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Perspectives on contingency management for alcohol use and alcohol-associated conditions among people in care with HIV

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Abstract

Background: Contingency management (CM) is an evidence-based approach for reducing alcohol use; however, its implementation into routine HIV primary care-based settings has been limited. We evaluated perspectives on implementing CM to address unhealthy alcohol use, and associated conditions, for people with HIV in primary care settings.

Methods: From May 2021 to August 2021, we conducted two focus groups with staff involved in delivering the intervention (n=5 Social Workers and n=4 Research Coordinators) and individual interviews (n=13) with a subset of participants involved in the multi-site *Financial Incentives, Randomization and Stepped Treatment (FIRST)* trial. Qualitative data collection and analyses were informed by the *Promoting Action on Research Implementation in Health Service (PARIHS)* implementation science framework, including *evidence* (perception of CM), *context* (HIV primary care clinic and CM procedures), and *facilitation* (feasibility outside the research setting).

Results: Several major themes were identified. Regarding *evidence*, participants lacked prior experience with CM, but the intervention was well received and, by some, perceived to lead to lasting behavior change. Regarding the clinical *context* for the reward schedule, the use of biochemical testing, specifically fingerstick phosphatidylethanol (PEth) testing, and the reward process were perceived to be engaging and gratifying, respectively, for both staff and patients. Participants described that the intervention was enhanced by its co-location within the HIV clinic. Regarding *facilitation*, participants suggested addressing feasibility for the non-research use, simplifying the reward structure, and rewarding non-abstinent reduction in alcohol use.

Conclusions: Among patients and staff involved in a clinical trial, CM was viewed as a helpful, positive, and feasible approach to addressing unhealthy alcohol use and related conditions. To enhance implementation, future efforts may consider simplified approaches to the reward structure and expanding rewards to non-abstinent reductions in alcohol consumption.

Keywords

Substance-related disorders; Alcohol-related disorders; integrated; HIV; reward

1. Introduction

Unhealthy alcohol use, ranging from at-risk use (i.e., levels of consumption that increases risk of harm) to alcohol use disorder (AUD)(Saitz, 2005), is increasingly prevalent in the United States (Substance Abuse and Mental Health Services Administration, 2021) and disproportionately prevalent among people with HIV (PWH)(Crane et al., 2017, Duko et al., 2019). In addition to the adverse impact of unhealthy alcohol use on health observed in the general population (Donroe and Edelman, 2022), unhealthy alcohol use additionally negatively impacts care at each stage of the HIV care continuum and is associated with greater mortality risk among PWH (Azar et al., 2010, Justice et al., 2016, Vagenas et al., 2015, Williams et al., 2019). PWH can also have medical conditions that are adversely impacted by alcohol use including tobacco use disorder (Ale et al., 2021), liver fibrosis, untreated hepatitis C (HCV) infection (Gallant et al., 2017), depression (Rezaei et al., 2019) or be prescribed psychoactive or other medications that may interact with alcohol (Womack et al., 2019). Effectively addressing unhealthy alcohol use among PWH is critically important to improving care and outcomes (Williams et al., 2016).

Behavioral interventions, predominantly motivational interviewing-based, have been found to be effective among PWH (Hasin et al., 2022, Kahler et al., 2018, Scott-Sheldon et al., 2017).However, these interventions have been modest in their impact and durability (Madhombiro et al., 2019). For example, results from a prior meta-analysis demonstrated that behavioral interventions were effective at reducing quantity of alcohol consumed and heavy drinking among PWH but overall found few studies that addressed alcohol consumption without additionally targeting other behavioral targets (e.g., medication adherence). Notably 50% of the included studies used techniques to address motivation including 32% using motivational interviewing and 18% using Motivational Enhancement Therapy (Scott-Sheldon et al., 2017). A subsequent randomized controlled trial, found motivational interviewing paired with a patient engagement smartphone application to be more effective at reducing drinks per day than use of the NIAAA clinician’s guide but that effects attenuated over the subsequent year (Hasin et al., 2022). Further, interventions offered in HIV clinical settings to non-treatment-seeking individuals have been challenged by patient’s low rate of acknowledgement of unhealthy alcohol use and low motivation for receiving treatment for unhealthy alcohol use (Cook et al., 2017, Edelman et al., 2016, Edelman et al., 2020, Edelman et al., 2017, Hasin et al., 2022). For instance, in the above mentioned randomized controlled trial, despite a plan to recruit 300 patients, only 114 were eventually enrolled in the trial (Hasin et al., 2022). Similarly in a pilot study of naltrexone for hazardous drinking in women with HIV, the study was stopped after enrolling 17 participants of a planned recruitment of 45 with barriers thought to include stigma around alcohol use, low motivation for treatment, and low perception of alcohol as problematic (Cook et al., 2017). Contingency management (CM) offers a potential solution to enhance motivation to engage in alcohol treatment. According to principles of learning and behavioral economics, undesirable behaviors such as unhealthy alcohol use are maintained in part by the reinforcing beneficial effects of alcohol use and by reinforcing environmental influences (e.g., family/friends who drink). Unhealthy alcohol use can be modified by reinforcing abstinence and other behaviors that support it while

withholding reinforcement and punishing drinking behavior and the non-completion of behaviors that support abstinence. Contingency management (CM) is a treatment strategy within this conceptual framework that reinforces desirable behavior, via timely incentives, when individuals achieve verifiable, targeted behavior change (e.g., abstinence) (Petry, 2012).

