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Addiction consultation services – Linking hospitalized patients to outpatient addiction treatment

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ABSTRACT

Background: Approximately 15% of hospitalized patients have an active substance use disorder (SUD). Starting treatment for SUD, including medications, during acute hospitalizations can engage patients in addiction care. In July 2015, the Boston Medical Center Addiction Consult Service (ACS), began providing inpatient diagnostic, management, and discharge linkage consultations. We describe this implementation.
Methods: The ACS staff recorded SUDs diagnoses and medication recommendations and tracked follow-up data for affiliated outpatient office-based addiction clinics and methadone maintenance programs. We assessed the number of consults, SUDs diagnoses, medications recommended and initiated, and outpatient addiction clinic follow-up.
Results: Over 26 weeks, the BMC ACS completed 337 consults: 78% had an opioid use disorder (UD), 37% an alcohol UD, 28% a cocaine UD, 9% a benzodiazepine UD, 3% a cannabinoid (including K2) UD, and <1% a methamphetamine UD. Methadone was initiated in 70 inpatients and buprenorphine in 40 inpatients. Naltrexone was recommended 45 times (for opioid UD, alcohol UD, or both). Of the patients initiated on methadone, 76% linked to methadone clinic, with 54%, 39%, and 29% still retained at 30, 90, and 180 days, respectively. For buprenorphine, 49% linked to clinic, with 39%, 27%, and 18% retained at 30, 90, and 180 days, respectively. For naltrexone, 26% linked to clinic, all with alcohol UD alone.
Conclusions: A new inpatient addiction consultation service diagnosed and treated hospitalized patients with substance use disorders and linked them to outpatient addiction treatment care. Initiating addiction medications, particularly opioid agonists, was feasible in the inpatient setting. Optimal linkage and retention of hospitalized patients to post-discharge addiction care warrants further innovation and program development.

1. Introduction

Substance use disorders (SUD) are associated with increased morbidity, mortality, and higher health care costs (Darke et al., 2006; Hannerz et al., 2001). The diagnosis of a substance use disorder alone is associated with a 13.8-year reduction in life expectancy (Hannerz et al., 2001). Since the 1990s, a dramatic increase in mortality has been demonstrated among middle-aged, non-Hispanic white Americans, primarily driven by overdose and other substance use-related health problems (Case & Deaton, 2015). Hospital admissions related to opioid overuse have increased 5% annually since 1993 (Owens et al., 2014), with admissions for infections related to injection drug use rising >70% since 2000 (Wurcel et al., 2016). In Massachusetts, between 2007 and 2014, opioid-related hospital discharges in general increased by 84% and those specifically heroin-related increased by 201% (Health Policy Commission, 2016). A 2016 Massachusetts study estimated that 15% of hospitalized patients have an active substance use disorder (Center for Health Information and Analysis, 2016), which is similar to the 17% found in a hospitalized cohort in a 2012 study done at Boston Medical Center (Walley et al., 2012). Hospitalized patients with SUDs are more likely to require resource- and cost-intensive healthcare interventions and leave without completing treatment, against medical advice (Ronan & Herzig, 2016). Medical and surgical inpatients with substance use disorders are also more likely to return to the emergency department or be readmitted to the hospital within 30 days of discharge (Walley et al., 2012).

Initiating treatment for substance use disorders in the acute hospital setting has also been shown to be feasible and effective (Liebschutz et

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al., 2014; O'Toole et al., 2006; Shanahan et al., 2010; Wei et al., 2015), leading to better medical and substance use outcomes, including decreased emergency services utilization, increased completion of medical therapy, and transitioning to outpatient substance use treatment (O'Toole et al., 2006; Wei et al., 2015). Starting agonist medications for opioid use disorders during acute medical treatment may be one key strategy in the pursuit of the goal to effectively engage patients in care for their SUD, improve retention in outpatient care, and decrease substance use (D'Onofrio et al., 2015; Liebschutz et al., 2014; Shanahan et al., 2010). Starting medication for alcohol use disorder during hospitalizations has also been associated with a decreased risk of hospital re-admission or emergency room visits (Wei et al., 2015).

