Assessing Receptivity to Contingency Management for

Methamphetamine Use Disorder in Primary Care

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Abstract

Methamphetamine use disorder (MUD) is a growing problem with few effective pharmacologic treatments. Though off-label medications used for MUD have only modest benefit, behavioral health treatment modality contingency management is effective in promoting abstinence and increasing treatment retention. Despite its documented effectiveness, CM is rarely used in practice due to legal, logistical, and implementation barriers. While primary care providers are increasingly comfortable with medications for opioid use disorder, they are less comfortable treating stimulant use disorder citing limited clinical experience, knowledge, and uncertain treatment options. The literature shows providers at times feel CM is not evidence-based, have unfavorable views of CM, and cite little confidence in the effectiveness of any MUD treatment modalities. Of note, to date there are no quantitative studies assessing nurses' views of CM, representing a gap in the literature that this research seeks to fill. This quality improvement project, conducted at an urban Federally Qualified Health Center (FQHC) in Portland, Oregon, aims to assess provider and staff receptivity to CM for MUD at baseline and after an educational in-service on CM to understand readiness for CM program implementation.

Keywords: contingency management, methamphetamine, methamphetamine use disorder, substance use disorder, federally qualified health center, behavioral health, quality improvement

Contents

Introduction

Problem description

Methamphetamine use disorder (MUD) is a growing problem causing significant morbidity and mortality with few effective pharmacologic treatment options. Methamphetamine, a potent central nervous system stimulant which is commonly smoked or injected can cause psychosis, depression, cognitive and neurologic deficits, cardiovascular dysfunction, renal damage, and increases the users' risk of contracting HIV, sexually transmitted infections, and viral hepatitis (Jones et al. 2022; Pasha et al. 2020).

At lower doses, methamphetamine leads to decreased fatigue and increased arousal, hypertension, decreased appetite, and behavioral disinhibition (Pasha et al. 2020). At higher doses, acute methamphetamine intoxication can lead to psychosis, ventricular fibrillation, coronary spasm, or cardiac failure (Pasha et al. 2020). Methamphetamine can also contribute to seizures, pulmonary edema, suicide, acute renal failure, skin and soft tissue infections, malnutrition, poor hygiene, and dental decay (Pasha et al. 2020). Use carries a significant societal financial cost: methamphetamine intoxication and overdose contribute to the $13 billion annual cost of US emergency department and inpatient encounters related to substance use disorder (Peterson et al., 2021). Between 2003 and 2015, annual hospital-related costs for amphetamine abuse-related encounters increased from $436 million to $2.17 billion (Winkelman, et al., 2018).

Morbidity and mortality from methamphetamine use in the United States has doubled over the last 10 years and drug overdose deaths linked to psychostimulants increased by 300% since 2013 (Jones et al. 2022; Paulus & Stewart, 2020). In 2020, Oregon ranked first in the nation in per capita methamphetamine use and last in the nation for adults needing but not receiving treatment for substance use disorder (Substance Abuse and Mental Health Services Administration [SAMHSA], 2020).

Reflecting these trends, amphetamine-related deaths in Oregon rose by 69% from 2020 to 2021 (McCarthy et al., 2022).

Unlike opioid use disorder (OUD), there are no FDA-approved medications to treat MUD and current combinations of off-label medications used for MUD treatment, primarily bupropion and naltrexone, have shown only modest success (Trivedi et al., 2021). However, co-occurring OUD and MUD is common, and use of naltrexone precludes use of highly effective medications for opioid use disorder like buprenorphine (Russell et al., 2023; Yen Li et al., 2021).

Though medications used for MUD have little benefit, a behavioral health treatment modality in which individuals using methamphetamine receive immediate material incentives, known as contingency management (CM), has shown to be effective in promoting abstinence and increasing treatment retention compared to standard of care (Brown & DeFulio, 2020; Chan et al., 2019; Petry, 2011). CM participants receive an immediate enforcing reward, typically cash, a gift card, or another material good, progressively escalating in value over the course of the program in exchange for each negative drug screen, which are typically done one to three times per week (Pfund et al., 2021). SAMHSA (2021) cites CM as the only treatment for MUD with significant evidence of effectiveness. However, many barriers exist in effective implementation of CM programs at the patient, clinic, and systems-level. Provider bias, negative attitudes towards individuals who use methamphetamine, and lack of knowledge of CM all pose barriers to assess prior to the implementation of a CM program. Evidence indicates that provider bias, along with logistical, legal, and funding barriers, make this effective intervention for MUD one that is rarely used in primary care (Dunn et al., 2023).

Available Knowledge

Methamphetamine use causes the release of dopamine and serotonin from an individual's nerve terminals in both the central and peripheral nervous systems and blocks the degradation of dopamine, which creates a pleasurable state of euphoria, alertness, and increased energy (Paulus &

Stewart, 2020). Acute and long-term methamphetamine use is associated with loss of dopaminergic neurons, dysfunction of the dopaminergic pathways, and impaired cognitive function, including learning and memory (Blum et al., 2021; Shukla & Vincent, 2021). To address this dopamine depletion, CM effectively activates the brains' reward pathway, offering a source of dopamine for the enrolled individual who receives immediate and frequent material incentives, which could be cash, a gift card, or a voucher, in exchange for a negative drug screen (Pfund et al., 2021). The core tenet of CM psychology is that tangible reinforcement with immediate reward for desired behaviors increases the likelihood of the positive behavior recurring (Barry & Petry, 2020).

CM for MUD has been found to reduce drug use, increase treatment retention, reduce psychiatric symptoms, reduce high risk sexual behavior, and increase quality of life (Rani et al., 2020; SAMHSA, 2021). A highly generalizable systematic review with meta-analysis looking at 50 randomized controlled trials (n=6,942 individuals) assessing psychosocial interventions versus treatment as usual for cocaine and amphetamine addiction found that CM alone or CM with community reinforcement was superior to treatment as usual for abstinence at 12-weeks treatment and showed the longest follow-up after treatment completion, with a number needed to treat (NNT) between 3 and 5 (De Crescenzo et al., 2018). By comparison, the NNT for cognitive behavioral therapy (CBT) alone was 10.5 (De Crescenzo et al., 2018). The NNT for pharmacologic treatment with bupropion and naltrexone, the current most effective pharmacologic treatment for MUD, found in the ADAPT-2 trial was 9 (Trivedi et al., 2021).

Despite its documented effectiveness in the literature, CM is rarely used in practice and many barriers have been identified in starting and supporting a CM program for MUD. While primary care providers are increasingly comfortable with medications for opioid use disorder, like buprenorphine, they are less comfortable in treating patients with stimulant use disorders citing limited clinical experience, knowledge, and uncertain treatment options (Dunn et al., 2023). This is consistent with findings from a large retrospective cohort study of care-engaged individuals with polysubstance use: the

majority were treated with gold-standard medications for opioid use disorder (buprenorphine) but none

of those with stimulant use disorder had a documented discussion or referral for CM and only 24% were

receiving off-label medications for MUD treatment (Yen Li et al., 2021).

Many primary care providers perceive patients with MUD as being minimally engaged in care,

citing a high rate of no-show and many missed appointments (Dunn et al., 2023). Addiction providers at

a methadone clinic believed patients were generally uninterested in treatment for MUD, as they did not

see their methamphetamine use as a problem (Breland et al., 2023). Other barriers cited by providers to

effective implementation of CM included clients' housing status, difficulty in coming to the clinic

multiple times per week for drug screens, and barriers with the clients' community of family, friends,

and children, making participation difficult (Nauman, 2021). Additionally, the literature reveals that

providers often hold stigmatizing attitudes and beliefs about MUD and believe patients using

methamphetamine are more difficult to treat than those using other substances due to perceived

agitation, aggressiveness, and paranoia (Dunn et al., 2023).

Provider knowledge and receptivity to CM is a known barrier to use of this treatment modality.

In one opinion-based survey of addiction medicine providers (n=31), 30% felt neutral or disagreed with

CM being an evidence-based approach to treating MUD (Nauman, 2021). Another study in which the

authors conducted semi-structured interviews with primary care providers found that providers had

little confidence in the effectiveness of any treatment for MUD, rarely mentioning psychosocial

interventions as a viable option when compared to medications, and had unfavorable views of CM

(Dunn et al., 2023).