There is a large body of research showing that CM is a highly effective behavioral intervention that improves treatment outcomes in a variety of substance use disorders (SUD) (Davis et al., 2016, Lussier et al., 2006, Prendergast et al., 2006), including AUD (Petry et al., 2000). CM-like behavioral economic incentive studies have also been conducted to improve antiretroviral therapy adherence among PWH (Alsan et al., 2017; Haug & Sorensen, 2006; Herrmann et al., 2017, Krishnamoorthy et al., 2021). While a recent study among hospitalized PWH with substance use, found no significant beneficial effect of a combined patient navigation and CM intervention on HIV viral suppression, it found significantly earlier treatment, earlier HIV visit initiation, more validated medications checks, and more HIV care visits in the CM group. (Metsch et al., 2016, Stitzer et al., 2018). As previously documented, there have been few efforts to promote CM in HIV clinical settings to address substance use and, to our knowledge, none specifically focused on unhealthy alcohol use or alcohol-associated conditions (Haug & Sorensen, 2006; Herrmann et al., 2017; Ledgerwood & Yskes, 2016; Metsch et al., 2016; Petry et al., 2000). Further, despite recognized challenges to CM adoption, including unsubstantiated concerns about external rewards negatively impacting internal motivation (Ginley et al., 2021) and practical considerations such as financial and time commitments (Petry et al., 2017), qualitative assessments of the perceptions of CM and factors impacting its implementation in HIV clinical settings from the perspectives of relevant stakeholders – including patients and staff are lacking.

To address this literature gap, we used mixed methods to gain a more comprehensive understanding of perspectives regarding CM to address unhealthy alcohol use within HIV clinical settings in the context of the *Financial Incentives, Randomization and Stepped Treatment (FIRST) Trial*. We anticipated this assessment would generate important insights for informing future implementation of CM to reduce unhealthy alcohol use and address medical conditions adversely affected by alcohol among PWH receiving care in HIV clinical settings.

2. Methods

2.1 Overview of FIRST

FIRST was a 7-site multicenter randomized controlled trial comparing CM with stepped care versus treatment as usual among PWH and unhealthy alcohol use (Edelman et al., under review).

Eligible patients met criteria for A) self-reported unhealthy alcohol use, defined as meeting criteria for 1) at-risk alcohol use (Alcohol Research: Current Reviews Editorial Staff, 2018), 2) alcohol use disorder (AUD) diagnosed by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), or 3) lower risk levels of alcohol use in the presence of a medical

condition potentially impacted by alcohol use including presence of a detectable HIV viral load, tobacco use disorder, liver fibrosis, untreated hepatitis C (HCV) infection, depression or prescription of psychoactive medications that may interact with alcohol and B) biomarker confirmed significant alcohol use defined as a phosphatidylethanol (PEth) level >20ng/mL (Edelman et al. under review; Eyawo et al., 2020).

Institutional review board approval was received from the institutional review boards of the coordinating center at Yale University (New Haven, CT) the Veterans Affairs (VA) Connecticut Healthcare System (West Haven, CT) and from the participating clinical sites. Prior to *FIRST* participation, written informed consent was obtained for patient participants.

2.1.1 Description of Contingency Management Intervention in *FIRST*—

Per protocol, CM visits occurred every three weeks over a 12-week study period. Participants could earn incentives by completing any of three target behaviors: 1) Abstinence from recent alcohol use verified by a breathalyzer or saliva testing; 2) Abstinence (or near abstinence) from alcohol use in the past 21 days verified by PEth <8ng/mL sampled via a fingerstick; and 3) Completion of an activity selected from a prespecified list to address their unhealthy alcohol use or a medical condition that is adversely impacted by alcohol use (Table 1). Breathalyzer was chosen to detect short term abstinence. PEth was chosen over other biomarkers for alcohol use due to its sensitivity and specificity and its ability to detect alcohol use for 21 days which is particularly useful in a clinical setting such as HIV clinic with monthly or less frequent visits. (Wurst et al., 2015, Eyawo et al., 2020, Hahn et al., 2021). Breath or saliva testing for recent alcohol abstinence commenced at the first CM visit and continued at each of the four subsequent CM visits. Because participants selected their first incentivized activity at the first CM visit, incentives for verified completion commenced at the second CM visit and continued at each of the subsequent three CM visits. Similarly, reinforcement for negative PEth tests commenced at the second CM visit and continued at each of the subsequent three CM visits. Prizes escalated with consistent, verified completion of the target behavior. The earnings from the draws were disbursed to participants in the form of Veterans Canteen Service (VCS) coupons (which could be redeemed at canteens, cafeterias, and coffee shops throughout the VA). Participants at the non-VA study site received earnings on a smart debit card. The debit card can be used at most stores that take credit cards but cannot be used for purchases of alcohol or tobacco products.

2.2 Overview of Mixed Methods Study

Consistent with prior work by our group and others (Edelman et al., 2021; Hawk et al., 2020; Joudrey et al., 2020), we conducted a mixed methods assessment in the context of *FIRST. FIRST* and this qualitative assessment were grounded in the *Promoting Action on Research Implementation in Health Services* (PARIHS) implementation science framework which is based on three core elements relevant for promoting successful implementation – *evidence*, *context*, and *facilitation* (Helfrich et al., 2010). In this study, *evidence* referred to experience and perceptions of CM; *context* referred to the HIV clinical setting where the intervention took place and the elements of the intervention; and *facilitation* referred to supports that were perceived to be needed to initiate and continue the intervention outside of the research infrastructure.

Patient participants and staff who took part in the qualitative portion of the study were verbally consented.

2.3 Settings and Participants

Seven HIV clinics located within the Department of Veterans Affairs (VA) in Atlanta, GA; Bronx, NY; Manhattan/Brooklyn, NY; Dallas, TX; Houston, TX; Los Angeles, CA; Washington, DC; and one non-VA-based clinic in New Orleans, LA were sites for the study. All clinics were academically affiliated and located in an urban setting.