Despite the high prevalence of substance use disorders among inpatients and the benefits of initiating treatment within this setting, substance use disorders are often not addressed (McNeely et al., 2012; Naeger et al., 2016; Rosenthal et al., 2016; Smothers et al., 2004). A 2016 analysis of patients admitted to an academic tertiary care center with injection drug use-associated infectious endocarditis showed that <8% of patients were discharged with any plan to start medical therapy for their opioid use disorder (Rosenthal et al., 2016). Indeed, physician or self-referral for any SUD treatment after hospital discharge remains uncommon (Naeger et al., 2016; Smothers et al., 2004). Among outpatient providers, a 2015 survey showed that even though nearly half of general internal medicine physicians frequently cared for patients with SUD, only 16% frequently referred patients with SUDs for any form of treatment, and only 6% frequently prescribed addiction pharmacotherapy (Wakeman et al., 2016). Without addiction treatment, a large majority of people with a substance use disorder will return to substance use after discharge from an inpatient setting (Chutuape et al., 2001; Volkow et al., 2014). Engaging inpatients in evidence-based medication treatment for opioid use disorders has been recognized as a "reachable moment" in which to improve the course of some of the highest risk individuals impacted by addiction (Shanahan et al., 2010). Barriers to inpatient initiation of medications for OUD include the limited availability of outpatient providers and programs, lack of insurance coverage, and federal privacy regulations that make coordinating and integrating medical and addiction care difficult (Fanucchi & Lofwall, 2016).

To address the growing need among inpatients for substance use disorder diagnosis and treatment and to improve the care of these hospitalized patients, the Boston Medical Center Addiction Consult Service (ACS) began providing inpatient diagnostic, management, and discharge linkage consultations in July of 2015. Here, we describe the initial experience of the BMC ACS: number of consults, diagnoses of patients, use of addiction medications, and linkages to outpatient care.

1.1. Program description

Boston Medical Center (BMC) is a 496-bed academic urban safety net hospital with a substantial burden of substance use disorders among its medical and surgical inpatients (Ronan & Herzig, 2016). In July of 2015, BMC started an Addiction Consult Service (ACS). The multidisciplinary team consisted of a halftime attending physician, board certified in addiction medicine, and a halftime nurse with addiction expertise. The attending physician rotated; the nurse was consistent. Addiction Medicine specialty fellows were typically included in this team, in addition to Internal Medicine and Family Medicine residents who rotated on the service. The ACS' services included the diagnosis and inpatient management of substance use disorders, brief bedside counseling (including education to enhance addiction treatment engagement, relapse prevention, overdose prevention, particularly recommending and prescribing naloxone rescue kits, and other harm reduction), the initiation and ongoing management of addiction medications, and discharge planning. Discharge work for the ACS included collaborating with the primary hospital medical team, social work, and hospital case management, as well as coordination with and linkage to post-discharge addiction providers. The ACS regularly collaborated with social work within the hospital and held weekly joint rounds with the Psychiatry Consult and Liaison service. Consultation requests for ACS services were primarily the result of word-of-mouth, with no pro-active advertising.

The main outpatient clinical sites for post-discharge outpatient linkage were two Boston Medical Center clinics and three local methadone treatment clinics. The Boston Medical Center outpatient clinics included the Office Based Addiction Treatment (OBAT) clinic, which provides buprenorphine, naltrexone, and other addiction medication treatment within primary care (Alford et al., 2011). Concurrent with the initiation of the inpatient addiction consult service, a once-weekly outpatient Discharge Clinic, staffed by two addiction medicine fellows, was started, where discharged patients previously seen by the inpatient service could continue addiction treatment pending admission into the OBAT or another permanent outpatient addiction treatment clinic. The three main referral methadone maintenance clinics were all part of a large independent methadone clinic company with clinics throughout New England. One of the ACS attendings and three BMC addiction medicine fellows staffed these clinics weekly, conducting admission history and physicals and providing medical evaluation and treatment.