Of note, there are currently no quantitative studies assessing non-providers' (registered nurses

[RNs] and medical assistants [MAs]) receptivity or understanding of CM as a treatment modality, which

represents a gap in the literature. One quality improvement (QI) study implementing CM at a U.S.

Department of Veterans Affairs (VA) location cited initial staff resistance to CM, who noted concerns

about paying patients for abstinence, doubts about CM's effectiveness, and concern about the gambling-like quality of some parts of the program (Ruan et al., 2017). Understanding RNs and MAs perceptions and receptivity to CM as a MUD treatment modality is important, as clinic staff are often the first to interact with a patient, screen them for various disorders on intake, and are in a position to advocate for and refer patients to CM (Schreffler et al., 2021).

Rationale

This QI project will utilize Kotter's 8-Step Process for Leading Change model to evaluate the programmatic site and assess provider and staff understanding and receptivity of MUD for CM. The Kotter change model was selected because it offers a simple step-by-step process that focuses on creating awareness of the problem, fostering a vision for change, communicating the vision, empowering action, and making change stick. The Kotter change model, a top-down leadership approach, fits the goals of this QI project, as currently no CM program exists at the implementation site and CM is currently rare in the outpatient setting, therefore it is hypothesized that providers and staff at the implementation site may be unfamiliar with CM as a treatment modality. Kotter's change model involves eight steps which are: 1) establish a sense of urgency; 2) create a guiding coalition; 3) form a strategic vision for change; 4) communicate the vision; 5) empower action; 6) generate short term wins; 7) sustain change acceleration; and 8) anchor new approaches in organizational culture (Carpenter et al., 2021). The Kotter change model is well established as effective and has been widely used by organizations to implement meaningful change, including in the realm of SUD in primary care (Carpenter et al., 2021). This model will support the success of this project because building a vision and obtaining provider and staff buy-in is critical before a CM program can be established. As has been shown in the literature, providers often report low comfortability or skepticism about CM and it is rarely used in practice; therefore, creating a sense of urgency, forming a vision, communicating the vision, and

educating is necessary for laying the foundation for effective and successful CM programming in the future.

This project was also designed using the levels of disease prevention as a framework. The disease prevention framework focuses on primary, secondary, and tertiary prevention. Primary prevention involves intervening before disease occurs; secondary prevention involves screening for and identifying diseases in the early stages before sign and symptom onset; and tertiary prevention involves managing disease to slow or stop progression (Kisling & Das, 2022). This QI project specifically focuses on tertiary intervention as the CM is a treatment for MUD. In the lens of SUD, tertiary prevention aims to facilitate entry of the individual into treatment so that further disability is minimized (Nelson et al., 2022).

Based on findings from the literature review, provider receptivity of CM and MUD treatment modalities is a critical barrier that must be addressed prior to the establishment of a CM program. Additionally, a gap in the literature exists in terms of quantitative assessment of support staff (RN and MA) receptivity and attitudes towards CM as a treatment modality. At this time, several QI studies mention that staff understanding and receptivity hindered progress on CM program implementation, but quantitative assessment will help define specific needs at the implementation site (Ruan et al., 2017). In addition to assessing provider receptivity to CM, understanding the outlook of support staff is critical as these are often the first line people to interact with a patient on intake and are in a position to screen for MUD, refer to CM programming, and advocate for the patient.

Aims

The goal of this QI project is to assess primary care provider and staff receptivity to CM as a treatment modality for patients with MUD. The intention is to understand baseline understanding of CM and measure whether an educational inservice on CM as a treatment modality changes receptivity and could influence establishment of a CM program and promote future referral for MUD treatment.

Methods

Context

This project will take place at an urban Federally Qualified Health Center (FQHC) outpatient clinic, which is part of the Department of Family Medicine at a large academic health center (AHC) in Portland, Oregon. In 2021 the clinic delivered care to 13,985 patients, over half of whom have publicly funded health insurance, and nearly 75% of whom are at or below 200% of the federal poverty line (Heidi Berthoud Consulting, 2022). The primary care portion of the clinic is made up of 26 physicians (including 10 residents), 4 nurse practitioners [NPs], and 4 physician assistants [PAs]. The primary care support staff team is made up of 12 RNs and 20 MAs. The clinic also houses a behavioral health team (social workers) and a pharmacy team. Due to its association with the area's large AHC, this clinic hosts medical residents, as well as NP, PA, medical, and pharmacy students.

As of January 2024, there are 238 patients with a diagnosis of methamphetamine use disorder at the implementation site, representing nearly 2% of the clinic's population (personal communication A, January 12, 2024). Of these, 101 have a concomitant diagnosis of opioid use disorder, representing approximately 25% of the MAT panel (personal communication A, January 12, 2024).

The implementation site was selected due to the presence of an established multidisciplinary Medication Assisted Treatment (MAT) team made up of providers, a nurse, and social workers who manage MAT (primarily for OUD) patients, along with their general primary care panel. As of May 2023, there were 424 active patients on the MAT team's registry, with a projection to have 450 by the end of 2023 (personal communication B, May 25, 2023). The MAT team is led by a physician medical director and includes one nurse, as well as two licensed clinical social workers (LCSW). The MAT team is supported by a full-time Panel Manager, who ensures tracking and outreach to support patients and maintain engagement (Heidi Berthoud Consulting, 2022). The MAT team meets once per week to discuss patient cases and ensure consensus on patient treatment and follow-up. The MAT team members act as

leaders in the SUD space, stay up to date on the latest evidence, serve as disseminators of information, and are available for consultation if others have questions about how best to manage or prescribe MAT for patients. Of the 34 primary care providers at the implementation site, 30 of them prescribe MAT medications (personal communication C, May 18, 2023). Though the MAT team's primary focus is treating patients with OUD, the presence of this established team structure is important in the context of identifying, referring, and treating patients with MUD due to the high occurrence of polysubstance use (Yen Li et al., 2021).

Interventions

Phase One of the intervention was an emailed Qualtrics, five-statement survey to understand baseline knowledge and comfortability with CM as a treatment modality for MUD (Appendix A). The survey was sent out one week and then again two days prior to those invited to three regularly scheduled meetings, one for providers and clinicians, one for back-office staff (MAs), and one for nurses. The pre-survey provided a brief author introduction and asked providers and staff to rate their baseline knowledge and receptivity to CM as a treatment modality for MUD using a 5-point Likert scale rating system (1 = Strongly Disagree to 5 = Strongly Agree).

Phase Two of the intervention was delivering a 15-minute educational presentation on CM at three regularly scheduled clinic meetings (Appendix C). The goal was to educate on the core tenants of CM as a treatment modality for MUD, as evidence indicates primary care providers often have little knowledge and familiarity with this treatment modality (Dunn et al., 2023). The presentation touched on the problem of methamphetamine in the US and Oregon, the core principles of CM, local context of CM (other programs in place, funding, logistical barriers), current pharmacologic options to treat MUD and efficacy of medications compared to CM, a literature review, logistics of CM programming including award types, sample reward schedules, and discussion of evidence-based effective monetary payouts per calendar year, and ethical considerations (Appendix C). A 14-slide PowerPoint presentation was

utilized during these sessions to help with information dissemination (Appendix C). There was time for discussion and questions after each presentation. The educational inservice was given three times at the implementation site between the months of August and November 2023.

Phase Three of the intervention was a repeat emailed Qualtrics survey sent to individuals who attended one of the educational sessions. The Phase Three survey had the same five statements from the pre-intervention survey designed to assess receptivity to CM to treat MUD with one additional screening question asking if the individual had attended one of the educational sessions (Appendix B).

Study of the Interventions

The study of the intervention was an assessment and comparison of provider and staff survey answers before and after the educational inservice intervention on CM for MUD. Survey response feedback was gathered through Qualtrics and then transferred to Google Sheets for analysis. The pre- and post-survey answers were broken down by role. Answers provided by each individual were hand coded with the number corresponding to each answer (1 = Strongly Disagree; 2 = Disagree; 3 = Neutral/Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree). Question 4 was reverse coded after data collection (1=Strongly Agree to 5=Strongly Disagree) for uniform directionality with the other four questions. The mean answer for each question was calculated for each role using both pre-survey and post-survey data. The answers from the post-survey were compared to answers from the pre-survey to assess whether Phase Two of the intervention (educational session) was associated with change in provider and staff understanding, receptivity, and comfortability with CM. The mean of all questions was calculated by group and then calculated for all groups.

