimal of treatment settings.

With regards to predictors of addiction pharmacotherapy, a previous study identified female gender, age less than 55, not having a co-morbid drug diagnosis, having a co-morbid psychiatric diagnosis and having specialty addiction care contact as predictors of receiving an alcohol medication in the VHA (Harris et al., 2012). Similarly in our study, not having co-morbid drug dependence or not having recent drug use were associated with prescription of alcohol medications. Previous studies identified both male and female gender (in conflicting studies), being older than 25, not being African-American, and not having a co-morbid psychiatric disorder as factors associated with receiving OAT (Oliva et al., 2012; Stein et al., 2012). In contrast, we were unable to detect associations between diagnosis of co-morbid major depressive disorder and post-traumatic stress disorder, and prescription of medications for drug dependence perhaps because of the high prevalence of this study's mental health disorders. Additionally, no patient demographic variables were found to be associated with prescription of addiction medications in unadjusted bivariate analyses in our study.

4.2. Clinical implications

From the findings of this study, having co-morbid drug dependence is associated with a lower odds of being prescribed an alcohol dependence medication. Similarly, having more severe alcohol addiction reduces the odds of being prescribed a drug dependence medication. Though naltrexone may not be recommended if a patient is taking or considering taking OAT because of its opioid receptor antagonism, this does not explain the association between drug use and receipt of alcohol medications, given that the alternative treatments, acamprosate and disulfiram, do not have a direct effect on the opioid receptor. Nor does it explain the association between recent cocaine use and the prescription of alcohol medications found in this study. As noted previously, prescribing OAT in patients who are actively drinking may introduce the risk of oversedation and overdose. Furthermore, people with drug use disorders who have more severe alcohol addiction may not be able to adhere to the often rigid requirements of an OAT treatment regimen. Since co-morbid drug use disorders are commonly observed in patients with alcohol dependence and vice versa (Compton et al., 2007; Stinson et al., 2005), this could significantly reduce the amount of prescribing of addiction medications and at the very least, clinicians should be advised of the full range of alcohol medication options. Additionally, this finding suggests that more work should be done testing the efficacy and risks of prescribing addiction medications for those with co-morbid alcohol and drug use disorders.

4.3. Limitations

Our study had several limitations. We measured prescriptions and were unable to validate whether these prescriptions were filled by participants. Though this may have affected our results, only a small minority of Medicare beneficiaries leave prescriptions unfilled (Kennedy, Tuleu, & MacKay, 2008). The most common reasons for leaving prescriptions unfilled were related to the cost of medications, which was not a concern for our study given medications were either covered by insurance or provided for free by the hospital pharmacy. We did not account for utilization of CCM care. This may be a factor since interest in addiction care was not an eligibility criteria and engagement with CCM care is significantly associated with addiction medications (Kim et al., 2011). Findings from this study were intended to be for purposes of hypothesis generation rather than for testing causality. The data presented in this study represent the experience of a single well-resourced chronic care management clinic based within an urban large primary care practice and therefore may not be generalizable to all other settings. However, clinicians did not have a treatment “philosophy” against medications, and in fact they were trained and familiar with the literature on medication efficacy and were eager to implement a protocol of offering medications for addiction when indicated and appropriate. Finally, few participants, particularly in the drug dependence group, received addiction medications, limiting our ability to adjust for potential confounders and more importantly, to detect and identify other potentially important predictors of prescription.

4.4. Future research

The findings in our study suggest that despite an intervention specially designed to deliver efficacious treatments, including addiction medications, that there are important barriers that

are underappreciated or have yet to be identified. For example, of the 20.6 million individuals in the United States with substance abuse or dependence in 2012, 94.6% did not feel they needed treatment (Substance Abuse and Mental Health Services, 2013). Reasons for not seeking treatment among those who identified a need for it included cost, stigma, and not knowing where to go for treatment. Thus, the development of interventions that reduce patient-level barriers such as the level of patient treatment-seeking, patient in addition to comorbidity and the other patient characteristics we identified in this study should be the aim of future studies. Our findings also suggest that providers should consider prescribing to those groups that appear to be under-prescribed addiction medications and might lack specific contraindications, such as individuals with co-morbid alcohol and drug use disorders. Additionally, though the intervention employed in this study largely addressed systems-level and provider-level barriers, these types of barriers to the delivery of addiction medications may remain in other settings and may be an area of focus for future research.

