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An investigation comparing primary and secondary substance cravings between mental health and substance use disorder program inpatients

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ABSTRACT

Background: Mental illness symptoms can trigger substance use cravings, which are strongly associated with relapse.

Aim: Our study examines differences in substances craved among adults entering inpatient mental health (MH) and substance use disorder (SUD) treatment programs in 2018.

Method: Our sample includes 2,486 adults; 1,686 adults admitted to MH programs and 800 adults admitted to SUD programs. We conducted chi-square tests and Fisher's exact tests to determine group differences, with a Bonferroni correction to adjust the alpha for multiple tests.

Results: We found that patients programmed to SUD services more often reported alcohol (39.99 vs. 49.63%; x^2 (1, N = 2,488) =20.56, p<0.001) and opioid (8. 00% vs. 35.88%; x^2 (1, N = 2,488) =299.48, p < 0.001) cravings. Patients programmed to MH primary more often reported cannabis (16. 35% vs. 1.00%; x^2 (1, N=2,488) =299.48, p<0.001), stimulants (10.25% vs. 6.13%; x^2(1, N =2,488) = 11.36, p < 0.001), and "other substances" cravings (21.45% vs. 3.25; x^2 (2, N = 2,488) =136.52, p <0.001). Both groups mostly did not report secondary cravings.

Conclusions: Because cravings can negatively impact treatment success of patients with co-occurring disorders, cravings should be assessed upon admission to mental health or SUD inpatient treatment.

Keywords: psychiatric treatment, cravings, mental health, substance use, co-occurring disorders

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Cravings, which are defined as subjective intense urges to use a particular substance or substances [1, 2], constitute a biological component of substance use disorders (SUDs) that can impede abstinence [3], especially among individuals with co-occurring mental illnesses [4-6]. According to the DSM 5, cravings are a behavioral effect of changes in the brain circuitry that accompany SUDs [7]. Upon entering treatment, cravings may intensify as individuals change their patterns of substance use [8]. In addition, cravings are one of the most robust predictors of relapse following treatment [9, 10]. Substance use can disrupt neurotransmitters which are associated with the stress response and other mood changes experienced during withdrawal leading to stronger symptoms, greater craving intensity and increased reliance on substance use as a method of symptom relief [11]. Without conscious awareness, work-related stress, mental illnesses, physical pain, social and environmental cues can trigger cravings [3, 12].

People who misuse substances, are often self-medicating to numb the pain that ranges from daily stressful situations to more extreme stress [13-15]. Research has found relationships between specific psychological characteristics and the choice of substance used for coping [15]. Patients with COD often have a lower health related quality of life, particularly in areas of social functioning and role identification [16] and may therefore be less likely to use social connections as a coping strategy [17]. Similarly, and Carrà and colleagues [16] found that compared to non-dependent participants, those dependent on drugs reported poorer quality of life, more extrapyramidal side effects, and poorer functioning on the GAF; people dependent on alcohol gave more reasons for non-compliance with medication, and reported poorer GAF functioning.

Additionally, research by Marquez-Arrico et al. [18] notes that the coping strategies used by drug dependent patients tend to be negative in nature, such as self-blame and guilt (self-criticism), and to isolate from others (social withdrawal) and notes that the frequency of use of these strategies and their possible association with relapse differed between subsets of patients with mental health disorders (schizophrenia and depression). The use of negative coping mechanisms in some cases seemed to contribute to relapse suggesting self-medication by substance use.

Given the important role cravings may play in recovery and the likelihood of co-occurring disorders, we believe that assessing differences in substances craved between individuals admitted to an inpatient mental health program (MH) and patients admitted to an inpatient substance abuse program (SUD) could provide useful information for practitioners, researchers, and policymakers alike. The findings from this study will be especially important as more states consider expanding the role of psychiatric providers to include inpatient substance use treatment in response to the opioid crisis. Within this context, understanding the implications of cravings among mental health inpatients on treatment protocols and progress becomes increasingly important.