Paired, two-tailed t-tests were run on Likert scores from pre-survey respondents (n=47) compared to the post-survey respondents (n=20) for each of the five survey questions to assess whether the intervention made a statistically significant change, with the assumption that the answers came from the same subjects. Coded numeric responses from the pre-survey (n=235 individual responses)

were compiled into one data set and responses from the post-survey (n=100 individual responses) were compiled into another data set. A paired, two-tailed t-test was run using these two data sets to calculate overall change.

Measures

The primary outcome measures for this project are the coded Likert scale answers to the pre- and post-intervention surveys given by the providers and staff at the implementation site (Table 2). Likert scales are self-reported responses to survey questions. The Likert scale used for this project included options (1,2,3,4,5). Validity testing on five-ordinal Likert scales was 89% reliable (Louangrath, 2018). There are several secondary outcome measures for this project, including the number of participants who completed the pre- and post-survey, the number of surveys sent out, and the response rate to these surveys (Table 1).

Analysis

Pre- and post-survey quantitative Likert scale data was analyzed after Phase Three was complete. Likert responses were analyzed as interval data, looking at the mean as the best measure of central tendency. Data were compiled to assess the mean of all respondents in the pre-survey and compared to the mean of all respondents in the post survey. Then, the mean Likert response was calculated by subgroups and compared. It must be acknowledged that Likert scale data may be subject to bias including central tendency bias, in which the respondent avoids using extreme response categories, and social desirability bias, in which the respondent attempts to portray themselves in a more favorable light (St. Andrews University, n.d.). T-tests were performed on data from pre- and post-survey responses for each individual question and using all data combined. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

In implementing an educational inservice on CM, the ethics of CM itself as a treatment modality for MUD must be taken into consideration. Despite SAMHSA's public support for CM for MUD, the legality of offering incentives for drug abstinence is murky depending on state and current policy is restrictive (Glass et al., 2020). Literature indicates that an effective yearly incentive total to treat MUD is between approximately $400 and $600 (Miller et al., 2013; Rash, 2023). However, as of 2023 under federal law, incentives provided to patients may be considered 'kickbacks' when they exceed a nominal value. Currently, The Centers for Medicare and Medicaid Services (CMS) caps the annual limit on incentives provided to beneficiaries to be $75 per calendar year, which is well under the monetary level considered to be effective for treating MUD with CM (Glass et al., 2020). The ethics of providing money for methamphetamine abstinence could be considered a 'kickback' if paid to the effective top limit of $600 per calendar year. However, in March 2022 the Office of the Inspector General issued Advisory Opinion No. 22-04 on behalf of a technology company offering application-based CM for substance use disorders allowing an annual maximum of $599 per member per calendar year (DeConti, 2022). It is unclear whether this will set precedent from a legal perspective on future CM programs.

It also must be noted that clinical trials on CM for MUD use abstinence from methamphetamine as the measurable and desired endpoint. Questions arise as to how CM fits into treating SUD from a harm reduction lens, as the model focuses on complete abstinence rather than minimizing use (Gagnon et al., 2021). CM payment schedules typically increased based on negative breath or urine drug tests. From a harm reduction perspective, complete abstinence may not be attainable for some people who use methamphetamine though reduction in use would be a positive step; however, this behavior would not be rewarded in CM (Gagnon et al., 2021).

For the purposes of this QI project, whether to present the ethical considerations of CM as a treatment modality during Phase Two of the intervention (educational sessions) was considered. It was

decided that ethical considerations would be a part of the presentation, so that providers and staff at the implementation site could have as much information as possible about CM.

Results

One-hundred and forty-one pre-surveys were sent out and 47 were completed in full: 18 by providers, 15 by nurses, six by MAs, four by behavioral health specialists, three by those in administrative and other roles, and one by a pharmacist (Table 1). Approximately 37 individuals attended one of the education sessions on CM for MUD held on August 24th, September 25th, and November 7th, 2023. Thirty-seven post-surveys were sent out and 21 were completed: 9 by providers, 4 by nurses, 4 by MAs, 1 by behavioral health, and 3 by administrator/others (Table 1). One of the provider post-survey responses was removed from the data set because they indicated they did not attend the education session.

Mean responses to pre- and post-survey statements were compiled into six sub-groups: providers, nurses, behavioral health, pharmacists, and administration/other (Table 2). At baseline, behavioral health specialists (n=4) were the most familiar with CM as a treatment modality for MUD, followed by providers (n=18) (Table 2). Nurses (n=15) were the least familiar with CM at baseline, with a mean response to Statement 1 ('I am familiar with CM as a treatment modality for MUD') of 2.6 (Table 2, Figure 2). Clinic-wide data (n=47) shows a generalized low familiarity with CM as a treatment modality for MUD, demonstrated by a clinic-wide mean response to Statement 1 of 2.7 (Table 2, Figure 2). Pre-survey data indicates nurses (n=15) were the least likely to feel CM was evidence based, with mean response to Statement 2 ('CM for MUD is evidence-based') of 3.27, and providers (n=18) and behavioral health (n=4) were the most likely to feel CM was evidence-based, with Statement 2 mean answers of 3.72 and 3.75 respectively (Table 2, Figure 3). Providers (n=18) were generally in agreement that MUD is more difficult to treat than OUD (Table 2). All groups felt nearly neutral that there are ethical issues with CM for MUD, as shown by an all-group mean to Statement 4 ('There are ethical issues with using CM to

treat MUD') of 3.15 (Table 2). Providers (n=18) and behavioral health (n=4) were the least likely groups to feel there were ethical issues with CM for MUD (Table 2). At baseline, providers (n=18) were the most likely to feel comfortable referring a patient to CM for MUD and nurses (n=15) were the least likely (Table 2, Figure 6).

Paired, two-tailed t-tests run on data sets from each statement revealed a statistically significant increase in favorable response for statements 1, 2, and 5, with p-values of .004, p<.001, and p<.001 respectively (Table 2). There was no statistically significant change in the pre- and post-intervention data sets for statements 3 and 4, as shown by p-values of .88 and .99 respectively (Table 2). As a group, the average response to Statement 5 ('I would feel comfortable referring a patient to CM for MUD if a program were available') changed from a mean of 3.5 at baseline to 4.75 after the intervention (Table 2, Figure 6). Looking at the entire data set (n=235 answers pre-intervention vs. n=100 answers post-intervention), there was an overall statistically significant change towards more favorable response to CM for MUD after the intervention, with a p-value of <.001 (Table 2, Figure 1).

Discussion

Summary

The findings of this QI project highlight the baseline understanding of CM and change in receptivity after educational sessions on CM at an urban FQHC primary-care clinic in Portland, Oregon. Baseline data shows that providers and behavioral health specialists were the most familiar with CM at baseline, and nurses were the least familiar. Clinic-wide (n=47), survey respondents initially had low-familiarity to CM for MUD (Table 2, Figure 2). Prior to the intervention, providers were the most likely to feel comfortable supporting a referral to CM, and nurses were the least likely. Data collected from respondents after attending one of three education sessions on CM shows that there was an overall statistically significant increase in favorability and receptivity to CM for MUD (p<.001) (Table 2, Figure 1). The data from this project provides useful information to the clinic as they work to establish their own

CM program. This research highlights baseline perceptions of CM at the implementation site, identifies which groups are most and least receptive to CM, and shows that educational sessions are effective at increasing receptivity to CM, an important and underutilized treatment for MUD.

Interpretation

There was a statistically significant change towards a more favorable view of CM as measured by Likert scale self-report after the intervention, as shown by a $p<.001$. Looked at by statement, there was a statistically significant change towards a more favorable response clinic-wide for Statements 1, 2, and 5 (Table 2). Importantly, for Statement 5 ('I would feel comfortable referring a patient to CM for MUD if a program were available') the mean answer changed from 3.5 at baseline to 4.75 post-intervention, which indicates that the majority of individuals changed to most closely align with 'strongly agree' if they would support a referral to CM.