A convenience sample of patient participants enrolled at the three highest recruiting sites, who completed the *FIRST Trial*, had been randomized to CM with stepped care arm, and completed at least one CM visit were invited by the local site team to participate in an individual telephone interview conducted by members of the coordinating center team. Individuals who had completed the trial most recently were prioritized for recruitment. They were compensated $50 for completing the interview. Patient participants who were randomized to CM with stepped care and had completed at least one CM visit also contributed satisfaction data collected during the 12-week assessments to the current analysis.

Social Workers (SW) and Research Coordinators (RC) who had participated in delivering the CM intervention and/or supporting the delivery of CM at their sites, respectively, were also invited to participate. Social Workers (SW) and Research Coordinators (RC) who had complementary roles in delivering the CM intervention and/or supporting the delivery of CM at their sites, respectively, were also invited to participate. Social Workers (SW) and Research Coordinators (RC) who had participated in delivering the CM intervention and/or supporting the delivery of CM at their sites, respectively, were also invited to participate. Social Workers (SW) and Research Coordinators (RC) who had complementary roles in delivering the CM intervention and/or supporting the delivery of CM at their sites, respectively, were also invited to participate. SW in these clinics were usually embedded in the clinic, had primary responsibility for providing the counseling aspect of the CM intervention, and included this intervention within their clinic workflow, hence, their feedback is critical to understanding how it could be incorporated into their work in a larger scale. The RCs were essential for helping with verification of activities (e.g., processing PEth); maintaining the fishbowl and incentives; and scheduling and coordination of visits. This would mimic what an additional assigned person, such as a medical assistant, would do in clinical practice and thus their feedback is important to understand the potential barriers for implementation.”

2.4 Data Collection

We conducted 30–60 minute individual interviews with *FIRST* patient participants over Microsoft Teams software. An interview guide was used that began with grand tour questions followed by specific probes that explored themes grounded in the *PARIHS* framework domains of *evidence* (patient history of alcohol use treatment, prior experience with and perceptions of CM), *context* (personal experience with location and elements of the CM intervention), and *facilitation* (feasibility and changes outside the research setting)

(see Appendix). Patient participant demographic information collected as part of baseline clinical trial assessment included age, race, and ethnicity with options as presented in Table 2. Adapted from a tool previously used to assess patient satisfaction with office-based substance use treatment (Barry et al., 2007), patient satisfaction data were collected at the week 12 assessment (Table 3).

Data were collected from RCs and SWs via two post-study focus groups that were role specific (one for SWs, one for RCs) along with a brief anonymous survey. The interview guide was similarly grounded in the PARIHS framework (see Appendix). Survey questions assessed demographics and experience in alcohol treatment/research. In addition, using the Contingency Management Beliefs Questionnaire (CMBQ), we assessed perceptions of factors impacting CM adoption across the three factors, including general barriers, training-related barriers, and CM supportive statements. The CMBQ has 35 items and uses a five-point Likert scale with scores ranging from no influence (1) to very strong influence (5) (Rash et al., 2013; Rash et al., 2012). Race and ethnicity were self-reported from the race categories of Asian, American Indian or Alaska Native, Black, Native Hawaiian or Pacific Islander, White, or other and the ethnicity categories Hispanic, non-Hispanic, or other.

Qualitative data were collected by members of the coordinating center team who did not work at any of the recruiting sites and included physician researchers trained in internal medicine, HIV medicine, addiction medicine, and/or qualitative methods.

2.5 Data Analysis

The three investigators (SC, DAF, EJE) who conducted the individual and focus group interviews took contemporaneous notes that were later used in the coding process to add context. The coding process was inductive, iterative, and grounded in the *PARIHS* framework. Two investigators (SC, EJE) independently reviewed and coded each transcript and then met to develop consensus and create a codebook. NVivo was used during the coding process by one investigator (SC) for organization and data management (QSR International, 2021). The sample was based on convenience (patient participants) and practical issues (staff participants), thus no *a priori* stopping criteria were defined. However, thematic saturation was reached as no additional codes or changes to the codebook were made in the final two transcripts and the number of interviews conducted was similar to the expected number needed for thematic saturation in the literature (Hennink & Kaiser, 2022). Individual interviews were coded prior to focus groups to allow the participant perspective to provide context to the staff focus group transcript analysis. We merged findings from patients, SWs and RCs to add rigor to our findings by triangulating data sources (Curry et al., 2009).

Quantitative data were analyzed descriptively. Means were calculated for CMBQ scores for each question and each factor (general barriers, training related barriers, and CM supportive statements). Quantitative data were integrated in an embedded design using the quantitative results to enhance qualitative themes (Creswell et al., 2011; Curry et al., 2013).

3. Results

Thirteen patient participants and nine staff (n=4 RC and n=5 SW) participated in an individual interview and focus group, respectively. Their characteristics are described in Table 2. Interviews were conducted a median of 12 months (IQR 10–15 months) after patient participants had completed their involvement in the clinical trial.

Organized by *PARIHS* (Stetler et al., 2011) we identified common themes in the interviews and illustrative quotes were chosen regarding patient experiences with alcohol use and prior treatment, perceptions of the contingency management intervention and its specific components, the impact of the intervention on participants, and its feasibility in a non-research setting.

Theme 1:

While prior experience with AUD treatment was common, all patients and nearly all staff had prior no experience with CM. For staff that had heard of it, they generally had negative perceptions; however, these changed over time.

