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RESEARCH ARTICLE

Voucher-based contingency management to promote treatment engagement in comorbid alcohol use disorder and alcohol-related liver disease: A pilot theory-informed qualitative study with service users

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Abstract

Background: Effective interventions for the management of alcohol-related liver disease (ARLD) remain a gap in clinical practice, and patients' engagement with alcohol services is suboptimal. Based upon the principles of operant conditioning, contingency management (CM) is a psychosocial intervention th at involves gradual, increasing incentives upon completion of treatment-related goals such as treatment attendance.

Methods: A pilot feasibility trial was conducted with 30 adult patients recruited from an inpatient clinical setting. Consecutive sampling was used to recruit patients presenting comorbid alcohol use disorder (AUD) and ARLD. Participants were randomized to integrated liver care (ILC), receiving hepatology and AUD care, or ILC with a voucher-based CM intervention (intervention arm). A longitudinal qualitative approach was adopted to explore anticipated (Stage 1) and experienced acceptability (Stage 2). The Theoretical Framework of Acceptability (TFA) guided semi-structured in-depth interviews and deductive analysis.

Results: Thirty participants were enrolled in the pilot trial, and interviews were conducted with 24 participants at Stage 1 and seven at Stage 2. Over half of the cohort (54.2%, $n = 13$) presented decompensated liver disease, and an average of 179 units of alcohol were consumed per week. Overall positive views toward voucher-based CM were noted, and explanatory data emerged across five TFA domains (*intervention coherence*, *ethicality*, *self-efficacy*, *perceived effectiveness*, *and affective attitude*). The core aspects of the voucher-based CM intervention matched participants' preferences and needs. Participants regarded CM as having a symbolic value and strengthening the therapeutic alliance with healthcare providers.

Conclusion: The data support the scope of voucher-based CM intervention to promote engagement with treatment services, and its potential to address the gaps in the care continuum in ARLD. The findings are of practical significance for developing person-centered, tailored interventions for this clinical population. The outcomes of

this investigation can inform decision-making among stakeholders and healthcare providers and improve health outcomes for this clinical population.

KEYWORDS
acceptability, alcohol-related liver disease, contingency management, theoretical framework of acceptability, treatment engagement

INTRODUCTION

Alcohol-related liver disease (ARLD) is a leading cause of preventable death in the United Kingdom (UK), resulting in health inequalities across sociodemographic groups (Williams et al., 2018). Due to its asymptomatic early onset, ARLD is most often diagnosed at an advanced stage, where the scope of treatment interventions to prevent further liver injury is limited (Innes et al., 2020). Given the dose–response relationship between alcohol consumption and ARLD progression, the choice of abstinence is the therapeutic hallmark for the prevention of further ARLD progression and mortality (Mehta & Sheron, 2019). However, only around 10% of patients receive alcohol use disorder (AUD) treatment (Mellinger et al., 2019). This clinical population is subject to barriers to sustained treatment engagement, including gaps in the care continuum, and worry about experiencing stigma and extrahepatic comorbidity (Schomerus et al., 2022). Previous research has also established that factors related to treatment preferences contribute to the low utilization of AUD treatment among patients with lived experience of ARLD (Mellinger et al., 2018). The underutilization of health services to prevent alcohol-related harm has been associated with outcomes including remission and mortality (Rautiainen et al., 2019). This highlights a need to bridge the gaps in ARLD treatment by developing acceptable and preference-sensitive interventions for this clinical population.

Contingency management (CM) is a psychosocial intervention that employs an incentive-based system to promote behavior change. Based upon the principles of operant conditioning, CM involves gradual, increasing incentives upon completion of a target behavior or treatment-related goals (Petry et al., 2000). Key aspects inherent to a CM intervention (target behavior and population, choice, magnitude, frequency, timing and duration of the reinforcer) shape its effectiveness in promoting behavior change (Kellogg et al., 2007). Within the field of substance use, the efficacy of CM in promoting health-promoting behaviors including abstinence, medication, and treatment adherence has been well-established (Lussier et al., 2006). Despite the substantial evidence base supporting its long-term efficacy and wider clinical application, there are still challenges related to the uptake of CM within the UK's National Health Service (NHS) (Ginley et al., 2021). These barriers to the adoption and diffusion of CM are related to its real-world clinical implementation, and few studies have attempted to integrate a CM intervention in a UK-based clinical setting (Ainscough et al., 2021; Metrebian et al., 2021). An additional major challenge is its acceptability, given the ethical and philosophical objections that CM is often met with. As previously reported, these concerns include CM being perceived as coercive and that it may undermine intrinsic motivation toward self-directed behavior change (Sinclair et al., 2011).

Theoretical framework of acceptability

Acceptability is a central consideration for the development, implementation, and scalability of complex healthcare interventions, and their corresponding internal and external validity (Skivington et al., 2021). Within the field of implementation science, intervention acceptability is defined as a "multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention" (Sekhon et al., 2017). The congruence between an intervention, patient preferences, and needs influences treatment engagement (Klaic et al., 2022). The theoretical framework of acceptability (TFA) is a theory-driven, seven-construct framework (Table 1) that conceptualizes the acceptability of an intervention through patients' experiences (Sekhon et al., 2017). By integrating a temporal perspective (anticipated vs. experienced acceptability), the TFA acknowledges changes in acceptability that result from the interaction between the components of an intervention, its delivery over time, and the setting in which it is being implemented. This can strengthen the notion of acceptability as a dynamic construct dependent on factors such as disease progression and treatment experience. As a result, the TFA provides a scaffold for a context and time-specific insight into the acceptability of an intervention, and its implications at the individual and community levels.

Evidence gap and current study

The current evidence-based interventions to improve patient outcomes in ARLD attest to the need for tailored, acceptable approaches to be trialed. To the best of the authors' knowledge, limited studies have explored the preferences and perceptions of patients with lived experience ARLD (Mellinger et al., 2023). This highlights a need for developing person-centered interventions to improve engagement with alcohol services (Subhani et al., 2024). Previous research has established the acceptability of CM to promote

TABLE 1 Overview of theoretical framework of acceptability (TFA) (Sekhon et al., 2017).