Statement 3 ('MUD is more difficult to treat than opioid use disorder') showed no statistically significant change from pre- to post-intervention with a p-value of .88 (Figure 4). The clinic-wide mean answer to Statement 3 was 3.8 (most closely aligned to 'agree') both before and after the intervention. The wording of this question was focused on methamphetamine itself, rather than CM for MUD, therefore may have created confusion for the respondents. Overall, respondents agreed that MUD is more difficult to treat than OUD; however, it was hypothesized that post-survey mean responses would be more closely aligned to 'strongly agree' as MUD has objectively fewer treatment options compared to OUD (Trivedi et al., 2021).

Like Statement 3, responses to Statement 4 showed no change before and after the intervention (Figure 5). The Likert scale answer options presented on Statement 4 ('There are ethical issues with using CM to treat MUD') of the original surveys had an opposite directionality compared to all the other statements, which may have created confusion for respondents (see Appendix A and B). Due to this opposition in directionality, Statement 4 responses were reverse coded after data collection. Even after

reverse coding, the clinic-wide mean answer was 3.8 before and after the intervention, most closely

aligning to the answer 'disagree' (Table 2). Though a large body of evidence does not exist on the topic

of CM and ethics, several studies highlight providers as having unfavorable views of CM, likening it to

'bribery', and have concerns that CM creates antagonistic power dynamics between patient and

provider (Dunn et al., 2023; Gagnon et al., 2021; Petry, 2010). Though past QI projects documenting the

implementation of CM programs have noted initial staff resistance to CM as a modality, data from this

Portland-based FQHC indicates that ethics may not be a major barrier to implementation (Ruan et al.,

2017). The ethics of CM was addressed in the Phase Two educational sessions, which may have eased

concerns and answered questions about CM.

Looking at data by sub-groups shows that at baseline nurses (n=15) were the least familiar with

CM for MUD (Table 2). Additionally, nurses were the least likely to feel CM for MUD was evidence-

based, though the mean baseline answer was still slightly above neutral at 3.27 (Table 2). At baseline

nurses were the least likely to feel comfortable supporting a referral to CM for a patient with MUD

(Table 2). Post-intervention nurse response (n=4) was too low to draw conclusions on change within this

group. However, baseline data within this subgroup indicates that if this clinic were to establish a CM

program, nurses would be an important group to work with on further education and training on CM.

This is the first quantitative data of its kind assessing nurses' receptivity for CM for MUD. To date, there

only exists quantitative data based on providers' perceptions of CM (Dunn et al., 2023; Nauman, 2021).

Limitations

While it was assumed that individuals who answered the pre-survey were also part of the

population that answered the post-survey, there is a possibility that the groups were not perfectly

paired, meaning some individuals who attended the educational sessions and answered the post-survey

may not have answered the pre-survey. The educational sessions were held during regularly scheduled

provider and staff meetings during the workday, all around the lunch hour. This may have introduced

sampling bias in which individuals who were more likely to attend lunch meetings were more likely to

answer favorably to the survey questions. As this project utilized Likert-scale self-reports, it must be

acknowledged that this method is subject to central tendency bias, in which the respondent avoids using

extreme response categories, and social desirability bias, in which the respondent attempts to portray

themselves in a more favorable light (St. Andrews University, n.d.).

The implementation site was selected for this project due to the presence of its established MAT

team, which has nearly 450 patients with OUD on its panel (personal communication B, May 25, 2023).

Additionally, the majority of providers prescribe medications for OUD, suggesting comfort and

experience treating patients with substance use disorder (personal communication C, May 18, 2023).

This may limit generalizability, as the sampled population may be more likely to support new and novel

treatments for substance use disorder, compared to primary care clinics without MAT teams or in non-

urban settings with less exposure to patients with MUD.

Conclusion

The results of this QI project provide meaningful data as the implementation site works to

establish a CM program. Changes from pre-and post-intervention data support a statistically significant

more favorable view of CM among clinic providers and staff. After the education sessions, the average

answer to the question regarding whether the respondent would feel comfortable referring a patient to

a CM program was closest to 'strongly agree,' which indicates this clinic now has greater preparedness

to establish their own CM program. Baseline data shows that nurses at the clinic were the least familiar

with CM and were the least comfortable supporting a referral to CM. This data indicates that prior to

establishing a CM program at this clinic, nurses would be an important group to target with more

education and training on CM. This is the first quantitative data surveying nurses on receptivity to CM.

There are several next steps for this QI project. The data from this research shows that the

providers at the staff have high receptivity and greater awareness of CM for MUD. This site is now better

prepared to run a small CM trial if funding were secured. More generally, an important next step would

be a standardized slide deck to educate providers and clinic staff about CM for MUD. The one used in

this project was specifically tailored for this clinic's patient demographics and discussed local trends in

substance use; however, a standardized approach would be beneficial for outpatient primary care clinics

nationwide (Appendix C).

Current research on CM perceptions shows primary care providers have low confidence in MUD

treatments, including CM (Dunn et al., 2023). Outpatient CM for MUD programs are uncommon;

therefore, it is of great benefit to understand provider and staff knowledge-base on CM before program

establishment. This research highlights baseline perceptions of CM and shows that educational sessions

are effective at increasing receptivity to this important and underutilized treatment.

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Table 1

Secondary outcome measures: Pre-survey (baseline) vs. post-survey (attended education session on CM) composition and survey response rates

Pre-survey respondents				Post-survey respondents		
Surveys sent	147			Surveys sent	37	
Surveys completed	47			Surveys completed	21*	
Response rate	32%			Response rate	57%	

Sample composition	%	n		Sample composition	%	n
Provider (MD, DO, NP, PA)	38%	18		Provider (MD, DO, NP, PA)	40%	8
Nurse	32%	15		Nurse	20%	4
Medical Assistant	13%	6		Medical Assistant	20%	4
Behavioral health	9%	4		Behavioral health	5%	1
Admin/other	6%	3		Admin/other	15%	3
Pharmacist	2%	1		Pharmacist	0%	0

*1 response discarded; individual indicated they did not attend a Phase 2 intervention

Table 2

Mean Likert-Scale Survey Responses Pre- and Post-Intervention

Role (# of responses) Pre- and post-survey	Statement 1 I am familiar with contingency management as a treatment modality for methamphetamine use disorder	Statement 2 Contingency management for methamphetamine use disorder is evidence based.	Statement 3 Methamphetamine use disorder is more difficult to treat than opioid use disorder.	Statement 4 There are ethical issues with using contingency management to treat methamphetamine use disorder.	Statement 5 As of today, I would feel comfortable referring a patient to contingency management for methamphetamine use disorder if a program were available.	Mean of all statements
Provider Pre (18)	3.11	3.72	4	3.28	4.06	3.63
Provider Post (8)	4	4.75	4.13	3.6	4.75	4.25
RN Pre (15)	2.2	3.27	3.67	3.07	2.6	2.96
RN Post (4)	3.75	4.25	4	3	4.5	3.9
MA Pre (6)	2.5	3.67	3.83	3	3.67	3.33
MA Post (4)	4	4.75	3.75	3.5	5	4.2
BH Pre (4)	3.5	3.75	3.5	3.17	4	3.58
BH Post (1)	5	5	3	2	5	4
Admin/Other Pre (3)	2.33	3.33	3.33	3	3	3
Admin/Other Post (3)	2.67	4	3	2	4.67	3.27
Pharmacist Pre (1)	4	4	3	3	5	3.8
Pharmacist Post (0)	0	0	0	0	0	0
All Groups Pre (47)	2.7	3.6	3.8	3.15	3.5	3.35
All Groups Post (20)	3.8	4.55	3.8	3.15	4.75	4.01
p-value **all groups pre vs. post intervention**	$p=.004$	$p<.001$	$p=.88$	$p=.99$	$p<.001$	$p<.001$