Nearly all patient participants had prior alcohol treatment experience in a variety of settings and treatment modalities, but none had experience with CM. The novelty of CM was part of its appeal. Patient participant 10 described:

> "I had been through five treatment programs and seemed like it wasn't working… And so, when she confronted me with the program I just, what got me was the offer, things that I could award or get free from trying to stop drinking. And it, I just gave it a try. Gave everything else a try so I was trying it too."

Among staff, few were aware of CM prior to work on this trial. On average, staff had 4.5 years of experience in alcohol treatment or research and yet only one staff member had prior experience with CM. Those that were aware of CM, had skeptical or negative perceptions, largely due to concerns about providing monetary prizes to people with a substance use disorder. One RC stated:

> "Well, I didn't see how offering financial incentives would be beneficial. You know I think I had the understanding as most people you know if you give someone that has an active addiction if you give them money then they're just gonna use it to, you know, buy more alcohol."

Staff members reported positive perceptions of CM after gaining more experience delivering the intervention. This was reflected in their pro-CM CMBQ average rating of 3.6 indicating some to strong influence of pro-CM statements on their interest about adopting CM. Although staff acknowledged that not all patients responded well to CM, the positive impact of CM for many patients shifted their outlook. One SW noted:

> "I thought it seemed a little crazy at first but then it, but I really, really liked it by the end. So I had a lot of fun working on the study… and I would love to do it again in the future if I could carve out the time."

One RC agreed that compared with prior treatment experience, CM seemed different.

> "When you ask and you go through the assessment like how many times have you been in other programs like SARP [Substance Abuse Recovery Program] and some of my patients would tell me like 10, you know. And then going through the contingency management they were like this is the first like program that's actually helped me realize what I've been doing as far as taking in my drinking and stuff."

Theme 2:

Use of biochemical verification of alcohol behavior change for determining reward eligibility had some difficulty, but was generally perceived as motivating.

For some patients the physical aspect of testing, either providing a breath sample for the breathalyzer or having a finger stick for PEth, led to some frustration. The breathalyzer was particularly difficult for those with lung disease and the testing for PEth required multiple finger sticks for some. Patient participant 7 said:

> "… the only thing I had a problem with was the breathalyzer. I couldn't hardly blow it—I couldn't blow those breathalyzers."

Overall, patient participants reported that seeing the objective results about their alcohol use promoted their motivation to change their drinking. Among patients who completed the Participant Satisfaction Survey, 87% felt that this monitoring helped their treatment. Patient participant 2 stated:

> "When I found out my next appointment was for testin' I could, I thought I could win something. And so, I gave it a try, you know. And I was very impressed with myself that by trying to achieve something that was hard, nothin' but easy to do, you know. And then I received the gift was much rewarding so it, it just kept me tryin' you know. I tried this one time and then I tried the second. The second time was pretty much easy, you know."

Patient participant 6 similarly said:

> "So, the question had to do what I thought about the finger draw? That actually was the most informative and instructive and rewarding part of the whole entire program because I found that information was something that was, you know, not determined by interpretation. It was a number and it showed what it showed, and I think it was very informative. I looked forward to it…. So, that singularly was the most impactful thing of the entire program for me personally."

Theme 3:

While preferences regarding type and magnitude of the prizes varied, generally the patients were motivated by them and found the process to be rewarding.

VA patient participants in this study were given VCS coupons to redeem at an onsite store ("Canteen"); however, those participants were sometimes frustrated when certain merchandise was unavailable at the canteen (e.g., items with greater appeal to female participants). One SW noted that at times the Canteen was understocked which may have been particularly impacted by the COVID-19 pandemic:

> "Our Canteen is scantily stocked and I was just thinking that if we had had a woman in… I think that she would be extremely disappointed…I find, some of the things that I think do not speak to women or do not let women know that the VA appreciates them."

Staff noted that a downside was that some drawings resulted in a slip of paper drawn from the prize bowl saying "good job" rather than a monetary reward and saw that this could be deflating. Although no research participants voiced similar concerns, one RC said:

> "And I agree with [other study staff] it's interesting that you called them 'zeros' instead of 'good jobs.' Because I think that was the perception. Well, you know I mean it was like you know almost like a trick, they got tricked. You know they were expecting to get some like a tangible reward and only got the good job. So, a lotta times when they pulled those you could see the disappointment on their face"

There was a lack of consensus about the appropriate type of prize. Staff noted that some patients were not engaged by the VCS coupons; and one patient expressed concern about using cash as prizes. One RC stated:

> "When I was trying to recruit patients and I told them that it would be Canteen vouchers like commissary vouchers, some people were like oh that's it?"

Patient participant 2 stated a preference for specific types of incentives and against cash:

> "Yeah. Yeah. But I wouldn't recommend cash. You know what I'm saying? And I, I think I see …you know, you can go and, you can buy drugs with cash. … buy drugs and alcohol with cash."

Overall, many participants indicated that the prize drawing was both fun and motivating. Staff had a similar perception on their survey, on average answering the CMBQ questions "CM is good for patients because they get excited about their treatment and progress" and "CM will help get patients in the door" (e.g., motivate them to come to clinic) as having a strong influence on their perspective of adopting CM. The tangible incentives available in CM impacted their perception of alcohol abstinence and other healthy behaviors supporting it as reflected by a couple of patient participants:

> "The rewards program to me, for me, was perfect. And no, it just worked, it worked well for me because I was actually achieving something. I was trying to accumulate as much as I can. So it became a contest with myself. A game. And I actually enjoy it."
>
> - Patient participant 1

> "I think it's brilliant to have this type of participation. Because, like I said, it was like—it's a long shot to say it's like going to a carnival or a county fair or something like that, but it had that type of stimulation that where, you know, it was kind of fun. It was unique. It was curious. It was, you know, you looked forward to it…And I think was a very positive element to throw in with studies and homework and consuming information."
>
> - Patient participant 6

One participant even noted that the feeling of being rewarded, not the actual award, was unique and the motivating aspect of the study. Patient participant 4 said:

> "I still have the bag full of the tickets in my bookbag that I used to carry with me. I have never even used them, but it was, for me, the incentive wasn't so much the drawing, which it was great that you'd pull a 50 and 75 or whatever it was, but just knowing that you would be, you had something tangible that you were going to obtain for a behavior change."