Treatment facilities often treat either mental illnesses or SUDs, but rarely treat both [19]. In fact, one study using national survey data found that only 11.8% of individuals with co-occurring disorders received integrated treatment [20]. The number of people who may not be receiving the integrated treatment they require may be substantial since in 2017 approximately 18.24% of adults with mental illnesses also had SUDs and 45.45% of people with SUDs had co-occurring mental illnesses [21]. Thus, when individuals admitted to an inpatient psychiatric hospital are not assessed for substance use cravings, treatment effectiveness may be limited because co-occurring mental illnesses and SUDs exacerbate the course of the mental illness by increasing relapses, hospitalizations, legal problems, medical problems, homelessness, incarceration, suicidality, and mortality [22-25]. Recent substance use among

mental health inpatients is also associated with treatment non-compliance [26].

One factor influencing treatment within MH programs is that individuals with co-occurring disorders may be unaware of or minimize their SUDs, preferring instead to focus treatment efforts on their psychiatric symptoms [27]. Unfortunately, failing to treat SUDs among those with co-occurring mental illnesses and SUDs has been correlated with poorer treatment outcomes, including a greater likelihood of hospitalization [28]. Conversely, when treatment facilities recognize and treat co-occurring mental illnesses and SUDs, outcomes are likely to improve. For example, McGaffin et al. [29] found that reduced substance use cravings preceded positive progress in mental health symptoms, which seems to suggest that mental health improves after cravings dissipate.

Several studies have found more intense cravings for people with co-occurring disorders, but most studies focused on a single substance or a single disorder. Griffin et al. [30] found that compared to patients without co-occurring disorders, patients with co-occurring disorders had stronger cravings for opioids at baseline. Fatseas et al. [31] found that patients with current mood and/or anxiety disorders had more intense cravings for cannabis compared to patients without mood and/or anxiety disorders. Likewise, Machielsen et al. [32] found that patients with schizophrenia and cannabis use disorder experienced greater cravings than those without cannabis use disorder. Coffey et al. [33] found that participants with Post-Traumatic Stress Disorder (PTSD) and alcohol use disorder reported the strongest cravings in response to the combination of trauma cues (i.e., negative emotions) and alcohol cues, which suggests that participants may have previously consumed alcohol in response to experiencing trauma cues. Tull et al. [34] also found that higher PTSD symptom severity was significantly correlated with more severe cravings after listening to the personalized trauma script, but Tull et al. did not indicate which substances the cravings were for. Similarly, a qualitative study that investigated the relationship between substance misuse, craving, and relapse found that after individuals faced cues associated with trauma such as nightmares or memories, they experienced cravings [35].

The literature exploring cravings among people with co-occurring disorders and different SUDs is quite limited. We found studies of cravings among individuals with alcohol, tobacco, cannabis, or prescription opioid use disorders in an outpatient treatment facility in Bordeaux, France. These individuals also had mood disorders, anxiety disorders or psychotic disorders, but were not actively psychotic. Each of these studies used computerized monitoring over two weeks to assess craving intensity and found that craving intensity was associated with substance use for disorders other than opioid use disorders. The authors posited that pharmacological opioid treatment, such as methadone or buprenorphine may explain the lack of cravings among individuals with opioid use disorders [8, 31, 36].

Polysubstance use describes using more than one substance over a set period of time either successively or simultaneously [37-45]. Individuals with co-occurring disorders have higher rates of polysubstance use than members of the general population who do not have co-occurring disorders [16, 46-49].

Under section 1115 of the Social Security Act, Medicaid directors provide states and localities the option to waive requirements of the Medicaid law in order to assess demonstration projects, pilot studies, or experiments that could be expanded if successful. Four areas 1115 waivers have targeted are: (1) waiving Medicaid's prohibition against funding "institutions for mental disease" in order to allow for inpatient SUD, mental health, or integrated treatment; (2) increasing Medicaid eligibility to include individuals with behavioral health needs, including co-occurring disorders; (3) increasing coverage for community-based behavioral health services that address the needs of

individuals with co-occurring disorders; and, (4) funding reforms within delivery systems, such as integrating physical and behavioral health [50]. Each of these four areas could improve access to treatment for individuals with co-occurring disorders.

The literature to date has not examined cravings for specific substances, which may have distinct influences on treatment outcomes. Studies have also not considered secondary cravings that may be prevalent among individuals with co-occurring disorders who may be more likely to engage in polysubstance use. Finally, we could not find any studies assessing substance use cravings in individuals admitted to inpatient MH programs referred to as institutions for mental disease (IMDs) in policy terms. The current study will begin to address some of these gaps in the literature.

