**Alcohol Interventions for LGBTQ+ adults: A systematic review**

Running title: Alcohol Interventions for LGBTQ+ adults

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**Abbreviations:**

LGBTQ+ - Lesbian, gay, bisexual, trans*, queer, questioning or otherwise gender-diverse or non-heterosexual

MSM – Men who have sex with men

GBMSMS – Gay and bisexual men who have sex with men

QATQS - The Quality Assessment Tool for Quantitative Studies

BCT – Behaviour Change technique

RCT – Randomized Controlled Trial

AUDIT - Alcohol Use Disorders Identification Test

ASI – Alcohol Severity Index

MI – Motivational Interviewing

CBT – Cognitive Behavioural Therapy

IBM - Information Behavioural Skills Model

AA – Alcoholic Anonymous

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Abstract

Background

Gender and sexual minority populations are more likely to drink excessively compared to heterosexual and cisgender people. Existing reviews of alcohol interventions focus on specific subgroups within the LGBTQ+ population and neither identify their theoretical basis nor examine how interventions are tailored to meet the needs of specific subgroups.

Methods

This systematic review includes published studies reporting the effectiveness of interventions to reduce alcohol use in LGBTQ+ people. The review followed PRISMA guidelines. Quality was assessed using the EPHPP Quality Assessment Tool.

Results

The review includes 25 studies, with the earliest published in 2005. The majority (n=20) focused on men who have sex with men; only two included sexual minority women and three included trans* people. Most studies were conducted in the USA (n=21) and used a randomised design (n=15). Five studies were assessed to be of strong quality, 7 moderate and 13 weak. Interventions were mainly delivered face-to-face (n=21). The most common approaches used to inform interventions were Motivational Interviewing (n=8) and Cognitive Behavioural Therapy (n=8). Nineteen studies reported a significant reduction in alcohol consumption.

Conclusion

This review suggests that for interventions to be effective in reducing alcohol consumption in LGBTQ+ people, they need to be informed by theory and adapted for the target population. Alcohol interventions which focus on sexual minority women, trans* people and people with other gender identities are needed. The findings have implications for professionals who need to identify when gender and/or sexuality are peripheral or central to alcohol use.

Key words: LGBTQ+, alcohol, interventions, systematic review, public health

Introduction

Gender and sexual minority populations (e.g. people who identify as lesbian, gay, bisexual, trans*, queer, questioning or otherwise gender or sexuality diverse; LGBTQ+) are more likely to drink excessively and be substance dependent than heterosexual and cisgender populations [1-3]. Scheim et al. [4] found the prevalence of heavy episodic drinking was 1.5 times higher for young trans*
adults, compared to the age-standardised general population. Similarly, King et al. [5] found the risk for past-year alcohol dependence was at least 1.5 times greater among lesbian, gay and bisexual people, compared to heterosexual people. Risk of dependence and alcohol-related problems are particularly pronounced among sexual minority women compared to their heterosexual counterparts [6].

A growing body of evidence suggests that LGBTQ+ people face challenges that make them particularly vulnerable to alcohol problems [7-10]. First, LGBTQ+ people are exposed to additional stress due to their experiences of stigma, internalised homophobia and concealing/disclosing LGBTQ+ identity [10]. These stressors may lead to using alcohol (and other substances) as a coping strategy [7]. For example, Kcomt et al. [11] found that reported experience of transphobic discrimination was associated with increased odds of alcohol misuse among trans* people. In addition, young LGB individuals might be at particularly high risk of substance-related harm, due to higher rates of bullying and violence [12]. Secondly, drinking plays a central role in the social environment of the LGBTQ+ community; alcohol appears to be more available in settings defined as lesbian- or gay-friendly [13] and the commercial gay scene is characterised by a heavy drinking culture [9, 14]. LGB people also tend to over-estimate the use of alcohol among their peers [15]. In addition, clubs and pubs on the commercial gay scene may provide spaces that allow people to celebrate difference [16] and feel ‘authentic’ [17]. For example, Peralta [16] found that gay, lesbian and heterosexual young people use drinking to justify behaviour that is different from societal expectations of gender. A third challenge is related to seeking and receiving support from alcohol services [18]. Health professionals may not be aware of LGBTQ+ social norms and the barriers LGBTQ+ people face when seeking support [18]. When considering these challenges, it is important to note that although LGBTQ+ people are often grouped together in research, they are not a homogenous group [19,20]. Moreover, stressors and risk factors for alcohol use may be more pronounced among specific sexual and gender minority subgroups [2].

The need to improve the health and wellbeing of LGBTQ+ people has received growing attention in America [12, 21] and Europe [22]. The U.S. Department of Health and Human Services [12] highlights key initiatives, including increased non-discrimination protections and increased capacity in services to support LGBT people. Similarly, the UK has committed to improving the way public services work for LGBTQ+ people [23].

However, the rates of hazardous drinking and alcohol-related problems among LGBTQ+ people remain high and there is lack of consensus on empirically tested interventions to address their alcohol use. Existing reviews of alcohol reduction interventions focus narrowly on specific subgroups
of the LGBTQ+ population (usually men who have sex with men), and neither identify their theoretical basis nor examine how interventions are tailored to meet the needs of each subgroup. A systematic review of interventions to reduce problematic alcohol use in men who have sex with men (MSM) found only 5 studies and concluded that well-designed, theoretically-informed interventions targeting hazardous drinking and alcohol use disorders among MSM were scarce [24]. Similarly, another review found only 2 interventions addressing problematic alcohol use in trans* people [25]. Research among sexual minority women is even more limited [6]; a recent scoping review did not identify any interventions to reduce alcohol use in sexual minority women [6].