Theme 4:

Staff expressed privacy concerns about integrating alcohol treatment within the HIV clinic, but patients overall preferred this integrated care model and emphasized the importance of the nonjudgmental and trusting attitude of clinic and staff.

One staff member shared concerns that patient participants might be reluctant to discuss their alcohol use if the intervention was linked with their other medical care. One RC said:

> "Well then if they're going to their primary [clinician] some of them aren't as open and honest… with their primaries about their alcohol consumption….I've had several participants ask me repeatedly if this information is going to be going back…"

On the other hand, this view was not shared by other staff and participants generally perceived that the location of the intervention was important for promoting engagement and behavior change success. Many noted the benefits of it being located within their primary clinics including convenience, already established familiarity and trust, and avoidance of stigma associated with visiting a clinic specializing in treating substance use disorders. Patient participant 9 stated:

> "Familiar surroundings it doesn't draw any additional attention to you. Whereas going to another part of the VA, oh I saw [name] over here, oh pardon I did mention my name, but I don't really care. So, what were you doing over there?"

Another participant emphasized the quality of care he received at his primary clinic and concerns that another clinic might not provide the same standard of care. Patient participant 4 stated:

> "So, had it been another group or somewhere else in the hospital, would I have gotten the same amount of care, treatment, communication, and overall aspect of pushing the program? Probably not."

Participants frequently identified the nonjudgmental and supportive approach of staff as one of the most significant benefits of the study and that it promoted successful engagement in and success of the intervention. Patient participant 1 said:

> "Because they were open to answer questions that I asked. And I didn't feel like I was being judged when I spoke. I didn't feel like I was going through, I didn't feel like I had to say the right things. I just had to be honest."

Staff also identified this supportive approach as a CM facilitator. Some used the additional time and access to a SW to encourage participation in the intervention. One RC noted:

> "if I could give them the opportunity to meet with her consistently, a lot of patients really liked that. Because there are so many times, I mean my office is right in front of, right behind the check-in desk and I hear people come to the desk, is the social worker here? Can I talk with the social worker? Oh no, she's with another patient. She's not here right now. So, I used that as one of my biggest advantages to the study."

When asked what additional supports might be helpful for an alcohol intervention offered in HIV clinics, some participants identified that the inclusion of supportive peers would promote their engagement with the integrated care program. Patient participant 8 said:

> "I connect more with a person [when] I know that what they are is a recovering addict or recovering alcoholic. And I know—or they can understand some of the interesting things that my mind will tell me and thoughts that I can do and can't do and stuff."

Theme 5:

While the research staff noted that some patients did not engage with the intervention, the patients who did often reported lasting behavior change.

While some staff felt that patients with low baseline motivation to change their drinking were less likely to engage in treatment, participants noted that the intervention could help enhance motivation to change among those less motivated. Patient participant 1 remarked on these dueling perspectives:

> "Because I don't think … it'll work for a person that's not ready. And then again, it may just make somebody aware of the fact, like it did me, that they had, they have an issue, and it allows them the space to think about what they want to do. …it puts out in the front when you're looking at that paper and you're looking at your consumption, oh, I do have a problem. It in a subtle way it addresses denial."

Several participants, including individuals who also received motivational enhancement therapy after CM, reported sustained benefits after the CM intervention ended, including continued use of controlled drinking strategies (i.e., counting their drinks for self-monitoring, planning alcohol use), sustained alcohol reductions, skills learned, and improved family relationships.

> "Yeah. I'm more aware of what I do. I count drinks …I know if I go out, if I have, plan on going out with some friends and there will be social drinking involved in it I should not drink anything else for the rest of the week 'cuz I know my particular goal is no more than three drinks a week."
>
> -Patient participant 9

Theme 6:

Some staff perceived that the CM rewards schedule was complex and favored a harm reduction rather than abstinence-focus; however, there was support for the visit schedule.

Overall, staff perceived that the intervention could be feasible outside of a research setting but stated that some changes would be needed to simplify the intervention. Notably on the CMBQ, staff on average rated "CM is difficult to implement" as having very little influence while rating "CM is worth the time and effort if it works" as having a strong influence. They recommended limiting the number of behaviors that could receive awards and more staff training and ongoing staff supervision while commenting on the benefit of having a team involved in the process.

One RC commented:

> "I would say if there was only one activity or indicator compared to the three or four, I can't remember, different things that allowed them to get pulls I think if it was just focusing on one activity at a time or one indicator at a time."

One SW addressed overall feasibility by stating:

> "I think the face-to-face training was very effective if we could all be, if the sites can be identified, the assigned clinicians committed, and you know time set aside in their work life for this to be a priority. And to be able to meet in a meaningful way for training and then ongoing relationships … it does take buy-in from our institutions."

Some staff and patient participants agreed that primary focus on abstinence may have limited treatment engagement for some patients and that it would be helpful to reward non-abstinent reductions in use as well. When reflecting on his prior treatment experience, patient participant 1 noted:

> "The ones that focused on abstinent, it's like it was, you were forcing something on somebody and they're not ready. Or even if they are ready, that change in the behavior became so drastic that the pressure could actually, for me, trigger a need or a reason to drink. But when I was in a program where it was just as important that I didn't, but it was not something that punished me, it gave me more of an incentive to really get into the program and work with it."