The purpose of this study is to investigate similarities and differences in primary and secondary substances craved among individuals admitted to inpatient psychiatric hospitals and programmed to either primary mental health (n=1,688) or primary substance use disorder treatment (n=800). Our study had the following aims: (1) to compare demographic characteristics of MH and SUD inpatient program populations among patients that were admitted to inpatient psychiatric hospitals and assessed for assessed for substance cravings; (2) to compare diagnoses of MH and SUD inpatient populations among these patients; (3) to explore whether primary substances craved differed between patients programmed to MH and SUD programs; and, (4) to investigate whether secondary substances craved differed between these patients.

Methods

Data source

Our analysis utilized de-identified patient-level data collected by inpatient psychiatric hospitals as part of routine clinical processes to monitor patients' progress, outcomes, and satisfaction in order to improve quality of care. Records came from adult inpatient admissions at 13 distinct free-standing psychiatric facilities during 2018. Regional location varied and included Arkansas, Arizona, Colorado, Florida, Indiana, Kentucky, Mississippi, New Jersey, Pennsylvania, and Texas. Each participating program was trained on reviewing and obtaining informed consent, and understanding the instrument and the data collection process, which calls for administering the instrument to applicable patients at admission during the facility's routine admission process. Staff was trained to administer the Brief Craving Scale to patients for whom a substance use issue was either identified or suspected at intake regardless of whether the substance use issue was considered primary or was not the intervention target. During the admission process patients completed the informed consent and admission forms, which included the instruments. Afterwards the patients were programmed to mental health treatment or substance use treatment based on information collected.

Overall, 29.9% of all admission across the facilities included in this study completed the instrument at admission (23.8% of admitted patients at MH programs and 55.0% of SUD program patient). Most patients with a completed admission instrument (1,688, 67.8%) were admitted to an MH program and the remainder (800, 32.2%) admitted to a SUD program.

Ethical considerations

We asked the legal department and the Institutional Review Board (IRB) at Universal Health Services, Inc. (UHS) to review this study to determine whether the study required IRB approval. Following their review, the UHS legal team and the IRB concluded that because the study uses de-identified data, which are aggregated and cannot be linked with any individual, the study is in accordance with UHS' internal policies pertaining to confidentiality and privacy, as well as with federal laws in the United States, such as the Health Insurance Portability and Accountability Act (also referred to as

HIPAA) under 45 Code of Federal Regulations (CFR)164.506(c)(4), and that the study does not require an IRB review.

Instrument

Data included patient-reported substance use and cravings, measured by the Brief Substance Craving Scale (BSCS), developed by the Craving Subcommittee of the NIDA Medications Development Research Units [51]. The BSCS is a 16-item self-report measure of patient craving for primary and secondary craved substances over a 24-hour period. We used the patient's self-reported primary and secondary substance as categorical variable and did not use the scores in this analysis.

ICD-10-CM codes captured for billing purposes were used to identify primary discharge diagnoses. The first two authors reviewed the diagnoses and collapsed them into groups based on DSM 5 diagnoses.

Gender and race/ethnicity were also captured from billing data from 13 of the facilities. One facility submitted patient gender and race/ehtnicity information to the researchers.

Statistical analysis

Descriptive statistics were calculated as frequencies and percentages for categorical data. Substances craved at admission were cross-tabulated with other patient demographic data and analyzed with a Chi-square to identify significant differences. If significant differences were found we then compared the individual categories to see where the differences existed. When a cell had a value of ≤ 5 we conducted a Fisher's exact test (FET). Because we conducted multiple tests, we used the multproc add-on in Stata to generate a Bonferroni correction that would adjust the alpha for multiple tests; the new p-value was 0.002 (Newsom, 2003). All data were analyzed using Stata 15.1 [52].