2. Methods

For patient care and quality assurance purposes, the ACS maintained a registry of referred patients. Between 07/2015 and 01/2016 the registry recorded the primary inpatient service, SUDs diagnosed, and the medications recommended and initiated. Additionally, follow-up data, both from BMC outpatient clinics and the methadone referral clinics were recorded. We calculated the frequencies of consults, individual SUDs, and recommendations and initiations of addiction medications. Descriptive statistics were calculated using proportions for categorical variables, means and medians for continuous variables as appropriate. The proportion of patients following up at the first appointment after discharge and then at 30, 90, and 180 days was also calculated. A patient was considered to still be in care if the patient had an active prescription for an addiction medication and/or notes in the electronic medical record from the clinic indicated on-going care. At the methadone clinic, patients were considered to still be in care as long as they were continuing to receive methadone medication from the clinic.

The Boston University Medical Campus Institutional Review Board determined this project to be exempt and not human subjects research.

3. Results

Over its first 26 weeks, 367 consults were placed to the ACS, with 337 consults completed on 319 unique patients. A mean of 2.8 consults were requested per weekday, Monday through Friday when the service was available. Consults not completed included patients who left against medical advice (AMA), were discharged prior to evaluation, refused to be seen, or were not appropriate consults (most often these were consults strictly for pain management without any known or suspected SUD). (Table 1). Among the 367 consult requests, the two

Table 1
Addiction consult service referral volume: July 2015 to January 2016 ($N = 367^{*}$).

	N
Consults seen	**337**
Consults not seen	**30**
Discharged before seen	14
Against medical advice	10
Not appropriate	3
Patient refused to be seen	1
Other	2

* Number of Unique Patients = 319.

largest consult referral sources were the general medicine teaching services (47%, $n = 174$) and the hospitalists services (11%, $n = 41$). Referring services also included 19% (71) from the different medicine subspecialty services (infectious diseases, cardiology, hematology-oncology, or nephrology), 7% (27) from the intensive care units (medical, cardiac, and surgical), 7% (26) from family medicine, 6% (23) from the surgical services (general, thoracic, cardiothoracic, trauma, and transplant surgery), and uncommonly from neurology, obstetrics and gynecology, and the emergency department before the patient was assigned an inpatient service (<1% each).

The number of SUDs diagnosed per patient ranged from 1 to 4, with a mean and median of 1.6 and 1 SUD diagnoses, respectively. Of the 337 encounters, this included 78% with an opioid use disorder (UD), 37% with an alcohol UD, 28% with a cocaine UD, 9% with a benzodiazepine UD, 3% with a cannabinoid (including K2) UD, and <1% with a methamphetamine UD (Fig. 1).

Among the discharged patients with an opioid use disorder who were not already engaged in treatment, methadone maintenance was initiated in 70 patients and buprenorphine maintenance in 40 patients. Naltrexone was recommended (though not necessarily initiated in hospital) 45 times (for opioid UD, alcohol UD, or both), acamprosate 12 times, disulfiram 6 times, and topiramate 2 times (Fig. 2). The ACS evaluated an additional 41 patients admitted already on methadone maintenance and 20 patients treated with buprenorphine, advising the referring team about medication management during the hospitalization and facilitating communication with the post-discharge providers.

Of the patients initiated on methadone, 76% (53/70) came to the methadone clinic post-discharge with 54% (38/70), 39% (27/70), and 29% (20/70) continuing to receive medication at 30, 90, and 180 days, respectively (Fig. 3). Notably, an additional 3 patients who did not make their initial intakes were later admitted to the methadone clinic without a second Addiction consult. One patient died, abstinent of illicit opioids per methadone clinic records, of unrelated causes prior to reaching 90 days on methadone.