This feeling was further reflected by staff noting that the rewards for biochemical testing only rewarded abstinence.

> "Some of my guys they came really close to getting less than eight [abstinence on PEth], but just didn't quite make it. So, they felt kinda disappointed 'cuz they felt they were working so hard but yet they were just like on the cusp and they just didn't quite go below the eight."

> "We had some participants who did very well in reducing the amount of alcohol that they drank but didn't get to that less than eight mark. And I think it would've been really good to be able to reward them for that."

Overall patient participants and staff considered the visit frequency of every three weeks to be helpful but indicated that more frequent visits would improve impact. One SW noted:

> "I felt that some of the participants felt, they were sort of like me, procrastinators. So I'll do it, I'll do it, I'll do it, and then by the time they get ready to do it you know they gotta come and see me. So I think that if they had less time they would've been on top of it a little more."

Patient participant 2 said:

> "Probably not often enough. You know what I'm saying? It would make me feel good when I did good on my results with the, you know, staying clean. You know what I'm saying? It would be incentive to stay clean. And then to see that I made progress, you know, every time I went in there."

4. Discussion

To our knowledge, this is the first study assessing multistakeholder perspectives of CM implemented in a HIV clinical setting to address alcohol use and associated conditions, in which several important findings were identified. Regarding *evidence*, few had heard of CM, and many staff had preconceived negative perceptions of CM. After participating, patients described the intervention as both increasing their motivation, helping them realize the impact alcohol was having, and leading to lasting skill building and change. Regarding *context*, while the location of the intervention within HIV clinical settings may have initially led to concerns by staff about privacy, participants found the trust they had already developed in this clinic and the accepting nature of staff integral to their engagement in the treatment. The biochemical tests used for rewards and the reward process itself, both integral to successful CM, were described as both motivating and fun. Notably this was also the first study utilizing PEth as a biomarker of alcohol abstinence in CM. Regarding *facilitation,* the importance of having prizes that were meaningful across the range of preferences among a diverse patient population was noted to optimize patient engagement. Staff reflected that CM could be implemented outside of a research study with a simplified list of rewarded behaviors and by expanding rewards to non-abstinent reductions in drinking as well.

The results of this study build on prior qualitative evaluations of CM as well as studies of integrated behavioral health treatment for substance use disorders in an HIV/primary care clinic. Qualitative assessments of CM-based interventions and its implementation have predominantly been limited to perspectives of clinicians and staff (Becker et al., 2019, Becker et al., 2021, Hagedorn et al., 2014, Hartzler, 2015, Hartzler et al., 2014, Kellogg et al., 2005, Kirby et al., 2006, Neale et al., 2016, Oluwoye et al., 2020). Two studies have previously assessed patient perspectives with qualitative interviews– one on its use alongside a personal health budget for people on injectable opioid agonist therapy (Neale et al., 2016) and another on implementation of CM across a health system for a variety of SUDs (Kellogg et al., 2005). In addition, a post-intervention survey of participants undergoing CM interventions in VA substance use disorder specialty clinics had similar findings to our study that earning rewards was positively received, the staff characteristics were critical to the success of the CM/treatment process, and that CM was thought to positively impact the

treatment experience (Hagedorn et al., 2014) Our findings echo others which have found limited awareness in CM or the evidence for its use among healthcare workers (Becker et al., 2019, Kirby et al., 2006) as well as more positive perceptions of it in those with CM experience (Kirby et al., 2006) as we saw at the end of the study.

Regarding the fishbowl technique for prize allocation, other qualitative studies have also found concern that the nonmonetary rewards ("good job") were deflating (Hagedorn et al., 2014) although this technique has been found effective in multiple prior studies (Peirce et al., 2006; Petry & Martin, 2002; Roll et al., 2006) including in the treatment of alcohol use disorder (Petry et al., 2000). Future efforts may consider offering rewards of low monetary value, such as a warm beverage or small treat, instead of non-monetary rewards.

Our study has some limitations. First, the qualitative sample of research participants was a convenience sample and thus may not reflect the experience of participants at all sites in the study. While our sample size of patient participants was modest, it is consistent with the expected number of participants required to reach thematic saturation (Hennink & Kaiser, 2022). We acknowledge, however, that findings may not be reflective of all patient participants involved in the parent clinical trial, particularly those individuals who were not reachable for study participation (and may have less favorable perspectives regarding the CM or be less likely to benefit). The small sample of staff, one focus group each for RC and SW, also did not allow us to derive differences between groups. Second, the demographic characteristics of participants enrolled in this study are reflective of these sites; however, findings may not be generalizable to other groups with varying racial, ethnic and gender composition. Third, the response rate on the participant satisfaction survey was <60% so may not reflect the experience of all participants and could reflect selection bias for those who completed or had a positive experience with the study. Fourth, interviews were conducted a median of 12 months (IQR 10–15) after completion of the study and thus responses may also reflect recall bias. Lastly, some participants received additional interventions in follow-up to CM as part of their study participation; while they were asked specifically about their experiences with CM, some of their experiences may have been driven by overall study participation.