Table 1 Sample Characteristics

	Psychiatric Inpatient (N = 1,688)		SUD Inpatient (N = 800)		Results Comparing Psychiatric and SUD Inpatient Characteristics
	N	%	N	%	
Sex					χ2 (1) = 0.01;
Female	575	34.06	271	33.88	$p > 0.05$
Male	1113	65.94	529	66.13	Cramer's V[1] = 0.00, CI [., 0.04]
Race/Ethnicity					
African American/Black	237	14.04	238	29.75	FET (5), $p < 0.001$***
American Indian or Alaska Native	6	0.36	3	0.38	Cramer's V = -0.07,
Asian	20	1.18	0	0.00	CI [0.21, 0.29]
Hispanic	145	8.59	23	2.88	
Non-Hispanic White	1146	67.89	527	65.88	
Undetermined	134	7.94	9	1.13	

Note: FET = Fisher's exact test. Within the Undetermined category 1 psychiatric inpatient was missing race/ethnicity information. Because of the number of tests conducted, we used the multproc add-on in Stata to generate a Bonferroni alpha correction; the resulting adjusted alpha is 0.002.
* $p < 0.05$, ** $p < 0.01$, ***p < 0.001

[1] Cramer's V is an effect size for nominal variables ranging between 0 to 1, with indicating a strong association. Values that fall outside the bounds of 0 and 1 are indicated with a missing value. (See Snyder & Howard, 2015).

Results

Our study's first aim was to compare demographic characteristics of patients admitted to MH and SUD programs and assessed for substance cravings. Table 1 provides the study's sample characteristics. Most patients (1,688, 67.84%) were admitted to an MH program and the remainder (800, 32.25%) admitted to a SUD program. There were no differences in gender composition between the groups; both groups were predominantly male. We found differences between groups for race/ethnicity (FET(5), $p <$

0.001), where the MH group had a lower proportion of African American/Blacks (14.04 % vs. 29.75 %; χ^2 (1, N = 2,488) = 86.72, p<0.001), Hispanics (8.59% vs. 2.88%; χ^2 (1, N = 2,488) = 28.16, p<0.001), and individuals whose race or ethnicity was not captured (7.94% vs. 1.13%; χ^2 (1, N =2,488) = 46.51, p<0.001). The MH group included Asian participants, while the SUD group did not (1.2% vs. 0.00; FET (1), p < 0.001).

Table 2 Diagnoses at admission

	Psychiatric Inpatient (N = 1,688)		SUD Inpatient (N = 800)	
	N	*%*	*N*	*%*
Anxiety disorders	8	0.47	1	0.13
Bipolar and related disorders	291	17.24	6	0.75
Depressive disorders	554	32.82	3	0.38
Obsessive-compulsive and related disorders	3	0.18	0	0.00
Schizophrenia spectrum/other psychotic disorders	235	13.92	3	0.38
Trauma- and stressor-related disorders[1]	223	13.21	0	0.00
Other diagnosis[2]	34	2.01	1	0.13
Alcohol use disorder	240	14.22	429	53.63
Cannabis use disorder	3	0.18	2	0.25
Cocaine use disorder	4	0.24	5	0.63
Opioid use disorder	40	2.37	299	37.38
Sedative use disorder	0	0.00	22	2.75
Stimulant use disorder	5	0.30	28	3.50
Other substance use disorder[3]	4	0.24	0	0.00

[1] Trauma- and stressor-related disorders included 193 individuals in the psychiatric inpatient group with PTSD and 52 individuals with an adjustment disorder.

[2] For mental health patients, other diagnosis includes: 1 individual with a mental disorders complicating pregnancy during the first trimester, 1 individual with a first trimester puerperal or post-partum psychosis (within days or weeks following birth), 1 individual with personality change due to a known physiological condition, 1 individual with a disruptive mood dysregulation disorder, 2 individuals with borderline personality disorder, 1 individual with cyclothymic disorder, 2 individuals with antisocial personality disorder, 1 individual with essential (primary) hypertension, 1 individual with acute stress reaction, 1 individual with other reactions to severe stress1 individual with other reactions to severe stress, 17 individuals with an unspecified mood disorder, 1 individual with a mood disorder due to known physiological condition with depressive features, 30 individuals with other specified persistent mood disorders, 1 individual with other disorders of psychological development, and 1 individual with intermittent explosive disorder. For SUD patients, other includes 1 individual with drug use complicating pregnancy first trimester.

[3] Other substance use disorder included 1 individual with Hallucinogen use disorder and 3 individuals with inhalant use disorder.