In conclusion, despite a resource-rich environment for addiction clinical care with few structural barriers to high quality clinical care, a minority of patients with alcohol and/or drug dependence were prescribed addiction medications. Although addressing system and clinician barriers can mitigate the low utilization of current medications for addictions, other barriers exist and need further elucidation and intervention in order to deliver these effective medications to appropriate patients.

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Highlights

- Prescription of addiction medications for those receiving chronic care management is described
- Factors associated with prescription of addiction medications in these individuals is described
- A minority of patients received addiction medications despite mitigation of treatment barriers
- Absence of drug dependence was associated with receipt of alcohol dependence medication
- Lower alcohol addiction severity was associated with receipt of drug dependence medication

Table 1

Baseline characteristics of drug and alcohol dependent participants randomized to the intervention arm of the AHEAD study assessing chronic care management in primary care for substance dependence (N=282)

Characteristic	N	(%)
Age, mean (SD)	38.6	(9.9)
Gender		
<i>Male</i>	198	(70)
<i>Female</i>	84	(30)
Race/Ethnicity		
<i>White</i>	132	(47)
<i>Black</i>	93	(33)
<i>Hispanic</i>	28	(10)
Homeless (1 or more nights in past 3 months)	159	(56)
Health insurance		
<i>Yes</i>	221	(79)
Dependence and recent use ^a		
<i>Alcohol only</i>	49	(17)
<i>Drug only</i>	76	(27)
<i>Alcohol and drug</i>	157	(56)
Opioid as first or second drug of choice		
<i>Heroin</i>	133	(47)
<i>Prescription opioid analgesic</i>	13	(5)
Addiction treatment (past three months, not including detoxification)	95	(34)
Mini-International Neuropsychiatric Interview		
<i>Major Depressive Episode (current)</i>	219	(78)
<i>Post-Traumatic Stress Disorder (current)</i>	100	(36)
Addiction Severity Index		
<i>Alcohol score, mean (SD)</i>	0.5	(0.3)
<i>Drug score, mean (SD)</i>	0.3	(0.2)

SD: Standard deviation

^a Recent use: Heavy drinking in the past 30 days for those with alcohol dependence and drug use in the past 30 days for those with drug dependence

Table 2

Addiction and psychiatric medication prescription to substance dependent participants randomized to the intervention arm of the AHEAD study (N=282)

Medication	Baseline, any use in past 3 months, % (95%CI)	90 day period after 1 st CCM clinic visit, % (95%CI)
Any addiction medication (n=282)	4.6 (2.2, 7.1)	20.9 (16.3, 26.1)
Any psychiatric medication (n=282)	22.7 (17.9, 27.7)	63.8 (58.2, 69.4)
Any alcohol dependence medication, among those with alcohol dependence (n=211)	1.9 (0.1, 3.7)	17.1 (12.0, 22.1)
Naltrexone	0.0 (NA)	10.0 (5.9, 14.0)
Acamprosate	1.4 (0.0, 3.0)	7.6 (4.0, 11.1)
Disulfiram	0.5 (0.0, 1.4)	0.5 (0.0, 1.4)
Any drug dependence medication, among those with drug dependence (n=253)	4.4 (1.8, 6.9)	9.1 (5.5, 12.6)
Methadone	2.4 (0.5, 4.3)	2.8 (0.7, 4.8)
Buprenorphine	0.8 (0.0, 1.9)	5.9 (3.0, 8.8)
Amantadine	0.0 (NA)	0.4 (0.0, 1.2)