TFA domain	Definition
Ethicality	The extent to which the intervention has good fit with an individual's value system
Affective attitude	Anticipated affective attitude: How an individual feels about the intervention, prior to taking part Experienced affective attitude: How an individual feels about the intervention, after taking part
Burden	Anticipated burden: The perceived amount of effort that is required to participate in the intervention Experienced burden: the amount of effort that was required to participate in the intervention
Opportunity costs	Anticipated opportunity cost: The extent to which benefits, profits, or values must be given up to engage in the intervention Experienced opportunity cost: the benefits, profits or values that were given up to engage in the intervention
Perceived effectiveness	Anticipated effectiveness: the extent to which the intervention is perceived to be likely to achieve its purpose Experienced effectiveness: the extent to which the intervention is perceived to have achieved its intended purpose
Self-efficacy	The participant's confidence that they can perform the behavior(s) required to participate in the intervention
Intervention coherence	The extent to which the participant understands the intervention and how it works

engagement with substance use treatment (Raiff et al., 2013; Srebnik et al., 2013). However, the differences between the UK and US healthcare systems may restrict the translation of these findings due to demographic and geographical factors. The current evidence exploring the acceptability of CM faces these contextual limitations, and no studies have trialed this intervention among individuals with ARLD. Given the scope of CM to improve treatment engagement and patient outcomes, further investigation of its acceptability among patients with lived experience of ARLD is warranted. Therefore, the present study aims to explore the acceptability of this clinical population toward implementing voucher-based to promote engagement with integrated liver care (ILC). Informed by the TFA, this investigation seeks to fill a gap in the current evidence base by examining acceptability as a dynamic, evolving construct reflecting patients' experiences and trajectories. By integrating both anticipated and experienced acceptability of voucher-based CM, the longitudinal approach aims to reflect ecological phenomena inherent to healthcare and treatment experiences. Understanding the views and experiences of voucher-based CM as delivered in a real-world setting can inform the development of person-centered interventions for the management of ARLD.

METHODS

Longitudinal qualitative research (LQR) and TFA

The role of qualitative approaches in studying the acceptability of healthcare interventions has been well-established (Ayala & Elder, 2011). To better capture the nature of acceptability as a dynamic, changing construct reflecting patient experience at different trajectory points, qualitative data in this study were collected longitudinally. Longitudinal qualitative research (LQR) acknowledges a temporal dimension inherent to social processes by considering their interplay with time (Holland et al., 2006). Through the collection and analysis of data across more than one occasion, LQR can therefore provide context and time-specific information to guide healthcare research and policy evaluation. Within implementation research, LQR can be applied to understanding patients' evolving perceptions and needs during the development and evaluation phases of complex interventions (Calman et al., 2013). For the present qualitative inquiry, the use of TFA as the theoretical framework for analysis conveniently aligns itself with the underpinnings of LQR by considering temporal perspectives (anticipated and experienced) regarding the acceptability of CM.

Design and setting

Qualitative data were collected as part of a single-center, prospective, individually randomized pilot feasibility trial exploring the scope of voucher-based CM to promote engagement with integrated liver care (ILC) in comorbid AUD and ARLD (NCT06183710) (ClinicalTrials.gov, 2023). The trial was conducted in partnership with the Alcohol Care Team (ACT) in an NHS Trust. The trust is a university-affiliated, public hospital based in South London, United Kingdom. ACTs are dedicated teams of nurses and practitioners that provide specialist interventions to individuals presenting to acute clinical settings with AUD or alcohol-related complications (Public Health England, 2019).

Semi-structured interviews were conducted at two stages: Stage 1 (baseline), carried out in the inpatient setting (anticipated acceptability). Stage 2 (12 weeks post-randomization) took place during the last ILC visit with participants receiving voucher-based CM per the study protocol (experienced acceptability). A study flow diagram can be found in Figure S1 (File S1). The article is reported following the Standards for Reporting Qualitative Research (SRQR) guidelines (O'Brien et al., 2014; File S2). The study was reviewed and approved by the Camden and Kings Cross NHS Research Ethics Committee (reference 22/LO/0744) as part of the ethics application for the pilot trial. Participants provided written informed consent before any data were generated.

ILC and voucher-based CM intervention

Multidisciplinary management has been suggested as the ideal treatment pathway for treating AUD and ARLD across specialist society guidelines; the association between continuity of care and the co-location of healthcare providers has been noted to influence long-term outcomes from AUD treatment (López-Pelayo et al., 2019).

Participants were allocated to ILC only (enhanced standard of care) or ILC with voucher-based CM (intervention) in the pilot trial. ILC consisted of four visits to the outpatient liver department over 12 weeks. The visits involved multidisciplinary management of co-morbid AUD and ARLD through the co-location of addictions and hepatology care. This multidisciplinary, integrated approach enables healthcare providers to work collaboratively and simultaneously manage psychosocial and pharmacotherapeutic treatment. The AUD treatment consisted of relapse prevention or motivational interviewing interventions, referral to support services and prescription of medication where appropriate. From a liver perspective, ILC included regular liver health education, monitoring of ARLD-associated symptoms (ascites, portal hypertension, and varices), referral to dietetics services and elective paracentesis.

The voucher-based CM intervention (Table 2) was adapted from a previous randomized controlled trial and established as acceptable during focus groups with service users (Donoghue et al., 2023). Through an iterative approach adopted at the early stages of research, patient focus groups, and clinical expertise consultations were held to further adapt the CM intervention, study design, and participant-facing documents. Per protocol, participants with AUD and ARLD (target population) were offered four ILC sessions over 12 weeks. The target behavior that CM aimed to promote was attendance at these four sessions. Incentivizing attendance to treatment as a target behavior is better aligned with standard practice, and logistically simpler and less costly compared to abstinence outcomes assessed through toxicology screening (Sinclair et al., 2011). Reinforcing engagement also enables an individual, tailored approach to treatment, where patients are allowed to discuss their treatment goals with healthcare providers. The incentive chosen was multi-outlet vouchers of monetary value, exchangeable for material goods. This was considered appropriate during patient focus groups held during protocol design. The vouchers were delivered in person four times (frequency of delivery) over 12 weeks (duration of reinforcer) and immediately after attending the ILC sessions (timing of delivery). The vouchers were of increasing value and amounted to a total of £120 (magnitude of reinforcer). Following incentive discontinuation and study termination, participants were offered further ILC follow-up on a case-to-case basis.