Our study's second aim was to compare the diagnoses of MH and SUD inpatients assessed for substance cravings; Table 2 provides the diagnoses for each group. As expected, primary diagnoses for MH inpatients were mostly mental illnesses and primary diagnoses for the SUD inpatients were mostly substance use disorders. Among those in the MH group, depressive disorders were the most common disorder (32.82%) followed by bipolar disorders (17.24%). For both the MH and SUD groups alcohol use disorders (14.22% vs. 53.63%) and opioid use disorders were the most common substance use disorders (2.37% vs. 37.38%). Among MH patients, 295 (17.48% of MH group) were determined to have co-occurring disorders. For patients admitted to a SUD program 13 (1.63% of SUD group) had co-occurring disorders. There were 150 patients with no reported diagnosis data.

To address our study's third aim we compared the primary substances craved by both groups (Table 3). MH inpatients, compared to the SUD inpatients, reported higher rates of craving marijuana (16.35% vs. 1.00%), stimulants (10.25% vs. 6.13%), and "other substances" (21.45% vs. 3.25%) while SUD inpatients, compared to the MH inpatients, had higher rates of alcohol (49.63% vs. 39,99%) and opioids cravings (8.0% vs. 35.88%). No differences were found between groups for cravings of benzodiazepines.

Table 3 Primary Cravings

	Primary Craving				Results Comparing Psychiatric and SUD Inpatient Cravings
	Psychiatric Inpatient (N = 1,688)		SUD Inpatient (N = 800)		
	N	%	*N*	%	
Alcohol	675	39.99	397	49.63	χ2 (1) = 20.56, $p < 0.001$*** Cramer's V[1] = -0.09, CI [0.06, 0.13]
Benzodiazepines (e.g., Valium, Xanax)	54	3.20	29	3.62	χ2 (1) = 0.31, $p > 0.05$ Cramer's V = -0.01, CI [., 0.05]
Cannabis/Marijuana	276	16.35	8	1.00	χ2 (1) = 299.48; $p < 0.001$*** Cramer's V = -0.35, CI [0.31, 0.39]
Opioids (e.g., heroin, morphine)	135	8.0	287	35.88	χ2 (1) = 299.48; $p < 0.001$*** Cramer's V = -0.35, CI [0.31, 0.39]
Sedatives	7	0.41	4	0.50	FET (1), p<0.001*** Cramer's V = -0.01, CI [., 0.05]
Stimulants (e.g., cocaine, amphetamine)	173	10.25	49	6.13	χ2 (1) = 11.36; $p < 0.001$*** Cramer's V = 0.07, CI [0.03, 0.11]
Other	362	21.45	26	3.25	χ2 (1) = 136.52; $p = 0.001$** Cramer's V = 0.23, CI [0.20, 0.27]

Note: Because of the number of tests conducted, we used the multproc add-on in Stata to generate a Bonferroni alpha correction; the resulting alpha is 0.002. FET = Fisher's exact test. * $p < 0.05$, ** $p < 0.01$, ***p < 0.001

[1] Cramer's V is an effect size for nominal variables ranging between 0 to 1, with indicating a strong association. Values that fall outside the bounds of 0 and 1 are indicated with a missing value. (See Snyder & Howard, 2015).

Table 4 Secondary cravings

	Secondary Craving				Results Comparing Psychiatric and SUD Inpatient Cravings
	Psychiatric Inpatient (N = 1,688)		SUD Inpatient (N = 800)		
	N	%	*N*	%	
None reported	1,065	63.09	364	45.50	χ2 (1) = 68.71, $p < 0.001$*** Cramer's V[1] = 0.17, CI [0.13,0.21]
Alcohol	114	6.75	47	5.88	χ2 (1) = 0.69, $p > 0.05$ Cramer's V = 0.02, CI [., 0.06]
Benzodiazepines (e.g., Valium, Xanax)	40	2.37	76	9.50	χ2 (1) = 62.08, $p < 0.001$*** Cramer's V = -0.16, CI [0.12, 020]
Cannabis/Marijuana	127	7.52	59	7.38	χ2 (1) = 0.02, $p > 0.05$ Cramer's V = 0.00, CI [.,0.04]
Opioids (e.g., heroin, morphine)	41	2.43	61	7.63	χ2 (1) = 37.27, $p < 0.001$*** Cramer's V = -0.12, CI [0.09,0.16]
Sedatives	9	0.53	5	0.53	FET (1), p>0.05 Cramer's V = -0.01, CI [., 0.05]
Stimulants (e.g., cocaine, amphetamine)	69	4.09	155	19.38	χ2 (1) = 154.83, $p < 0.001$*** Cramer's V = -0.25, CI [0.21,0.29]
Other	206	12.20	32	4.0	χ2 (1) = 42.23, $p < 0.001$*** Cramer's V = 0.13, CI [0.09,0.17]