Our work has implications for research, clinical care, and policy. First, overall patients and staff responded very positively to the use of PEth for determining alcohol use in an objective way once challenges with obtaining test results were overcome. Efforts to incorporate PEth data with a motivational interviewing based behavioral intervention to address alcohol reduction are underway (Justice, 2022). Second, additional research is needed to establish the efficacy of CM for unhealthy alcohol use in HIV clinical settings. The current study can guide future investigations by providing insight into patient preferences for objective measures of alcohol use and reinforcers to promote decreased use and abstinence. From a clinical perspective, the current study highlights the potential value of reinforcing multiple health-related behaviors in addition to decreases in drinking with individuals who are not seeking treatment for unhealthy alcohol use. Initial staff resistance to CM is not uncommon and policies that reflect and highlight the evidence to support CM may help with implementation. For instance, the VA has provided support for CM implementation in its substance use clinics nationally; and, California Medicaid has recently implemented a

pilot for CM. Institutional support may address staff hesitancy and augment staff's positive experiences allowing for greater implementation of this behavioral treatment.

5. Conclusion

We found that in a clinical trial setting, patients and staff found a CM-based intervention for unhealthy alcohol use and associated conditions implemented in an HIV/primary care setting to be helpful, motivating, and feasible. PEth based biochemical testing was positively viewed by participants as a marker for alcohol use and is a verifiable target for CM. These results can inform strategies for design of future intervention to address unhealthy alcohol use in HIV clinical settings and more broadly.

Declaration of Interests:

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FIRST Implementation Sub-study: Patient Interview Guide

Introduction:

This study is intended to understand your experiences receiving contingency management -- the rewards program - to address unhealthy alcohol use and your medical conditions adversely impacted by alcohol, including HIV. We would like to learn about your experiences with the FIRST Trial to inform future efforts to improve treatment approaches in the future. Everything that is said here will be kept confidential. We will only share a summary of these findings with others so that we can try to improve your experiences.

1. To get started, prior to participating in the study, had you had any experiences with contingency management?
    a. What worked well?
    b. What was difficult?
    c. How did/would you describe it to your friends and/or family?
    d. What made you interested in participating in the study?
2. It looks like you completed [#] of sessions for contingency management. Tell me what affected your interest in coming to these visits?
    a. What did you like?
    b. What didn't you like?
    c. To what extent did the program affect your motivation to change your alcohol use or complete an activity?

3. Now, I would like to ask you some specific questions about the program - we want to hear about what you liked and did not like. This is so we can improve how we or others might implement this type of program in the future.
    a. How clear was the reward system to you (for example, how often you received rewards, how rewards increased over time, the re-setting of rewards when behaviors weren't completed?
    b. How did you feel about the opportunity to receive rewards for abstaining from alcohol use?
    c. What was it like to have a blood test checked to monitor your alcohol use?
    d. How did you feel about the opportunity to receive rewards for completing activities to help you abstain from alcohol use or manage your medical conditions that are affected by alcohol use?
    e. What was it like meeting with the social worker? What did you like about it? What didn't you like about it? Is there someone else you would have preferred to offer this treatment?
    f. How did you like the schedule of appointments – every 3 weeks?
    g. What about the length of the treatment of 12 weeks?
4. How comfortable did it feel? How did it compare to other treatments you have received for your alcohol use? Other health conditions?
    a. Please tell us your thoughts about receiving rewards for abstaining from alcohol and completing healthy activities, e.g., what was surprising, pleasant, unpleasant, etc?
5. Would you like to see this program continued? What would you keep? What would you change?
6. What else do you think would be helpful for us to know?

Thank you!

FIRST Implementation Sub-study: Staff Focus Group Guide

Introduction:

This study is intended to understand your experiences delivering contingency management to address unhealthy alcohol use and medical conditions adversely impacted by alcohol among individuals with HIV. We would like to learn about your experiences with the FIRST Trial to inform future efforts to improve treatment approaches in the future. Everything that is said here will be kept confidential and I ask that others do the same. We will only share a summary of these findings with others so that we can try to improve your experiences. We ask that only one person speak at a time and that you identify yourself by site each time you speak. To get started….

1. Prior to the FIRST Trial, please describe any prior experiences you have had using contingency management (CM)?
    a. With which patients did you use CM? **(please use study IDs only)**
    b. Which behavior(s) were reinforced?
    c. What type(s) of reward did patients receive?
    d. What worked well?
    e. What was difficult?
2. What has been your experience with providing contingency management to address unhealthy alcohol use and medical conditions adversely impacted by alcohol – including tobacco use, liver disease, depression, hepatitis C treatment, HIV viral control - among individuals with HIV?
    a. What has worked well? (for getting participants to decrease their alcohol use, complete activities? what about for you in implementing this program?)
    b. What has been difficult? (for getting participants to decrease their alcohol use, complete activities? what about for you in implementing this program?)
    c. How comfortable did it feel? How did it compare to other treatments you provide to address alcohol use?
    d. Please tell us your thoughts about delivering contingency management, e.g. what was surprising, pleasant, unpleasant, etc.?
3. I would like to ask you some specifics about our approach to contingency management, regarding your experiences with how the following worked:
    a. Visits every 3 weeks: too frequent, too infrequent, just right; why?
    b. Five visits over the 12 week period: too many, too few, just right; why?
    c. Costs and benefits of reinforcing the following behaviors?
        i. Recent abstinence verified by breathalyzer?
        ii. 3 weeks of abstinence verified by PEth?
        iii. Activities to address alcohol use and related medical conditions?
    d. To what extent and how did the contingency management program fit in with your other responsibilities?
    e. How complex was it to implement the reward schedule? verification procedures, including PEth?

4. If you were to implement a contingency management program to address unhealthy alcohol use in HIV clinics, how would you design it (or, what would you do differently)? For example:
    a. What type(s) and frequency of trainings and ongoing support would be helpful?
    b. How would you change the target behaviors?
    c. How would you change the timing of visits?
    d. How would you change the reward schedule?
    e. What kind of support, e.g. coaching, materials, advocacy, would be needed?
    f. Who would implement it?
5. What else do you think would be helpful for us to know?