Figure 1

Mean Likert-Scale Responses Pre- vs. Post-Intervention: Clinic-Wide Results, Statements 1-5 and Overall
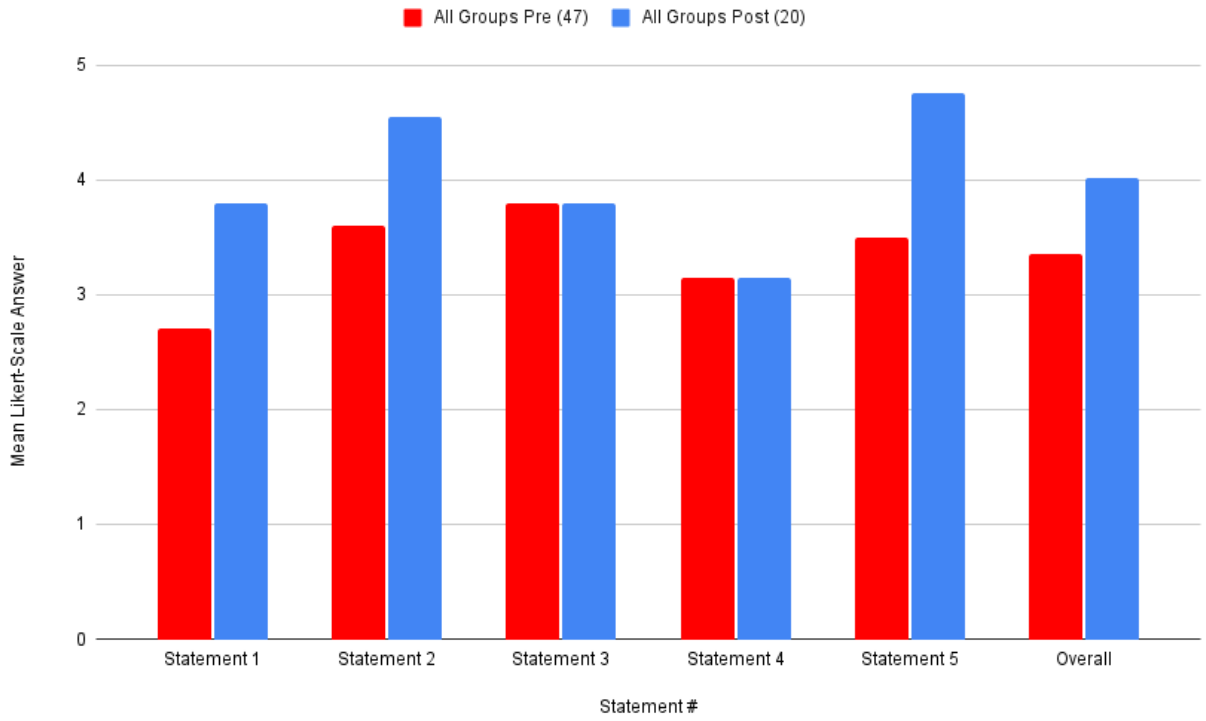
Figure 2

Statement 1 Pre- vs. Post-Survey Results: 'I am familiar with contingency management as a treatment modality for methamphetamine use disorder'
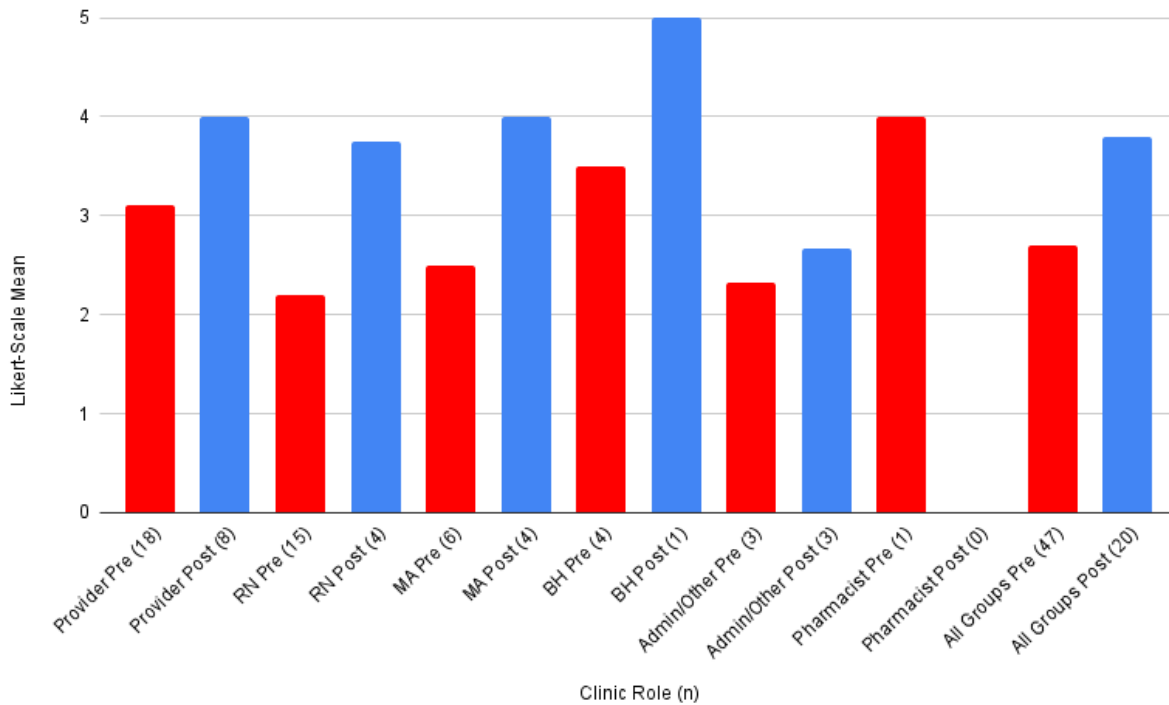
Figure 3

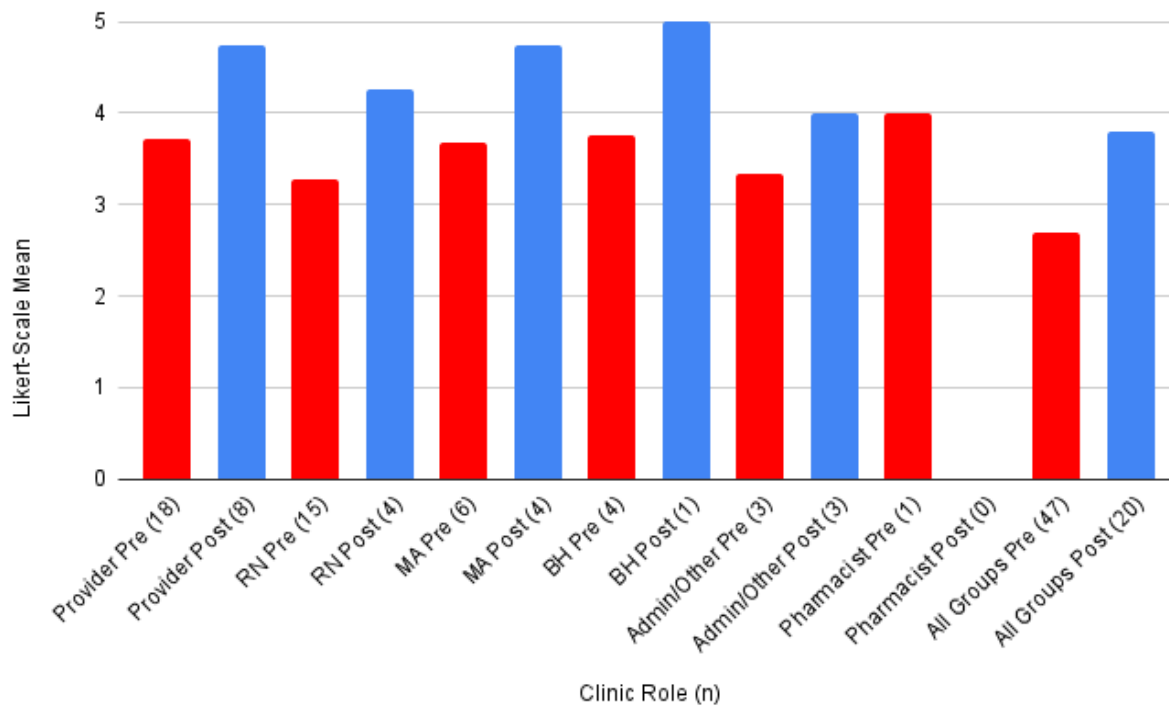*Statement 2 Pre- vs. Post-Survey Results: 'Contingency management for methamphetamine use disorder is evidence based.'*