Note: Because of the number of tests conducted, we used the multproc add-on in Stata to generate a Bonferroni alpha correction; the resulting alpha is 0.002. FET = Fisher's exact test. * $p < 0.05$, ** $p < 0.01$, ***p < 0.001

[1] Cramer's V is an effect size for nominal variables ranging between 0 to 1, with indicating a strong association. Values that fall outside the bounds of 0 and 1 are indicated with a missing value. (See Snyder & Howard, 2015).

Table 5 Secondary cravings by primary craving

	Had Secondary Cravings by Primary Craving							
	Psychiatric Inpatient (N = 1,688)				SUD Inpatient (N = 800)			
	No		Yes		No		Yes	
	N	%	*N*	%	*N*	%	*N*	%
Alcohol	476	70.52	199	29.48	215	54.16	182	45.84
Benzodiazepines (e.g., Valium, Xanax)	21	38.89	33	61.11	14	48.28	15	51.72
Opioids (e.g., heroin, morphine)	55	40.74	80	59.26	104	36.24	183	63.76
Cannabis/Marijuana	160	57.97	116	42.03	3	37.50	5	62.50
Stimulants (e.g., cocaine, amphetamine)	90	52.02	83	47.98	11	22.45	38	77.55
Other	261	72.10	101	27.90	16	61.54	10	38.46
Sedatives	1	14.29	6	87.71	1	25.00	3	75.00
None reported	17	1.01	0	0.00	1	0.13	0	0.00
Total	**1,065**	**63.09**	**623**	**36.91**	**364**	**45.40**	**436**	**54.40**

Finally, to address our fourth aim, we compared the secondary cravings of each group (Table 4). Both groups' most common response was no secondary cravings (comparing MH to SUD: 63.09 % vs. 45.500). Compared to the MH patients, the SUD inpatients reported more secondary cravings of benzodiazepines (2.37% vs. 9.50%), opioids (2.43% vs. 7.63%) stimulants (4.09% vs. 19.38%. The MH inpatients reported more secondary cravings for "other substances" than the SUD inpatients (12.20% vs. 4.00%). There were no differences between groups for cravings of alcohol or marijuana. Table 5 shows what the primary craving was for those who had a secondary craving. For both groups, most of those with a primary craving of alcohol did not report a secondary craving. But, for both groups, those who reported a primary craving of cannabis, opioids, or stimulants did have a secondary craving.

Discussion

As legislation and funding initiated to address widespread opioid use problems in the US provides new opportunities to respond to SUDs in traditionally psychiatric settings, we sought to investigate the differences in primary and secondary cravings between those programmed to MH primary to those programmed SUD primary We compared demographic characteristics, diagnoses, primary cravings and secondary cravings among individuals who entered inpatient treatment and completed a substance craving instrument from 2018.

Our first aim was to assess how demographic characteristics of each group differed. We did not find any gender differences, but there were racial/ethnic differences between the groups. Across both groups a majority of patients reported non-hispanic white (67.2% overall) as their racial group. Comparing the MH group to the SUD group there weren't differences in the proportion of patients who were white. This study's sample of MH inpatients differs from SAMHSA statistics on overall mental health care utilization, which found that inpatients were more likely to be African American/Black than white (1.4% vs. 0.7% respectively) [53].

Our second aim was to explore the diagnoses each group had at discharge. For the most part, primary diagnoses for the MH group were mental illnesses and diagnoses for the SUD group were substance use-related. This was as expected.

Our third aim was to compare primary cravings of each group. Both groups reported that alcohol cravings were the most common craving. There were no significant differences in cravings for benzodiazepines between the two groups. There were several substances, however, that MH inpatients reported craving more commonly than SUD inpatients. These findings are significant in emphasizing the role of substance use as a potential coping mechanism in MH inpatients and therefore as an area that should be addressed in all MH treatment plans rather than just those aimed at individuals with a SUD. The role of alcohol cravings is particularly important for a number of reasons. Alcohol withdrawal can pose significant health risk and should be managed medically. Secondly, alcohol use and depression are strongly linked in the literature. A diagnosis of depression is associated with greater likelihood of relapse and with greater cravings [54-57].