CCM: Chronic care management

Table 3

Unadjusted and adjusted logistic regression models, odds of receiving a prescription for alcohol addiction medications, among those with CIDI alcohol dependence (n=211)

	Unadjusted		Adjusted ^a	
Independent variable	OR (95% CI)	p-value	OR (95% CI)	p-value
CIDI-12M alcohol and drug dependence status				
Alcohol and drug dependence	1.00 (ref)	<0.001	1.00 (ref)	0.01
Alcohol dependence only	5.62 (2.40, 13.18)		3.49 (1.39, 8.75)	
Addiction Severity Index drug score				
Lowest tertile	1.00 (ref)	0.003	1.00 (ref)	0.06
Middle tertile	0.49 (0.22, 1.10)		0.63 (0.27, 1.48)	
Highest tertile	0.15 (0.05, 0.46)		0.23 (0.07, 0.78)	
Addiction Severity Index alcohol score				
Lowest tertile	1.00 (ref)	0.07	1.00 (ref)	0.07
Middle tertile	1.23 (0.46, 3.33)		1.20 (0.42, 3.48)	
Highest tertile	2.64 (1.06, 6.57)		2.70 (1.03, 7.09)	
Past 30 day opioid use				
No	1.00 (ref)	0.02	1.00 (ref)	0.04
Yes	0.29 (0.11, 0.79)		0.34 (0.12, 0.97)	
Past 30 day cocaine use				
No	1.00 (ref)	<0.001	1.00 (ref)	0.01
Yes	0.29 (0.14, 0.60)		0.35 (0.16, 0.76)	
Past 30 day marijuana use				
No	1.00 (ref)	0.14	1.00 (ref)	0.35
Yes	0.57 (0.28, 1.20)		0.69 (0.32, 1.50)	
SF-12 PCS (one unit increase)	0.95 (0.91, 0.99)	0.01	0.96 (0.91, 1.00)	0.04

CIDI: Composite International Diagnostic Interview

OR: Odds ratio

SF-12 PCS: Short Form Health Survey-12 Physical Component Summary score

^a Adjusted for age, gender, race, homelessness, and health insurance

Table 4

Unadjusted and adjusted logistic regression models, odds of receiving a prescription for drug addiction medications, among those with CIDI drug dependence (n=253)

	Unadjusted		Adjusted ^a	
Independent variable	OR (95% CI)	p-value	OR (95% CI)	p-value
Prior addiction med usage, past 3 months				
No	1.00 (ref)	0.07	1.00 (ref)	0.06
Yes	3.67 (0.92, 14.64)		4.16 (0.95, 18.25)	
Addiction Severity Index drug score				
Lowest tertile	1.00 (ref)	0.055	1.00 (ref)	0.03
Middle tertile	6.57 (1.42, 30.32)		8.14 (1.67, 39.62)	
Highest tertile	4.86 (1.02, 23.22)		6.36 (1.21, 33.47)	
Addiction Severity Index alcohol score				
Lowest tertile	1.00 (ref)	0.01	1.00 (ref)	0.02
Middle tertile	0.37 (0.14, 1.01)		0.33 (0.11, 0.97)	
Highest tertile	0.18 (0.05, 0.66)		0.17 (0.04, 0.68)	
Any days with heavy drinking (5+ men/4+ women), past 30 days				
No	1.00 (ref)	0.03	1.00 (ref)	0.06
Yes	0.37 (0.15, 0.89)		0.40 (0.15, 1.03)	
Past 30 day opioid use				
No	1.00 (ref)	0.007	1.00 (ref)	0.01
Yes	3.45 (1.40, 8.48)		3.38 (1.32, 8.66)	
SF-12 PCS (one unit increase)	0.96 (0.92, 1.01)	0.12	0.96 (0.91, 1.01)	0.10

CIDI: Composite International Diagnostic Interview

OR: Odds ratio

SF-12 PCS: Short Form Health Survey-12 Physical Component Summary score

^a Adjusted for age, gender, race, homelessness, and health insurance