Of those started on buprenorphine in the hospital and following up in the BMC system, 49% (16/33) attended their post-discharge clinic visit, and 39% (13/33), 27% (9/33), and 18% (6/33) continued receiving buprenorphine at BMC at 30, 90, and 180 days, respectively (Fig. 3). Among patients who were not retained in buprenorphine clinic, additional information was available to determine that 2 transferred to another addiction treatment center prior to 90 days, 1 was lost to follow-up prior to 180 day, and another 1 patient relapsed prior to 180 days and was started on methadone after another admission and consultation from the ACS.

Of the 45 naltrexone patients, 19 (2 for OUD, 15 for AUD, and 2 for both) were scheduled for a discharge clinic visit to either continue or initiate naltrexone, and 26% (5/19) attended their post-discharge clinic visit. All patients who were started on naltrexone were initially started

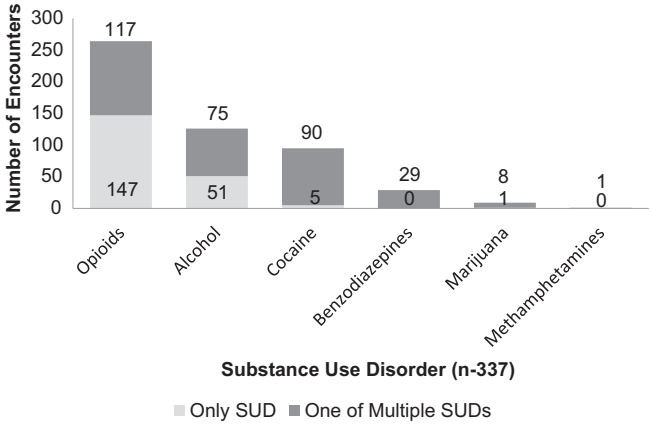

Fig. 1. Substance use disorders diagnosed.

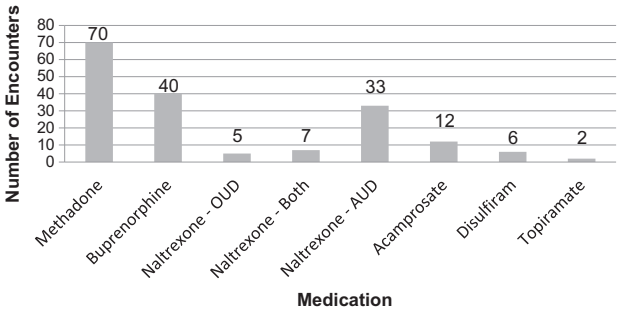

Fig. 2. Medications recommendations for substance use disorders.

on the oral formulation while in hospital, because injectable naltrexone was not on the inpatient formulary. Most insurance plans in Massachusetts do cover injectable naltrexone and thus outpatient transition to injectable naltrexone was usually recommended by the ACS post-discharge. Notably all patients who followed up were prescribed naltrexone exclusively for alcohol use disorder, not opioid use disorder or a combination of both (Fig. 3). Among those prescribed naltrexone for alcohol use disorder alone, 33% (5/15) attended their post-discharge clinic visit with 27% (4/15), 13% (2/15), and 0% (0/15) still in care at 30, 90, and 180 days, respectively. Prior to 30 days, one patient stopped their naltrexone, which was not restarted nor replaced by another medication for alcohol use disorder, but did remain in care with the primary care doctor.

4. Discussion

The Boston Medical Center ACS is a multi-disciplinary hospital consultation care team implemented to address the need at an urban safety-net hospital for the diagnosis and management of SUDs with linkage of hospitalized patients with these disorders to post-discharge care. The consultation service was utilized by a broad variety of primary clinical services. The service successfully linked patients to post-discharge addiction treatment, particularly patients with opioid use disorders who were initiated on methadone and buprenorphine while hospitalized.