TABLE 2 Characteristics of the voucher-based CM intervention adopted in the pilot feasibility trial.

CM feature	Intervention characteristics
Target behavior	Engage with ILC
Target population	Service users with comorbid AUD and ARLD
Choice of incentive	Multi-outlet vouchers
Magnitude of incentive	£120 (£15, £25, £35, £45)
Duration of incentive	12 weeks
Frequency of delivery	Four times during ILC (12 weeks), delivered in person by ILC consultants
Timing of delivery	Delivered during ILC

Study population and sampling

Consecutive sampling was used to recruit patients presenting comorbid AUD and ARLD. An overall cohort size of 30 participants was chosen to inform the feasibility outcomes of the pilot trial (Lancaster et al., 2004). Following hospital admission and referral to the ACT, potential participants were identified, approached, and provided with the study information sheet by the Consultant Addictions Psychiatrist (NJK), Consultant Hepatologist (NS) or researcher (SH). The fieldwork team (SH, NJK, and NS) presented the study to participants during joint ward rounds to establish patients' familiarity with the researcher.

Patients were eligible if they presented an established diagnosis of moderate–severe AUD (suggested by a score above 15 on the Alcohol Use Disorder Identification Test (Saunders et al., 1993)) and ARLD (hepatitis, cirrhosis, or decompensated liver disease), a minimum age of 18 years, of any sex assigned at birth, gender identity, and ethnicity. Both AUD and ARLD diagnoses had to be clinically validated and recorded in electronic medical records. Referral to ILC, the ability to communicate independently in English and provide informed consent consisted of additional criteria for inclusion. Patients who were pregnant and dependent on substances other than tobacco and cannabis were not eligible. Informed consent was sought from patients by the fieldwork team (SH, NJK, and NS) following the initial approach.

Data generation

In-depth, semi-structured interviews conducted between January 2023 and April 2024 allowed an exploration of participants' views and acceptability regarding voucher-based CM and the experiences of those receiving CM in the pilot trial. Given the longitudinal nature of this qualitative investigation, baseline interviews focusing on anticipated acceptability were conducted within the inpatient setting. Follow-up interviews on experienced acceptability were conducted in the liver outpatient department at the last ILC visit. In both settings, participants were interviewed in private rooms to preserve confidentiality and by the same trained female researcher (SH). The topic guide was developed for this study by the research team and informed by the TFA. The interview questions were piloted during patient focus groups and refined upon the feedback received. To elicit clarification

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and enhance the trustworthiness of the data, the interviewer employed verification techniques such as member checking, probing, and response clarification (Morse, 2015). A £15 *honorarium* was offered to participants for each interview. Interviews were recorded using an encrypted device and transcribed verbatim by a professional transcription service. All transcripts returned to the research team were checked (by SH) for accuracy against the original recordings.

Data management and analysis

Interview transcripts were uploaded to NVivo (version 12) to assist with data management and analysis. A theory-driven, deductive approach was used to systematically code and analyze the data. The coding framework was informed by the TFA, and the findings were organized according to its domains. Analysis followed the principles of the Framework Method (data familiarization, framework identification, indexing, charting, mapping, and interpretation) (Ritchie & Spencer, 1994). The themes identified during Stages 1 and 2 were compared and integrated to inform anticipated and experienced acceptability. The first author (SH) coded and analyzed the transcripts. The coding frame and themes were subsequently cross-checked against the transcripts by the second author (SP) and discussed with the remaining authors for consensus. Participant quotes have been included as empirical data to illustrate the main findings.

FINDINGS

Sample characteristics

Thirty participants were enrolled in the pilot trial, of whom 24 were interviewed at Stage 1. Reasons for missing data include self-discharge before data generation ($n=3$), death ($n=2$), and decline in cognitive function due to hepatic encephalopathy ($n=1$). Following randomization and allocation to the intervention arm, five participants were noted as deceased (multiorgan failure $n=3$, worsening prognosis due to acute alcohol hepatitis $n=1$, unknown $n=1$), and three did not engage with the study (experiencing homelessness and not having access to communication technologies $n=1$, unable to contact $n=1$, under custody $n=1$). Seven participants receiving CM were interviewed at Stage 2.

Participants' ages ranged between 28 and 66 years, with an overall mean age of 46.8 (SD 9.0); 29.2% ($n=7$) of the cohort identified as female. Participants' ethnic backgrounds were Asian, Asian British or Asian Welsh (12.5%, $n=3$), Black, Black British, Black Welsh, Caribbean, or African (8.3%, $n=2$) and White, White British, and White Welsh (79.2%, $n=19$). Slightly over half of the cohort had decompensated liver disease (54.2%, $n=13$). At baseline, an average of 177.9 alcohol units (SD 74.10, range 42–350) were consumed per week. Additional information can be found in Table 3.

Main findings

The main findings were mapped upon several TFA domains for anticipated and experienced acceptability of voucher-based CM. At each Stage, explanatory data emerged across five TFA domains (Table 4): *intervention coherence* and *ethicality*, *self-efficacy*, *perceived effectiveness (anticipated and experienced)*, *and affective attitude (anticipated and experienced)*. Participants did not elaborate on *burden* and *opportunity costs*; therefore, these were not considered indicators of acceptability toward voucher-based CM.

Anticipated acceptability of voucher-based CM

Intervention coherence and ethicality

Positive attitudes toward voucher-based CM and its wider clinical implementation were noted. Participants demonstrated a general understanding of the voucher-based CM intervention employed in the trial and its respective components (target behavior, choice, and magnitude of incentive, frequency, duration, and timing of delivery).