Thank you!

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Table 1:

Reinforcement Schedule Overview of Contingency Management Intervention to Reduce Unhealthy Alcohol Use Among People with HIV

	Breathalyzer <0.003g/dL	**PEth <8ng/ml**	**Activity**
Purpose	Current alcohol use	Recent alcohol use, reflecting past 21 days	Progress toward addressing alcohol use or medical condition impacted by alcohol
Visits potentially rewarded	Weeks 0, 3, 6, 9, 12	Weeks 3, 6, 9, 12	Weeks 3, 6, 9, 12
Initial reward	1 draw	5 draws	3 draws
Potential increase between visits	1 draw	1 draw	1 draw
Maximum possible draws at week 12	5 draws	8 draws	6 draws

PEth=phosphatidylethanol

Table 2:

Participant Sociodemographic and Clinical Characteristics*

	FIRST Trial Participants CM group (n=56)	Qualitative participants (n=13)	Research Coordinators and Social Workers (n=9)
Age mean (SD)	59.14 (10.09)	58.87 (9.08)	45.89 (12.23)
Sex at birth n, % female	04 (6.67%)	01 (7.69%)	8 (88.89%)
Self-identified Gender Identity, n (%)			
Male	52 (92.86%)	12 (92.31%)	
Female	4 (7.14%)	1 (7.69%)	
Transmale	0 (0%)	0 (0%)	
Transfemale	0 (0%)	0 (0%)	
Other	0 (0%)	0 (0%)	
Chose not to answer	0 (0%)	0 (0%)	
Race, n (%)			
American Indian or Alaskan Native	0 (0%)	0 (0%)	0 (0%)
Asian	1 (1.79%)	1 (7.69%)	1 (11.11%)
Native Hawaiian or Other Pacific Islander	0 (0%)	0 (0%)	0 (0%)
Black or African American	43 (76.79%)	10 (76.92%)	2 (22.22%)
White	9 (16.07%)	2 (15.38%)	5 (55.55%)
More than one race	1 (1.79%)	0 (0%)	0 (0%)
Other	2 (3.57%)	0 (0%)	0 (0%)
unknown/not reported	0 (0%)	0 (0%)	1 (11.11%)
Ethnicity, % Hispanic	6 (10.71%)	1 (7.69%)	1 (11.11%)
AUDIT-C, mean (SD)	7.04 (2.15)	6.69 (1.84)	
Alcohol Use Disorder, n (%)	41 (74.55%)+	0 (69.23%)	
Any prior alcohol treatment, n (%)	17 (30.36%)	8 (61.54%)	
Number of prior treatment episodes in those with prior treatment, median (IQR)	4 (2–8)	4.5 (1.5–11)	
Any outpatient or inpatient alcohol treatment in prior 90 days, n (%)	2 (3.57%)+	1 (7.69%%)	
HIV viral load, detectable, n (%)	**6 (10.71%)**	**0 (0%)**	
CD4 count, cells/mm,^{3} median (range)	604.0 (71.0 – 1488.0)	708.0 (296.0 – 1299.0)	
Average drinks per week over past 21 days as baseline, median (range)	16.8 (6.0 – 67.3)	21.0 (7.7 – 67.3)	
Number of contingency management visits, median (IQR)#	4 (3–5)	5 (4–5)	
Study site, n (%)			
Atlanta	19 (33.93%)	05 (38.46%)	
Bronx	4 (7.14%)	0	
Houston	2 (3.57%)	0	
Los Angeles	4 (7.14%)	0	
Manhattan/Brooklyn	7 (12.50%)	3 (23.08%)	

	FIRST Trial Participants CM group (n=56)	Qualitative participants (n=13)	Research Coordinators and Social Workers (n=9)
Washington DC	16 (28.57%)	5 (38.46%)	
New Orleans	4 (7.14%)	0	
Study role, n (%)			
Research coordinator			4 (44.44%)
Social Worker			5 (55.55%)
Years of experience with alcohol treatment/research, mean (SD)			4.55 (2.30)
CMBQ Barriers score, mean (SD)[^]			2.2 (1.1)
CMBQ Training related barriers score, mean (SD)[^]			2.6 (1.3)
CMBQ, Pro-CM score, mean (SD)[^]			3.6 (0.9)

[*] At baseline (for patient participants) or time of focus group (for staff participants)

[^] Contingency Management Beliefs Questionnaire (CMBQ) - statement on a 5-point Likert scale from no influence to strong influence regarding influence in adoption contingency management(Rash et al., 2013; Rash et al., 2012)

[+] Missing assessment/response for one participant

[#] Both the FIRST Trial CM participants group and qualitative sample only included those who completed ≥ 1 CM session

Table 3;

Participant Satisfaction

	Week 12
Quality of Care, very good or excellent) n, %	19/31 (61.2%)
Convenience of location, very good or excellent n, %	13/30 (43.3%)
Competency of care team addressing AUD, know quite a bit or seem to know everything n, %	28/31 (90.3%)
Refer a friend, probably or definitely n, %	27/31 (87.1%)
Helped deal with alcohol use, a little or a lot n, %	27/31 (87.1%)
Satisfied with trial, somewhat or very n, %	27/27 (100%)
Talking about my alcohol use with SW, helped a little or a lot (n=31) n, %	29/31 (93.6%)
Receiving rewards based on my alcohol use, helped a little or a lot (n=31) n, %	28/31 (90.3%)
Being treated with respect, helped a little or a lot (n=31) n, %	31/31 (100%)
Monitoring my alcohol use, helped a little or a lot n, %	26/30 (86.7%)

All questions were a 5-point Likert scale with answers above representing 4 or 5 on the scale