The bulk of consults came from services associated with the Department of Medicine and General Internal Medicine, which is the group from where the ACS attending physicians, addiction medicine fellows, and many resident trainees were based. Consultation requests seemed to develop based on need combined with word-of-mouth of the service's usefulness; little to no advertising was carried out.

The most common SUD consulted for was opioid use disorder, which reflects two realities: Massachusetts, like much of the United States, is in the midst of an opioid use epidemic; and effective medical treatments for OUD are available. Alcohol use disorder (AUD), which is even more prevalent than OUD and has established medical treatments, was the next most common SUD requested consultation. The fewer consults for AUD compared to the OUD may reflect the fact treatments for AUDs are not as well recognized and the complexities of linking such patients to ongoing care for their SUD is not as substantial.

When starting opioid agonist therapy, follow-up rates were similar to those seen in prior studies conducted at Boston Medical Center for methadone (Shanahan et al., 2010) and buprenorphine (Liebschutz et al., 2014). Notably, these prior studies, particularly for initiating buprenorphine in the acute medical setting, had more selective eligibility criteria for the initiation of medication and had dedicated research staff to assist in discharge planning and follow-up. That our follow-up rates were similar shows that starting agonist therapy in-hospital and linking patients to on-going outpatient care is feasible in real world situations, not just well-controlled experimental settings. Initiating opioid agonist treatment, specifically methadone and buprenorphine, was more common and resulted in more successful linkage than initiating

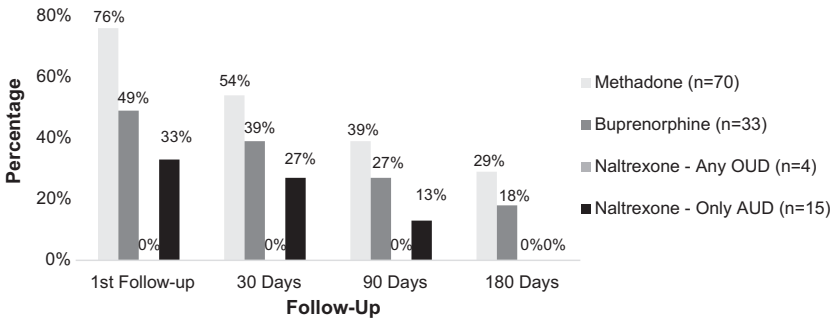

Fig. 3. Follow-up rates by medication.

naltrexone, a pure opioid antagonist. Initiating naltrexone was often limited by the requirement for several days of complete opioid abstinence to avoid precipitated withdrawal.

The decision to initiate methadone or buprenorphine relied on a mixture of factors including withdrawal severity, patient preference, past experience, provider judgment, and geographic and financial logistics of the follow-up clinic. Consistent with the hospital's existing practices, primary hospital teams often started methadone to control a patient's withdrawal symptoms prior to the addiction consult service assessment, which complicated subsequent consideration of the initiation of buprenorphine during the hospitalization. The higher linkage and retention rates in those started on methadone may have been due to patient selection criteria, the intrinsic properties of the medications, or the differences in the care delivery systems to which the ACS linked patients. The superior retention rates observed for patients started on methadone, a full agonist, as compared with buprenorphine, a partial agonist, has been described in prior studies (Bell et al., 2009; Hser et al., 2016; Minozzi et al., 2013). The less structured treatment environment in which buprenorphine and naltrexone are delivered may engage patients less and respond less quickly to their needs than the methadone treatment system where patients are seen daily at first. This decreased intensity of engagement compared with the methadone system has been suggested as a reason why patients on buprenorphine may be more likely to return to drug use after cessation of treatment as well (Bell et al., 2009). In the Boston Medical Center ACS system, patients discharged on methadone were expected at the clinic the next day to receive methadone, whereas patients started on buprenorphine received a prescription to bridge them to an office visit that was most often one to six days later. Perhaps the larger degree of freedom and lesser structure, particularly in early recovery, was insufficient support for some patients. As well, prior research suggests that though the quality of life for people on methadone and buprenorphine is very similar, people starting methadone may reach a better quality of life more rapidly than those starting on buprenorphine (Ponizovsky & Grinshpoon, 2009). Finally, it is possible that a partial agonist, buprenorphine, is just not able to full satisfy the “opioid debt” in some patients. Notably, the medication dose at the time of discharge varied, particularly for methadone, but dose at discharge was not recorded for this study. Prior studies have positively correlated dose and treatment retention (Hser et al., 2014; Mattick et al., 2014). Strategies to improve linkage and retention for inpatients initiated on medication for substance use disorders warrant further research.