Participants considered multi-outlet vouchers of monetary value to be an adequate choice of incentive. Although not the case of the adopted voucher-based CM intervention, a few participants were apprehensive toward the use of cash-based incentives. These observations reflected a concern that cash reinforcers could prompt alcohol use during recovery. P9 noted that, depending on the stage of change of an individual, cash could mediate alcohol use:

> It is an incentive, you know. As long as they're not going out spending it on drink, which is not in my head at the moment (…) some people with liver disease, if they've got money on them it's a trigger.
>
> (P9, male, aged 51, cirrhosis)

Therefore, compared to alternatives such as cash, clinical privileges, or tokens, multi-outlet vouchers were deemed a suitable incentive for this clinical population. This is illustrated by P1 in the excerpt below:

> For some desperate people it could be a problem, so ideally gift vouchers, so they can't buy alcohol and stuff. I think that will be beneficial.
>
> (P1, male, aged 36, decompensated liver disease)

No drawbacks from the intervention were anticipated. Participants explained that exposure to CM and respective trialability and observability would foster their familiarity and acceptability toward the intervention. Participants also considered the dialectical relationship with their healthcare providers as a facilitator of acceptability toward voucher-based CM. P14 and P5 describe the role of exposure and

TABLE 3 Sample characteristics at Stages 1 ($n=24$) and 2 ($n=7$).

Sample characteristic	Stage 1 ($n=24$)	Stage 2 ($n=7$)
Mean age (SD, range)	46.8 (9.0, 28–66)	43.0 (10.9, 28–60)
Sex assigned at birth, % (n)		
Female	29.2 (7)	14.3 (1)
Male	70.8 (17)	85.7 (6)
Gender identity, % (n)		
Female	29.2 (7)	14.3 (1)
Male	70.8 (17)	85.7 (6)
Ethnic group, % (n)		
Asian, Asian British, or Asian Welsh	12.5 (3)	14.3 (1)
Black, Black British, Black Welsh, Caribbean, or African	8.3 (2)	–
White, White British, White Welsh	79.2 (19)	85.7 (6)
Marital status, % (n)		
Single	41.7 (10)	28.6 (2)
With partner	12.5 (3)	14.3 (1)
Married	16.7 (4)	14.3 (1)
Divorced	16.7 (4)	42.9 (3)
Widowed	12.5 (3)	–
Employment, % (n)		
Employed	16.7 (4)	28.6 (2)
Self-employed	12.5 (3)	28.6 (2)
Not employed	62.5 (15)	42.9 (3)
Retired	8.3 (2)	–
ARLD diagnosis, % (n)		
Acute alcohol-related hepatitis[a]	8.3 (2)	–
Alcohol-related cirrhosis	37.5 (9)	42.9 (3)
Decompensated liver disease	54.2 (13)	57.1 (4)
ARLD symptoms upon admission, % (n)[b]		
Ascites	33.3 (8)	28.6 (2)
Hepatic encephalopathy	16.7 (4)	–
Jaundice	16.7 (4)	–
Portal hypertension	25 (6)	–
Upper gastrointestinal bleeding	12.5 (3)	–
Variceal hemorrhage	25 (6)	–
Albumin (g/L), mean (SD, range)[b]	33.75 (8.24, 21–51)	40.28 (9.58, 26–53)
AST (U/L), mean (SD, range)[b]	115.16 (79.05, 19–339)	69.28 (52.64, 35–158)
Bilirubin (μmol/L), mean (SD, range)[b]	87.41 (104.59, 6–471)	61 (98.16, 8–276)
Creatinine (μmol/L), mean (SD, range)[b]	59.16 (22.68, 31–128)	61.14 (22.95, 35–98)
GGT (U/L), mean (SD, range)[b]	630.12 (467.50, 83–1811)	382.85 (227.48, 152–791)
INR, mean (SD, range)[b]	1.19 (0.14, 0.90–1.50)	1.03 (0.08, 1–1.50)
Sodium (mmol/L), mean (SD, range)[b]	135.87 (5.40, 122–142)	138.58 (4.19, 132–145)
MELD 3.0 score, mean (SD, range)[c]	15.9 (5.71, 6–26)	11.85 (6.30, 6–24)
CPG score, mean (SD, range)[c]	8.09 (1.94, 5–11)	6.28 (1.11, 5–8)
CLIF-C AD score, mean (SD, range)[d]	36.5 (8.08, 20–49)	32.25 (6.49, 26–40)
Mean TLFB weekly units (SD, range)	177.9 (74.10, 42–350)	60.8 (130.6, 0–350)
Comorbid mental health diagnoses, % (n)[b]	58.3 (14)	42.9 (3)
Additional medical comorbidity, % (n)[b]	41.7 (10)	14.3 (1)
Prior contact with alcohol treatment and support services, % (n)[b]	70.8 (17)	85.7 (6)
Community alcohol services	82.3 (14)	71.4 (5)
Peer support initiatives	29.4 (5)	14.3 (1)
Alcohol assertive outreach team	11.7 (2)	–

TABLE 3 (Continued)

Sample characteristic	Stage 1 ($n=24$)	Stage 2 ($n=7$)
Prior contact with ACT, % (n)[b]	75.0 (18)	85.7 (6)
Prior alcohol-related admissions, % (n)[b]	66.7 (16)	71.4 (5)

Abbreviations: ACT, Alcohol Care Team; ARLD, Alcohol-related liver disease; AST, aspartate aminotransferase; CLIF-C AD, Chronic Liver Failure Consortium Acute Decompensation Score; CM, contingency management; CPG score, Child-Pugh score; GGT, gamma-glutamyl transferase; INR, international normalized ratio; MELD score, Model for End-Stage Liver Disease 3.0 score; *n*, number; SD, standard deviation; TLFB, Timeline Followback; 1 unit = 8 g of ethanol.

[a]Episode of acute alcohol-related hepatitis with no cirrhosis at the time of enrolment.

[b]Data obtained from electronic health records.

[c]Calculated for participants presenting cirrhosis and decompensated liver disease.

[d]Calculated for participants presenting decompensated liver disease.

TABLE 4 Coding frequency in the theoretical constructs of the TFA (Sekhon et al., 2017).

Theoretical construct (TFA)	Code frequency	Number of interviews with code
Anticipated acceptability (Stage 1)	187	24
Intervention coherence	25	16
Ethicality	6	4
Self-efficacy	52	22
Anticipated effectiveness	40	18
Anticipated affective attitude	64	22
Experienced acceptability (Stage 2)	34	7
Experienced effectiveness	18	7
Experienced affective attitude	16	7

therapeutic alliance in shaping views toward CM. Therapeutic alliance refers to a synergistic, collaborative bond established between a healthcare provider and a service user in person-centered interventions, and their mutual agreement toward treatment-related goals (Horvath & Luborsky, 1993).