Figure 4

Statement 3 Pre- vs. Post-Survey Results: 'Methamphetamine use disorder is more difficult to treat than opioid use disorder.'
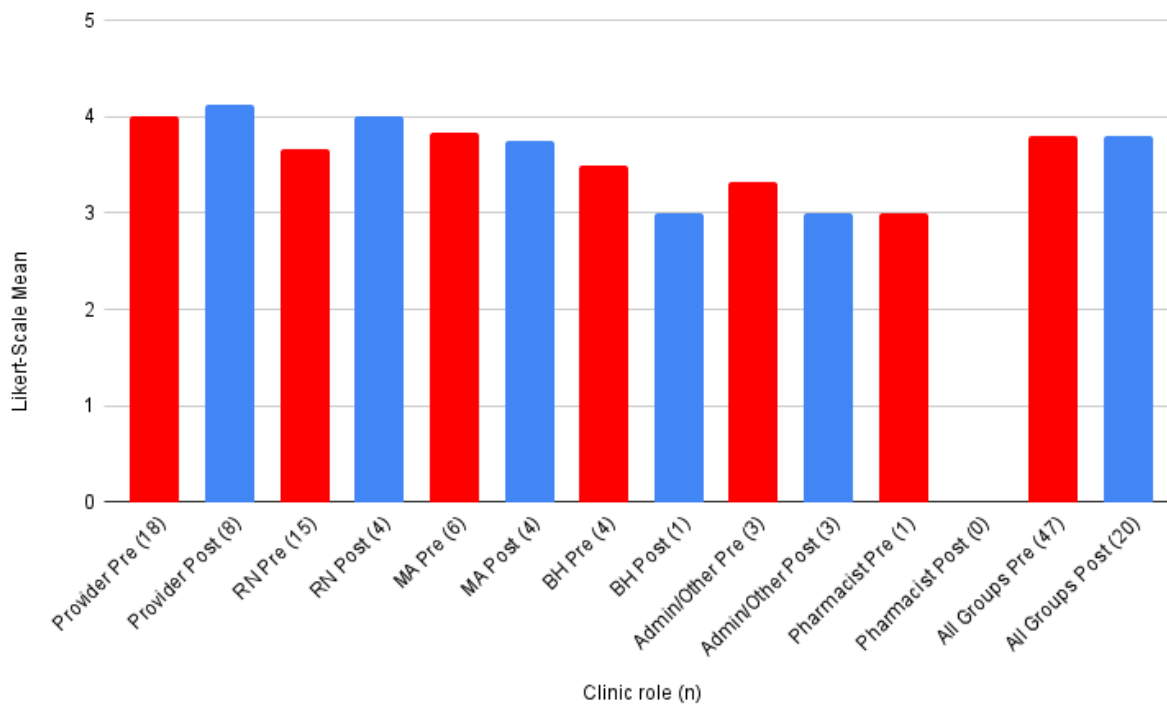
Figure 5

Statement 4 Pre- vs. Post-Survey Results: 'There are ethical issues with using contingency management

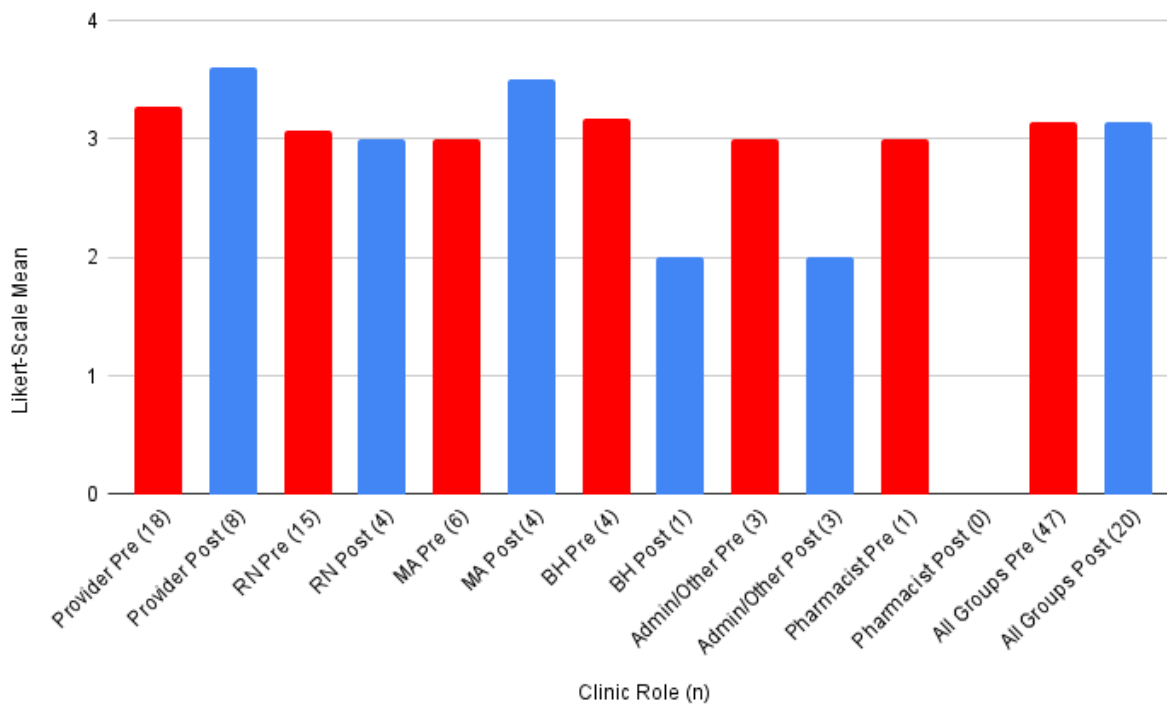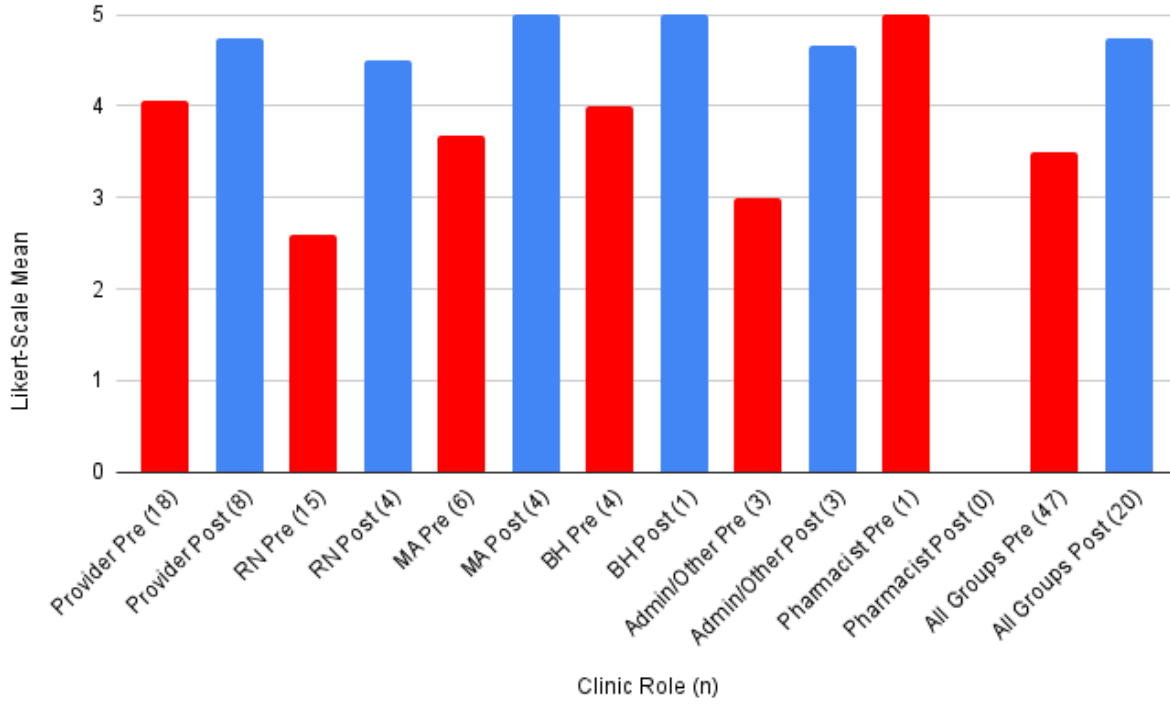*to treat methamphetamine use disorder.'*

Figure 6

Statement 5 Pre- vs. Post-Survey Results: 'As of today, I would feel comfortable referring a patient to contingency management for methamphetamine use disorder if a program were available.'