Regardless of the differences in the rates of patients making their first post-discharge appointment, patients started on both methadone and buprenorphine continued to fall out of care over the course of the subsequent 180 days. This pattern has been seen in prior research as well (Bell et al., 2009; Mattick et al., 2004). The reasons for this are not entirely clear, but likely point out that medication alone, particularly among patients who were not necessarily seeking addiction treatment, is not adequate to sustain many patients in treatment during any one treatment trial.

The overall number of patients scheduled to start naltrexone for an opioid use disorder after discharge from the hospital was small and none of them made that appointment. A prior meta-analysis also found poor rates of follow-up for naltrexone when used for opioid use disorder, particularly oral naltrexone (Mattick et al., 2004). More recent studies of injectable naltrexone have shown better rates of follow-up injections, but still substantial discontinuation at each subsequent injection (Cousins et al., 2016; Lee et al., 2016). Initiating naltrexone by the Boston Medical Center ACS was hampered for patients with an active OUD because they were rarely in the hospital long enough to obtain the period of abstinence necessary to avoid a precipitated withdrawal. Not being able to initiate the medication until post-discharge undoubtedly led to a decrease in follow-up with clinical appointments. Additionally, injectable naltrexone, which provides 30 days of treatment after one injection, was not on the inpatient formulary. One strategy for those hospitalized patients recommended for injectable naltrexone would be to transfer them to an inpatient addiction treatment facilities to complete a medically supervised withdrawal and then initiate injectable naltrexone. Such transitions are not common currently and would require relationship building between programs, but would likely improve rates of follow-up.

There are several limitations in this description of the implementation of the Boston Medical Center ACS that warrant acknowledgment. First, the generalizability of the BMC ACS is limited. BMC is a center with previous experience of initiating addiction treatment in the hospital (Liebschutz et al., 2014; Shanahan et al., 2010), where several providers were board-certified in addiction medicine and there was an addiction medicine fellowship, both closely connected to outpatient treatment programs and in a state where there is near universal health insurance coverage. However, with healthcare insurance evolution and parity laws, these barriers may become more surmountable at other hospitals. Second, we collected data for quality improvement purposes via the electronic medical record and did not systematically assess patient or provider perspectives. Third, because this was an evaluation of a new program implemented throughout a hospital, we did not do any tests of effectiveness using a control group. Fourth, we did not have access to follow-up data at treatment programs outside of the affiliated office-based addiction clinics or methadone maintenance programs. Lastly, the scope of the information collected was primarily restricted to clinical outcomes. While the implementation of this consult service was promising for reducing readmissions and improving the health care costs of high risk patients, conducting a cost analysis was outside the scope of this study. We also did not collect data regarding admitted diagnoses or lengths of stay.

5. Conclusion

A new inpatient addiction consultation service that diagnosed and treated hospitalized patients with substance use disorders and linked them to outpatient care was actively implemented and utilized upon its creation. Initiating addiction medications, particularly opioid agonist

treatments, among medical and surgical inpatients was feasible in the inpatient setting. Effectively linking to and retaining patients in post-discharge addiction care remains a challenge and warrants further innovation and program development.

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