Of particular interest is the higher proportion of patients who were programmed to MH treatment, but reported stimulant cravings, specifically methamphetamine and cocaine. Akindipe and colleagues [58] reported that 36% of patients admitted for methamphetamine use disorder also had co-occurring psychiatric disorders. A study investigating co-occurrence of psychiatric disorders in a methamphetamine using population found that although some patients met criteria for methamphetamine-induced disorders, a large proportion of patients met criteria for mental health disorders independent of methamphetamine use [59]. Similarly, in Spain, one study found that 36% of 227 cocaine dependent patients had evidence of lifetime co-occurring disorders as opposed to those induced by cocaine use [60]. The high

proportion of patients reporting stimulant cravings has significant implications for program design and treatment planning. For example, patients with stimulant use have high rates of co-morbidity and are high consumers of health care services [61]. Greater severity of methamphetamine use has been associated with shorter treatment episodes [62]. No medications have been shown to be efficacious in the treatment of stimulant use disorder, further complicating the treatment and perhaps also impacting retention. Therefore, examining the patient use patterns especially as related to dealing with stress and coping, is an important aspect of providing treatment. Clinicians should assess and speak to the potential for negative coping mechanisms, such as those discussed in Marquez-Arrico et al. [63], and their relationship to cravings and subsequent relapse.

The work by Carrà et al. [16] and Carrà et al. [48] is worth noting here. If attention is not given to addressing social roles, life functioning and services such as peer support and case management are not offered, patients may continue to struggle with the stressors that often result in relapse. As Gillen et al. [13], Khantzian [14], Suh et al. [64] report, often substance use is a form of self-medication and as different substances appeal to different psychological profiles, incorporating this into prescribing and medication management strategies would serve the co-occurring populations well. Strong treatment models will incorporate these findings, including our finding on cravings, into their treatment and discharge planning processes to support patients in finding other coping mechanisms.

Our fourth aim was to compare secondary cravings of each group. We found that for both groups, not reporting a secondary craving was the most common response. Given the high rates of polysubstance use among individuals with co-occurring disorders [49], we were somewhat surprised with these findings. But, there still may be a substance that is used most often or in higher dosages among individuals who engage in polysubstance use.

Conclusion

Our study has some limitations that merit attention. First, this study sample was drawn from private for-profit MH and SUD inpatient treatment programs and only applicable patients in those programs that were assessed at admission for substance cravings with the BSCS, which may not generalize to other groups, particuarly the larger MH group. Further, some patients admitted to MH programs may be admitted to those programs due to lack of SUD program availability. This study focused on cravings reported at baseline, which may not predict treatment outcomes. Moreover, the ICD-10-CM diagnostic measure we used may not accurately represent the participants' diagnoses and it has yet to be determined whether this approach is entirely valid. It is possible that other measures would have better captured diagnoses, including the intensity, duration and frequency of symptoms. The study sample was predominantly male, so future studies should consist of samples with a greater gender balance. Additionally, it is possible that factors external to the patient could lead to a primary MH diagnosis in individuals with co-occurring mental health and substance use disorders. Among these factors is the stigma associated with substance use disorder which could influence patient reports of craving as well as payer trends for services. Finally, we did not use multivariate analyses, which would have provided more confidence about the study's findings.

Our study also has several key strengths. First, our study brings attention to the role cravings may play among individuals with co-occurring disorders who are receiving treatment in a MH program. Second, our study did not focus on a single substance, instead patients reported on a number of potential primary and secondary substances craved. Third, we also included participants with a wide range of mental illness and SUD diagnoses.

This study has important implications for practice and research. Practitioners in psychiatric and SUD treatment facilities should assess clients for co-occurring disorders. Both MH and SUD providers should also assess cravings as part of intake and craving mitigation and management should be included in patients who screen positive regardless of program focus. Future studies should build on the foundation of this study. Qualitative studies are needed to deepen our understanding of how psychiatric symptoms may influence cravings and substance use as well as the role that substance use plays in the management of psychiatric symptoms. Larger-scale and longitudinal studies are also needed to understand the etiology and sequelae of co-occurring disorders and the role cravings play as those disorders progress.

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