Appendix A

Introduction and Initial Survey on Baseline Knowledge

Hello - my name is Leah Bachhuber, and I am a student in the Oregon Health & Science University Family Nurse Practitioner Doctor of Nursing Practice (DNP Program). I am doing my final doctoral project at the OHSU Richmond Clinic to further understand how a contingency management (CM) program for methamphetamine use disorder could work at this site. I will be giving a 15-minute inservice to discuss CM for MUD at a later date.

To help me further understand your baseline understanding of CM, I would be grateful if you would take a brief survey to aid in my research. This survey will take less than 5 minutes to complete.

Thank you for your time and please contact me if you have any questions.

Pre-Survey
Baseline Knowledge of Contingency Management as a
Treatment Modality for Methamphetamine Use Disorder

My role is:
- Provider (MD, DO, NP, PA)
- Nurse
- Behavioral health
- Pharmacist
- Medical assistant
- Administrative
- Other

Please answer the following questions based on your opinion and clinical experience working with patients with methamphetamine use disorder:

Statement 1					
I am familiar with contingency management as a treatment modality for methamphetamine use disorder	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Statement 2					

CM for MUD is evidence-based	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Statement 3					
MUD is more difficult to treat than opioid use disorder	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Statement 4					
There are ethical issues with using CM to treat MUD	**Strongly Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Strongly Agree**
Statement 5					
I would feel comfortable referring a patient to CM for MUD if a program were available	**Strongly Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Strongly Agree**

Appendix B

Post-Education Session Survey
Perceptions and Understanding of Contingency Management as a
Treatment Modality for Methamphetamine Use Disorder

My role is:
- Provider (MD, DO, NP, PA)
- Nurse
- Behavioral health
- Pharmacist
- Medical assistant
- Administrative
- Other

Screening question					
I attended one of the presentations on contingency management from Leah Bachhuber	**Yes**	**No**			
Statement 1					
I am familiar with contingency management as a treatment modality for methamphetamine use disorder	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Statement 2					
CM for MUD is evidence-based	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Statement 3					
MUD is more difficult to treat than opioid use disorder	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Statement 4					
There are ethical issues	**Strongly**	**Somewhat**	**Neither Agree**	**Somewhat**	**Strongly Agree**

with using CM to treat MUD	**Disagree**	**Disagree**	**nor Disagree**	**Agree**	
Statement 5					
I would feel comfortable referring a patient to CM for MUD if a program were available	**Strongly Disagree**	**Somewhat Disagree**	**Neither Agree nor Disagree**	**Somewhat Agree**	**Strongly Agree**

Appendix C

Presentation Materials for Phase 2 Intervention

2/28/24

Slide 1

OHSU

Contingency Management for Methamphetamine Use Disorder

PRESENTED BY: Leah Bachhuber, RN, BSN – OHSU FNP Candidate, 2024

Slide 2

Problem

- Morbidity and mortality from methamphetamine use disorder (MUD) has doubled in last 10 years in US
- Amphetamine-related OD deaths have increased by 300% since 2013 in OR, increased by 70% from 2020 to 2021
- **Oregon**:
  - #1 in nation in per capita meth use
  - #1 in nation for adults needing but not receiving treatment for SUD
- Meth is cheaper, more widely available, more toxic?*
- No FDA approved medication to treat MUD

(Getty Images)

(Dunn et al, 2023; Jones et al, 2022; McCarthy, 2022; Paulus & Stewart, 2022; Trivedi et al, 2021)

Slide 3

Treatment Options

- **Pharm option**
  - ADAPT-2 trial (Trivedi et al., 2021):
    - Extended-release injectable naltrexone (380 mg Q 3 weeks)
    - Bupropion (450 mg QD)
  - Results:
    - 13.6% naltrexone-bupropion group vs. 2.5% placebo group
    - NNT = 9
  - Problem:
    - Precludes use of gold-standard MOUD
    - Co-occurring polysubstance use is common
- **Contingency management**
  - Behavioral health treatment modality
  - Currently the only treatment w/ significant evidence of effectiveness
  - NNT = 3 to 5

(Carpenter et al, 2021; Kirling & Bux, 2022)

Slide 4

Contingency Management

- 'Operant conditioning', 'behavior reinforcement', 'motivational incentives'
- Monetary, voucher, or prize-based reinforcers in exchange for desired behavior (negative drug screen)
- If desired behavior does not occur, reinforcers are removed
- MUD: dysfunction of dopaminergic pathways
  - CM: activates brain reward pathways = dopamine source

CM Core Principles

- **Immediacy of reward**
  - Behavior that is reinforced in close temporal proximity to occurrence will increase in frequency
- **Frequent monitoring**
  - Most effective: 2-3 drug tests per week
  - Saliva tests: 4 days; urine test: 3-5 days
- **Effective rewards**
  - $350-$1,200 per patient is effective

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Latest Literature

- **Systematic review by Brown & DeFulio (2020) n=27 studies**
  - Findings: 26 of 27 studies found CM effectively reduced meth use
- **Systematic review and meta-analysis by De Crescenzo et al. (2018) n=50 studies**
  - Findings: Most effective psychosocial intervention for MUD/CUD is CM + community reinforcement.
  - CM or CM + CR is most efficacious and acceptable treatment for MUD in short and long term
- **Systematic review by AshaRani et al. (2020) n=44 studies**
  - Looked at non-pharm interventions for MUD
  - CM shows strongest evidence favoring assessed outcomes
  - CBT alone or w/ CM also effective
- **Gap**: interventions that support long-term drug abstinence

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Secondary Benefits

- Longer retention in treatment
- Greater # of therapy sessions attended
- Higher utilization of medical and other services
- Reduced high risk sexual behavior
  - Fewer sex partners
  - Studied extensively in MSM and HIV rates
- Increased positive affect and morale
- Group setting: social connections

(AshaRani et al., 2020; Brown & DeFulio, 2020)

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Program Logistics

Sample CM Schedule

Week	Sample	Points	Dollars	Bonus	Cumulative Earnings
1	Mon	10	$2.50		$2.50
	Wed	15	$3.75		$6.25
	Fri	20	$5.00	$10.00	$21.25
2	Mon	25	$6.25		$27.50
	Wed	30	$7.50		$35.00
	Fri	35	$8.75	$10.00	$63.75
3	Mon	40	$10.00		$83.75
	Wed	45	$11.25		$75.00
	Fri	50	$12.50	$10.00	$97.50

- **Rewards**: Vouchers, gift cards, cash, smart debit cards, prize draws
- **Schedule**: Escalating with reset vs no reset
  - Reset schedule = higher adherence
- **Typical duration**: 12-24 weeks
- **Restrictions**: Typically placed on purchase of cannabis, tobacco, alcohol, lottery tickets

(Brown & DeFulio, 2020;)
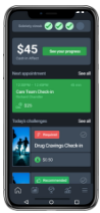
8

Local Context

- Multiple CM programs in development or early stage locally including **CCC**, **Cascadia Behavioral Health**, **OHSU**
- **OHSU IMPACT** Trial (in progress, n=50 to 70)
  - **Population**: Extended length of hospital stay, active stimulant use disorder
  - **Problem**: Patients using methamphetamine in the hospital and low engagement in care
  - **Technology**: Affect Therapeutics App, 2x weekly saliva tests via video
  - **Incentives**: $3 for taking test, $8 if its negative, 4th negative test +$10
  - **Payout**: Amazon or Fred Meyer digital gift cards (Care Oregon imposed restriction), $350 maximum

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National Context

- **California**: 1st state in nation to offer CM as a Medicaid benefit
- 1st quarter 2023 California Medi-Cal launched CMS approved CM program for stimulant use disorder
- Structured 24-week outpatient program
  - +additional 6 months of additional recovery support
- Max payout $599 per calendar year
- ICD-10 codes:
  - R82.998: Diagnosis for positive urine test for stimulants
  - Z71.51: Diagnosis for negative urine test for stimulants

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Financial Considerations

- $600 in incentives – net taxpayer benefit of >$3,000, net economic benefit >$23,000
- **SAMHSA**: "most effective MUD treatment" BUT won't pay more than $75 per pt per year
- **CMS**: Anti-Kickback Statute for payouts over $75
  - Need Office of Inspector General permission
- **Current Oregon funders**
  - Care Oregon
  - Measure 110
    - $265 million funded 2021-2023 cycle

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Conclusion

- CM effectively reduces methamphetamine use
- **Currently most EB treatment for MUD**
- More logistically complex than pharmaceuticals
- **Broad harm reduction secondary benefits**
- Some financial and policy hurdles
- **Action on MUD treatment is needed to address acute problem**

12

12

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Thank You!