> There could be someone else in the same predicament as myself, that's elsewhere that won't get any vouchers, so it's quite a nice gesture. I've got to see what they are, what they're for. Any benefit's better than nothing. Until I start looking right into it and speaking to you guys a bit more often maybe, then I'd have a bit more input and a bit more understanding.
>
> (P14, male, aged 41, decompensated liver disease)

> It'd help me more to know about what's gonna happen, how it's gonna happen, being involved in the system, knowing more, would probably get into it.
>
> (P5, male, aged 60, alcohol-related cirrhosis)

Ethicality was coded in a small number of transcripts ($n=4$). One participant (P10) had an ambivalent view regarding the ethicality of voucher-based CM, pointing out that providing an incentive for completing a specific behavior could be a source of undue inducement:

> It doesn't seem quite appropriate, but sure! It just feels a little bit like bribery.
>
> (P10, female, aged 50, decompensated liver disease)

Self-efficacy and anticipated effectiveness

Real-world implementation of voucher-based CM intervention within clinical settings was expected to drive behavioral change. Participants attributed this to the internal and external validation inherent to CM delivery. At the individual level, the ability to observe and receive a concrete, immediate incentive upon achieving a target behavior served formalized participants' engagement with treatment. Compared to cash alternatives, participants suggested the vouchers had a symbolic meaning as tangible evidence of their behavior change and noted that this could enhance their self-efficacy. Additionally, evidence of a measurable behavior (engagement with treatment), corresponding recognition by healthcare providers and in-person delivery of voucher-based CM contributed toward a meaningful and reciprocal therapeutic alliance. This anticipated internal and external validation inherent to the voucher-based CM intervention is outlined below by P14:

> They [ILC healthcare providers] will see that I will be a lot better than I was two weeks ago, and that's a benefit. Another benefit of receiving the vouchers is that I can see that I'm doing OK and that I haven't drunk, which will work in my favour. Means that I'm taking it seriously.
>
> (P14, male, aged 41, decompensated liver disease)

Frequency and timing of delivery are two core constructs of a CM intervention (Petry, 2011). Participants described how these components of the adopted intervention would further help formalize and sustain behavior change. Participants noted that the routine delivery of the CM schedule cued a structured, sustained engagement with ILC.

P7 illustrates this structural resemblance between the repeated delivery of CM and treatment frequency:

> This time I've got to stick to a routine. When I haven't got a routine, I'm terrible. So the motivation to know I'm coming to get it each week would be a great motivator for me.
>
> (P7, female, aged 55, acute alcohol-related hepatitis)

Participants identified a few challenges that could undermine CM's effectiveness. While a voucher-based CM intervention was recognized as a viable approach to drive behavior change, this was also reliant upon an individual's stage of change and deliberative decision-making processes. As noted by P24, internal motivation was a central factor for engagement:

> I was willing to do it anyway because it's for my benefit. If you haven't got the willpower to do something what's the point of doing it? It's a minor thing [the vouchers]. For sure, for some people it would make them want to do more because some people are interested in that.
>
> (P24, male, aged 46, decompensated liver disease)

Self-efficacy and anticipated perceived effectiveness of CM also shifted according to the individual's stage toward enacting behavior change. In line with the Transtheoretical Model of Change, P7 explained how their views toward voucher-based CM differed at the precontemplation and preparation stages (Prochaska & DiClemente, 1983):

> I wasn't too sure about it, I thought 'Oh no, I don't need this now, I can't be bothered with all this voucher nonsense.' Seriously, I'm gonna be truthful. It was the way I was feeling then. But everything helps, whatever you can do for me I'm happy to do now.
>
> (P7, female, aged 55, acute alcohol-related hepatitis)

Two additional factors were anticipated to influence self-efficacy and CM's effectiveness in promoting treatment engagement. These included competing professional responsibilities and exacerbation of ARLD symptoms.

As acknowledged by P21, while the voucher-based CM intervention could be motivating and represent a potential source of financial gain, its magnitude, and competing professional demands diminished participants' self-efficacy toward engaging with ILC:

> I mean it's good and everything, I know I need to do something about my liver, but I obviously need to get money in for my work, and those vouchers come nowhere near.
>
> (P21, female, 42 years old, decompensated liver disease)

Participants also anticipated that symptoms associated with ARLD progression could outweigh the ability to engage despite the presence of a positive incentive. Thus, as noted by P1, physical pain was an anticipated barrier to self-efficacy and treatment engagement:

> I think it would depend on how much pain they were in. Luckily for me, I've never felt pain in my liver. I know it's enlarged but I've never felt pain. But if someone's in real agony, they might not want to go even if there is an incentive.
>
> (P1, male, aged 36, decompensated liver disease)

Overall, the interview data suggests that CM was anticipated as an external source of validation of their achievements. Its proximal, structured delivery mechanisms were considered helpful in inducing and sustaining behavior change. However, participants also anticipated that self-efficacy and perceived effectiveness of voucher-based CM could be shaped by intrinsic motivation to change, competing priorities, and ARLD progression.

Anticipated affective attitude

Overall attitudes toward voucher-based CM reported by participants were favorable and positive. Namely, the anticipated benefits of the intervention included its symbolic and use value and ability to elicit financial agency.

Participants expressed the symbolic value from an incentive of monetary value exchangeable for goods that could stimulate their mood and well-being. Particularly, such incentives could bring positive feelings after hospitalization or distressing events, as described by P14:

> I'm quite chuffed actually. Lately the only thing I receive free is medication, you know, it's something different. It's a really good thought, I wasn't expecting that. You're just sitting there in a hospital chair, thinking the world's weighing down upon your shoulders, feeling all miserable and that, and then 'There you go, there's some vouchers for you' could actually make your day a bit better.
>
> (P14, male, aged 41, decompensated liver disease)

The magnitude and frequency of the incentive were of practical and economic utility. Participants reported that the intervention could consist of a source of partial income, of importance upon the rise in living costs at the time of data collection (January 2023–May 2024) in the UK (Barton et al., 2023). P7 illustrates this in the statement below:

> Especially a time like this, yeah, with what's happening in the world. I mean everybody's short of money, everything's going up. Every little helps, you know,