Contact: bachhubl@ohsu.edu

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Appendix D

Project Timeline

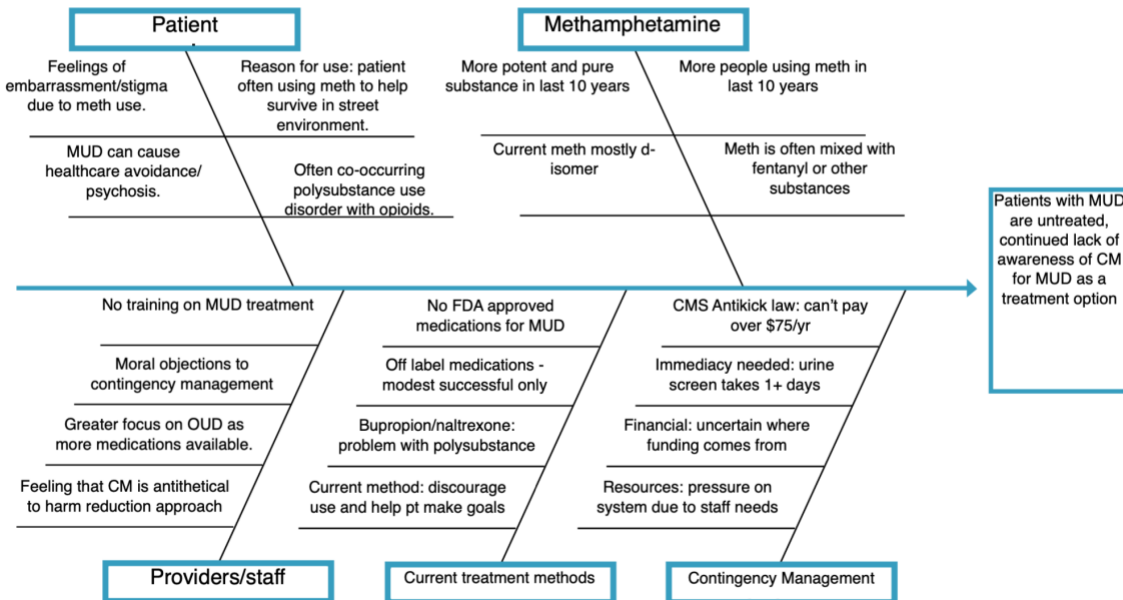|	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec-Mar
Finalize project design and approach (703A)		X						
Complete IRB determination or approval (703A)		X						
Intervention implementation (in-service for providers, RNs, MAs) (703B)				X	X	X	X	
PDSA Cycle 1 – Further conversations (703B)				X				
Final data analysis (703B)								X
Write sections 13-17 of final paper (703B)								X
Prepare for project dissemination (703B)								X

Appendix E

Cause and Effect Diagram

Template: Cause and Effect Diagram

Team: Leah Bachhuber _____   Project: Assessing Receptivity to Contingency Management in Primary Care _____

1) Input the effect you'd like to influence.
2) Input categories of causes for the effect (or keep the classic five).
3) Input causes within each category.

Patient
- Feelings of embarrassment/stigma due to meth use.
- Reason for use: patient often using meth to help survive in street environment.
- MUD can cause healthcare avoidance/ psychosis.
- Often co-occurring polysubstance use disorder with opioids.

Methamphetamine
- More potent and pure substance in last 10 years
- More people using meth in last 10 years
- Current meth mostly d-isomer
- Meth is often mixed with fentanyl or other substances

Providers/staff
- No training on MUD treatment
- Moral objections to contingency management
- Greater focus on OUD as more medications available.
- Feeling that CM is antithetical to harm reduction approach

Current treatment methods
- No FDA approved medications for MUD
- Off label medications - modest successful only
- Bupropion/naltrexone: problem with polysubstance
- Current method: discourage use and help pt make goals

Contingency Management
- CMS Antikick law: can't pay over $75/yr
- Immediacy needed: urine screen takes 1+ days
- Financial: uncertain where funding comes from
- Resources: pressure on system due to staff needs

Patients with MUD are untreated, continued lack of awareness of CM for MUD as a treatment option

Appendix F

IRB Letter of Determination

NOT HUMAN RESEARCH

June 14, 2023

Dear Investigator:

On 6/14/2023, the IRB reviewed the following submission:

Title of Study:	Understanding Receptivity to Contingency Management for Methamphetamine Use Disorder Among Providers and Staff in Primary Care: A QI Project
Investigator:	Lisa Radcliff
IRB ID:	STUDY00025951
Funding:	None

The IRB determined that the proposed activity is not research involving human subjects. IRB review and approval is not required.

Certain changes to the research plan may affect this determination. Contact the IRB Office if your project changes and you have questions regarding the need for IRB oversight.

If this project involves the collection, use, or disclosure of Protected Health Information (PHI), you must comply with all applicable requirements under HIPAA. See the HIPAA and Research website and the Information Privacy and Security website for more information.

Sincerely,

The OHSU IRB Office

Appendix G

Letter of Support from Implementation Site

Letter of Support from OHSU Richmond Clinic

Date: June 9, 2023

To whom it may concern,

This letter confirms that I, Dr. Jason Kroening-Roche, allow Leah Bachhuber (OHSU Doctor of Nursing Practice Student) access to complete her DNP Final Project at OHSU Richmond Clinic. The project will take place from approximately June 2023 to December 2023.

This letter summarizes the core elements of the project proposal, already reviewed by the DNP Project Preceptor and clinical liaison (if applicable):

- **Project Site(s)**: OHSU Richmond Clinic – 3930 SE Division St., Portland, OR 97202
- **Project Plan: Use the following guidance to describe your project in a brief paragraph.**
  - **Identified Clinical Problem**: Contingency management (CM) for methamphetamine use disorder (MUD) is an evidence-based treatment modality but is rarely used in clinical practice. Evidence indicates primary care clinicians often aren't familiar with CM and have logistical or ethical concerns about CM that may influence referral to a program, were it to be in place.
  - **Rationale**: This project, which utilizes Kotter's 8-Step Process for Leading Change, will assess the implementation site to understand future establishment of a CM program. Kotter's change model was selected because no CM program is currently in place. The project is based on the tenant of tertiary prevention.
  - **Specific Aims**: To assess and understand primary care providers and staff receptivity to CM as a treatment modality option for MUD. Understanding receptivity to CM before and after an educational in-service will allow tailoring of further 'next steps' in laying the groundwork for a CM program.
  - **Methods/Interventions/Measures**: This QI project involves gathering data from two surveys of providers and staff: a pre-intervention survey to gather baseline understand to CM for MUD and a post-intervention survey to understand if an education in-service changed attitudes and increased receptivity to CM.
  - **Data Management**: This QI project involves two surveys – a pre-intervention survey and a post-intervention survey. The surveys will be sent out through Qualtrics and response data will be managed in Google sheets. All data will be appropriately de-identified and no PHI will be used during this project.
  - **Site Support**: This site will provide support for the project by allowing for the intervention to take place during meeting times and will allow for the collection of data from providers and staff.
  - **Other**: The student will work to provide a 'deliverable' of an evidence-based guide for establishing a CM for MUD program which will include logistical recommendations and funding options.

During the project implementation and evaluation, Leah Bachhuber will provide regular updates and communicate any necessary changes to the DNP Project Preceptor.

Our organization looks forward to working with this student to complete her DNP project. If we have any concerns related to this project, we will contact Leah Bachhuber and Dr. Lisa Radcliff, DNP, FNP (student's DNP Project Chairperson).

Regards,

Dr. Jason Kroening-Roche, Family Medicine Physician at OHSU Richmond Clinic
Email: kroening@ohsu.edu   Phone: 503-418-3900

_____   6/9/23
Sig   Date Signed