> every little helps. It's not easy out there, it's a struggle, you know? And right now for instance I'm on half pay at work, and after that, it's gonna be no pay at all, so it's good to help me while I'm off.
>
> (P7, female, aged 55, acute alcohol-related hepatitis)

Participants thus valued the sense of individual agency that the intervention could provide. In addition to improving their internal motivation to attend ILC, participants such as P6 expressed that voucher-based CM would meet their personal needs, which appear to be modest and pragmatic:

> I mean because a lot of alcoholics, or current alcoholics, we're not rich people. If you get a voucher - for instance, a lady wants to get a bit of makeup to make herself look better - it's a good incentive. I've said to my girlfriend if I get a voucher, I can buy myself a pair of slippers!
>
> (P6, male, aged 28, decompensated liver disease)

This ability to be self-sufficient and attend to individual necessities was regarded as an important aspect of participants' treatment and recovery journey. As stated above and by P10, the incentives inherent in a CM intervention could grant self-empowerment and motivation during recovery and treatment trajectories:

> I'm not gonna look a gift horse in the mouth! I think it [recovery] involves a certain amount of self-care, and you know, and feeling like you deserve something nice, so sure. Yeah, it's good for me to be motivated and get out and about.
>
> (P10, female, aged 50, decompensated liver disease)

Therefore, overall participants' attitudes toward voucher-based CM demonstrated that, in addition to consisting of an extrinsic motivator to promote engagement with treatment, the choice and magnitude of the incentives could mediate their autonomy, deemed valuable during recovery and treatment.

Experienced acceptability of voucher-based CM

Seven participants were interviewed at Stage 2 (47% retention rate in the intervention arm). Reasons for loss to follow-up have been provided above, and experienced barriers to clinical research and treatment access are reported elsewhere (Hemrage et al., 2024). Following the TFA, data were coded across the theoretical components of experienced *effectiveness* and *affective attitude*.

Experienced effectiveness

Participants allocated to CM described that the intervention improved their internal motivation to engage with ILC and that its relative advantage could apply to the wider ARLD clinical population. P14 explained that the mechanisms underlying the effectiveness of voucher-based CM included its regular delivery and internal and external validation of behavior change:

> It kept me going in a sense, something to look forward to. You want to turn up with good news for yourself and give everybody else good news at the same time. There are different patients with different scenarios, in different situations. It would be helpful in a sense that someone in the same sort of situation as what I've been through, could be of help.
>
> (P14, male, aged 41, decompensated liver disease)

Views of the experienced effectiveness of voucher-based CM outweighed those of anticipated effectiveness. In addition to inducing initial engagement with services, participants expressed confidence toward maintaining engagement following incentive discontinuation. This suggests, from a patient perspective, the potential of voucher-based CM to induce sustained, self-directed behavior change, and improve liver function over time (Table 5). This is illustrated by P15 in the excerpt below:

> Makes you more motivated than I would have thought. I come in and take a little weight off the shoulders. It does help I believe. It really seems to be helping. I don't see a reason to stop coming in to be fair.
>
> (P15, male, aged 36, decompensated liver disease)

Experienced affective attitude

Similarly to Stage 1, overall positive attitudes toward voucher-based CM were noted. At Stage 1, emerging themes included the economic utility and symbolic value of the intervention. Participants considered the CM schedule to accommodate the ability to meet their personal needs and enact individual agency.

Participants described how the incentives from the voucher-based CM intervention formalized the attainment of their treatment goals and described its scope as suitable for the wider ARLD population. Highlighted in the excerpt by P5, participants were positive about the possibility of exchanging the vouchers for meaningful goods:

> If someone is determined to stop drinking, this is such a nice reward. They can buy something for themselves to make them happier. Doesn't matter, chocolate, flowers, some T-shirt or something like that, it's nice. Even though it's very individual, because there are lots of different people, one deserves this kind of gift. For example, with this voucher, I will buy something for my home and treat myself. I don't think about spending it

TABLE 5 Changes in liver function for participants receiving CM.

Liver function outcome	Stage 1 ($n=7$)	Stage 2 ($n=7$)
Albumin (g/L), mean (SD, range)[a]	34.85 (7.755, 27–47)	40.28 (9.58, 26–53)
AST (U/L), mean (SD, range)[a]	138.28 (114.89, 19–339)	69.28 (52.64, 35–158)
Bilirubin (μmol/L), mean (SD, range)[a]	106 (98.23, 6–282)	61 (98.16, 8–276)
Creatinine (μmol/L), mean (SD, range)[a]	56.28 (17.11, 38–91)	61.14 (22.95, 35–98)
GGT (U/L), mean (SD, range)[a]	1074.28 (523.32, 381–1804)	382.85 (227.48, 152–791)
INR, mean (SD, range)[a]	1.21 (0.14, 1–1.40)	1.03 (0.08, 1–1.50)
Sodium (mmol/L), mean (SD, range)[a]	135.28 (5.86, 123–140)	138.58 (4.19, 132–145)
MELD 3.0 score, mean (SD, range)[b]	17.85 (7.64, 6–30)	11.85 (6.30, 6–24)
CPG score, mean (SD, range)[b]	8 (1.91, 6–10)	6.28 (1.11, 5–8)
CLIF-C AD score, mean (SD, range)[c]	38.25 (7.36, 33–49)	32.25 (6.49, 26–40)

Abbreviations: AST, aspartate aminotransferase; CLIF-C AD, Chronic Liver Failure Consortium Acute Decompensation Score; CPG score, Child-Pugh score; GGT, gamma-glutamyl transferase; INR, international normalized ratio; MELD score, Model for End-Stage Liver Disease 3.0 score; *n*, number; SD, standard deviation.

[a]Data obtained from electronic health records.

[b]Calculated for participants presenting cirrhosis and decompensated liver disease.

[c]Calculated for participants presenting decompensated liver disease.

> on alcohol or something kind of stuff. It's Monday, it's grey, if you have some reward like this it can make you happier!
>
> (P12, female, aged 53, cirrhosis)

In addition, P12 also noted that a monetary-value incentive did not prompt alcohol use, which was an ethical concern raised at Stage 1.

At Stage 1, participants regarded the intervention as being of use value by eliciting their agency as individuals. The vouchers were suggested to have economic utility (P5) and to facilitate self-care (P14):

> They come in handy. It was a pleasant surprise, put it that way! I wasn't expecting it.
>
> (P5, male, aged 60, cirrhosis)

> It was really cool, yeah. Yeah, was a really good idea. I did treat myself. I bought myself some aftershave, and a couple of deals at [retailer], I went to [supermarket]. They did help, yeah.
>
> (P14, male, aged 41, decompensated liver disease)

Overall, regarding appropriateness and perceived effectiveness for the wider ARLD clinical population, the voucher-based CM intervention was acceptable and suitable for inducing and motivating engagement with ILC. The voucher-based CM intervention provided an extrinsic factor influencing internal motivation to enact behavior change. As summarized by P24, the patient's experience of voucher-based CM through a sustained engagement with ILC was comparable to obtaining educational qualifications:

> I think it's best to come in a couple of times and then acknowledge that you have to comply with the rules. They [ILC healthcare providers] are gonna follow you through from start through to the end. It's like going to school, you study for your diploma from the start, and you don't stop until you get it.
>
> (P24, male, aged 46, decompensated liver disease)

DISCUSSION

Effective interventions to improve health outcomes in patients with ARLD remain a clinical unmet need. Acceptability is a key component during the development and implementation of complex interventions. Informed by the TFA, this investigation aimed to establish the acceptability, from a patient perspective, of implementing voucher-based CM in a real-world, clinical setting. A longitudinal qualitative approach, aligned with the principles of the chosen theoretical framework, propelled a context and time-specific insight into the acceptability of a voucher-based CM intervention.

The adopted voucher-based CM intervention was anticipated to promote engagement with ILC following hospitalization by addressing attendance as a target behavior. In real-world, nonresearch settings, overreliance on abstinence-based outcomes has been reported as a major barrier to large-scale implementation of CM (Gagnon et al., 2020). From a patient standpoint, attendance-based CM has been shown to improve retention with substance use treatment and to result in longer periods of abstinence (Petry et al., 2018). In the present investigation, CM was anticipated to motivate engagement with ILC by building up participants' self-efficacy. Participants expected that receiving an incentive for a measurable, observable action such as attendance at ILC could enhance their confidence in goal-directed behavior change. Indeed, those allocated to the CM group explained that the intervention induced initial contact and improved their confidence toward sustained engagement with ILC.

Thus, from a person-centered perspective, attendance to treatment was considered an appropriate, attainable target behavior for this clinical population. This is consistent with a meta-analysis favoring attendance over abstinence-based targets in CM interventions (Pfund et al., 2022). Nevertheless, this should be considered considering evidence favoring abstinence-based CM, which has also been shown to be acceptable and effective in substance use treatment (Becker et al., 2019).

The mode of CM delivery also corresponded to patients' needs and preferences. As observed, participants valued the sense of routine and continuity rendered through the frequent incentive delivery. Synergistically, the intervention could be a heuristic device for regular, sustained treatment engagement. In the adopted voucher-based CM intervention, incentives were provided during the ILC visit. Current theoretical approaches to substance use and AUD emphasize an increased bias toward smaller, immediate reinforcement relative to delayed reinforcement (Acuff et al., 2023). This paradigm is compatible with the operational mechanisms of voucher-based CM, emphasizing the timing of incentive delivery as a central construct for its effectiveness. In a meta-analysis, the effectiveness of immediate reinforcer delivery has been established as superior to delayed reinforcement (Lussier et al., 2006). An additional practical advantage of the adopted voucher-based CM intervention relates to its in-person delivery. The incentives were delivered by the ILC consultants, who were also involved in the clinical care of the participants during their admission. This mode of delivery was noted to enable the continuity of care. This was also noted to strengthen participants' confidence during their treatment journey through mechanisms including external feedback, recognition, and verbal reinforcement. These observations suggest the role of CM in sustaining dialectical, therapeutic alliance in outpatient treatment (Maisto et al., 2020). Consistent with previous qualitative research, establishing an ongoing therapeutic alliance based on familiarity is the backbone of relational continuity of care (Murphy & Salisbury, 2020). Relational continuity is a "therapeutic relationship between a patient and one or more providers that spans various healthcare events and results in the accumulated knowledge of the patient and care consistent with the patient's needs" (Burge et al., 2011). Accordingly, the frequent, immediate, and in-person delivery of the CM intervention aligns with the characteristics of integrated management of ARLD and may serve as a protective factor to relational continuity of care. Relational continuity and respective utilization of alcohol-related health services have been linked to AUD outcomes such as remission and mortality (Rautiainen et al., 2019).

Overall affective attitudes toward voucher-based CM were positive and favored its clinical implementation. Nevertheless, concerns regarding the ethicality of CM's mechanisms were noted at Stage 1. Participants suggested that a cash-based CM intervention could propitiate alcohol use. These initial observations are reflective of the main ideological concerns toward CM and consist of an implementation barrier to the uptake of CM in substance use treatment (Gagnon et al., 2021). These objections may be rooted in stigma toward individuals seeking substance use treatment, as these are not raised among other clinical populations (Lutge et al., 2015). This is often grounded upon the views that monetary rewards are enablers of substance use and can result in diminished acceptability toward CM at a community level (Cameron & Ritter, 2007). However, a substantial body of empirical evidence has contradicted the link between remuneration of any form and the likelihood of continued substance use (Festinger & Dugosh, 2012; Lemansky et al., 2023). Accordingly, participants at Stage 2 acknowledged that the reinforcers did not motivate alcohol use, emphasizing that a voucher-based CM did not interfere with their choice of long-term abstinence.

Across the literature, there are widespread views toward the type of incentive (cash, single or multi-outlet vouchers, tokens, clinical privileges) offered to vulnerable clinical populations. On one hand, cash incentives are deemed less stigmatizing by placing trust and respect upon participants and are often preferred by research participants with opioid use disorder (Anderson & McNair, 2018). On the other hand, alternatives such as vouchers and prizes are logistically simpler to implement and are preferred by Institutional Review Boards and Ethics Committees (Largent et al., 2017). In the present investigation, participants considered a multi-outlet, voucher-based CM adequate compared to existing alternatives. These were considered to empower participants' sense of agency and the ability to exercise their choice as individuals. This preference for vouchers compared to cash alternatives was found to be specific to individuals with lived experience of ARLD and to contrast with that of other clinical populations in receipt of substance use treatment (Anderson & McNair, 2018). These findings suggest that ARLD patients have unique preferences and needs, which are relevant when applying CM across different populations. By reinforcing engagement with treatment, the transactional, symbolic scope of the intervention conveyed participants' monetary autonomy to attain meaningful, tangible goods. Autonomy, as a socially embedded capacity, and self-determination are prerogative to person-centered approaches in substance use treatment (Williamson, 2021). Thus, by eliciting a sense of agency, a voucher-based CM intervention may present itself as a valuable, person-centered approach in ARLD treatment (Fleck & Fleck, 2013).

An additional challenge to the acceptability and uptake of CM in substance use treatment relates to the durability of its effect following reinforcer discontinuation (Petry et al., 2017). Historically, concerns have been noted regarding the long-term efficacy of CM, upholding the assertion that external reinforcement may weaken intrinsic motivation toward self-directed behavior change (Deci et al., 1999). However, current literature largely supports the medium and long-term benefits of CM compared to other interventions in AUD and within the wider sphere of substance use treatment (Lussier et al., 2006; Sayegh et al., 2017). Consistent with empirical data, the present study found that participants receiving CM perceived it as effective in inducing long-term engagement with ARLD treatment.

Strengths and limitations of this study

By being nested in a pilot feasibility trial, the data reflect real-life perceptions and experiences of a novel intervention in an understudied clinical population whose treatment exhibits clinical and evidence gaps. The findings can further guide the development and testing of acceptable interventions to improve health outcomes among patients with comorbid AUD and ARLD.

Through a theory-driven approach, this qualitative investigation provides solid evidence that voucher-based CM is an acceptable intervention to promote treatment engagement in patients with comorbid AUD and ARLD. Applying the TFA as a theoretical framework enabled a comprehensive understanding of how participants prospectively and retrospectively perceived CM. Compared to other theoretical approaches, the TFA allowed for the context and time-specific identification of five core aspects (*intervention coherence, ethicality, self-efficacy, anticipated and experienced effectiveness, anticipated and experienced affective attitude*). A major advantage of using the TFA is its ability to recognize the dynamics of patient experience and acceptability toward treatment interventions at different time points. This is also congruent with the underpinnings of LQR, emphasizing the subjective experience of time innate to internal and social health-related phenomena during treatment experience (Audulv et al., 2022). Furthermore, the temporal aspect of the TFA can also account for shifts in patients' decision-making processes and intrinsic motivation toward behavior change (Prochaska & DiClemente, 1983). Thus, applying the TFA and LQR enhanced the generation of in-depth data that reflects ecological transitions in health experiences and needs among patients with ARLD (Tuthill et al., 2020).

A methodological limitation of LQR observed in this study relates to participants' long-term participation in research (Calman et al., 2013). As observed in this study, high attrition rates in the pilot trial led to a smaller cohort size at Stage 2. This is consistent with the literature reporting challenges of conducting research involving similar clinical subgroups (Comerford et al., 2017). As noted, factors such as ARLD progression, mortality, and barriers to accessing health-enabling resources can impact research participation (Wilcox & Ely, 2019). Given the high attrition rate, it was not possible to ascertain the acceptability of voucher-based CM among participants unwilling to receive this intervention or not engaging with the study. In addition, there were also demographic differences (particularly gender) between the two groups. Therefore, while the findings may indicate the acceptability of CM to promote treatment engagement, the views captured at *Stage 2* are limited to those who attended the last ILC visit. This may compromise the generalizability of the results by biasing the sample to participants who found ILC and CM overall favorable. Addressing these limitations could further inform the development of tailored approaches.

Another limitation of the adopted CM intervention is the frequency of the target behavior being promoted. In a meta-analysis, more frequent CM has been associated with increased effect sizes (Pfund et al., 2022). While the study was not aimed at assessing the efficacy and the trial adopted aimed to implement CM schedule in a real-world setting, previous research adopted models with more frequent treatment encounters with treatment (at least 1–3 times per week) (Pfund et al., 2022). Therefore, research would benefit from investigating the acceptability of CM interventions incorporating more frequent encounters. Given that face-to-face encounters are subject to capacity constraints, this could be achieved by integrating digital health interventions into ARLD treatment (Hammond et al., 2021).

Despite these limitations, the in-depth data generated in this study provides valuable insight into the acceptability of implementing CM to improve engagement with ILC and its scope to sustain the multidisciplinary management of ARLD and foster therapeutic alliance between patients and their healthcare providers.

CONCLUSION

The findings in this study suggest positive perceptions toward voucher-based CM, establishing its acceptability among patients with lived experience of ARLD. The symbolic value of the employed CM intervention matched ARLD patient preferences and needs. Participants anticipated the intervention could represent an extrinsic drive to increase internal motivation to engage with treatment. Indeed, those who received the voucher-based CM intervention suggested that this provided additional motivation to attend ILC. This was noted to strengthen the therapeutic alliance between healthcare providers and patients. Therefore, a voucher-based CM was deemed an appropriate intervention to enact sustained engagement with treatment, and its more comprehensive clinical implementation may consist of an opportunity to improve patient outcomes in comorbid AUD and ARLD. While the intervention was deemed acceptable in this clinical population, future research could benefit from implementing more frequent treatment encounters.

AUTHOR CONTRIBUTIONS

SH: conceptualization, methodology, formal analysis, data curation, investigation, writing–original writing, review and editing; SP: conceptualization, methodology, formal analysis, data curation, supervision, writing–review and editing; NJK: investigation, writing–review and editing; NS: investigation, writing–review and editing; PD: conceptualization, writing–review and editing; CD: conceptualization, writing–review and editing.

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CONFLICT OF INTEREST STATEMENT

During 2019–2023 (while employed at KCL), SP's position was part-funded by income from research grants obtained from MundiPharma Research Ltd and Camurus AB. The remaining authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The pilot study has been reviewed by King's College London and King's College Hospital in accordance with the research ethical standards in place. A favorable ethical opinion was granted by Camden and Kings Cross NHS Research Ethics Committee (reference 22/LO/0744). Written informed consent was obtained from all participants.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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