This systematic review synthesises the evidence from alcohol interventions targeting the full spectrum of LGBTQ+ people. Our research questions are: 1) What are the key components of effective alcohol interventions for LGBTQ+ people?; 2) How are interventions tailored to meet the needs of LGBTQ+ people?; 3) Is it appropriate to include all LGBTQ+ people in the same intervention?

**Methods**

The protocol for the current review is registered on the PROSPERO database (CRD42019153256) [26].

**Eligibility criteria**

The review included published articles, written in English, that evaluated the effectiveness of an intervention for addressing alcohol use and/or alcohol related harms among LGBTQ+ adults (18 years or older). Given the limited number of existing interventions among LGBTQ+ people [6, 24, 25], we included studies with different designs. Studies describing the feasibility and/or acceptability of an intervention, or participants’ experience of the intervention, were excluded. Alcohol use was broadly interpreted to refer to a range of drinking outcomes, including heavy episodic drinking, hazardous drinking and alcohol dependence. Eligible interventions could take a psychosocial, behavioural or medical approach and address other outcomes (e.g. drug use, condomless sex) as long as the intervention had a clear component addressing alcohol use and/or alcohol related harms. To ensure that sources had been vetted for scientific quality, only articles in peer-reviewed journals were included; grey literature (e.g. dissertations, reports) was excluded.

**Information sources**

We systematically searched Eric, CINAHL, MEDLINE, PsychInfo, PubMed, ProQuest and the Cochrane Library. We also screened the reference lists of included articles.
Databases were searched from inception until September 2019. The search strategy was developed after consulting previous literature reviews on similar topics [24, 25, 27] and included keywords for alcohol, LGBTQ+ and intervention. We also conducted an initial search of Web of Science to identify relevant search terms. The text words in the titles and abstracts of relevant articles were used to refine the search strategy. Search terms were applied only to the abstracts of potential articles; no other limits were applied. An example of a search strategy is presented in Supplementary material 1.

Study selection
The databases yielded 6279 results, which were exported into RefWorks. The titles and abstracts of 3701 articles were screened against the inclusion criteria by the primary author (ED), and a random sample of 741 titles and abstracts (20% of the overall number) were screened by a second reviewer (CE, JF, LE). Reviewers reached the same independent decision in 92.3% of the cases and the remainder were discussed. Full text for all preliminary eligible studies was retrieved (n=72), and assessed by two reviewers (ED and CE, JF, LE or SW). Again, disagreements were resolved through discussion, which was the case for 15 articles. The review included 25 articles. The study selection process is reported using the PRISMA flowchart [28] in Figure 1.
Figure 1. PRISMA flowchart of study selection process

Data extraction

A data extraction sheet informed by the Cochrane Developmental, Psychosocial and Learning Problems group [29] data extraction tool was developed for this review. Information was extracted
from each article in the following domains: article information (i.e. author, year, title, country), study aim, methods (i.e. design, context), participants (i.e. recruitment methods, selection criteria, description of participants), intervention information (i.e. theory, mode of delivery, intervention components, who delivered the intervention, how the intervention was tailored for LGBTQ+ people, comparison group), outcomes (i.e. alcohol outcomes, other outcomes) and results (i.e. alcohol outcomes results, other results). Data were extracted into Microsoft Excel by the primary author. Although we initially intended for all extracted data to be double checked by a second reviewer (CE), after 50% of randomly selected data were checked, there were no major discrepancies so we decided additional data checking was not required.

Risk of bias
The Quality Assessment Tool for Quantitative Studies (QATQS) was used to assess the methodological quality of the included studies [30]. QATQS covers any quantitative study design and has acceptable reliability and validity across a diverse range of populations and settings [30, 31]. It has previously been used in a review of interventions to reduce problematic alcohol use in MSM [24]. The following characteristics were assessed: i) selection bias (e.g. strong rating if participants were representative of the target population and there was greater than 80% participation); ii) study design (e.g. strong rating for RCTs); iii) confounders (e.g. strong rating for studies that controlled for at least 80% of relevant confounders); iv) blinding (e.g. strong rating if the study was double-blinded); v) data collection methods (strong rating if those were shown to be valid and reliable); and vi) withdrawals and dropouts (e.g. strong rating when the follow-up rate was 80% or greater). Each study was given a quality rating of strong, moderate or weak for each of the dimensions, followed by an overall rating. The overall rating was strong if the study was not assessed as weak on any of the individual dimensions, moderate if there was one weak rating and weak if there were two or more weak ratings. The quality appraisal was carried out to assist with the interpretation of findings; no study was rejected based on the results of the quality assessment. Quality assessment was conducted independently by two reviewers (ED and SW, JF or LE).

Synthesis of results and additional analysis
Key results were summarised in an evidence table (Supplementary material 2), brought together in a narrative synthesis and presented in relation to the research questions.
Commonly used intervention strategies examined in the included studies were classified according to the Behavior Change Technique (BCT) taxonomy [32].
Results

Summary of studies

The systematic review includes 25 articles [33-57], published in peer-reviewed journals. Most of these (n=19) were published since 2010. The majority of studies were conducted in the USA (n=21) with the remainder in Australia [40], Canada [53], China [42] and South Africa [47]. Fifteen studies were randomised controlled trials (RCT), of which 2 were exploratory. Eight studies adopted a before and after design. One study was a non-randomised feasibility trial and one compared intervention and control sites without randomisation.

Recruitment methods and participants: Participants in most studies were recruited via a combination of community outreach strategies, including online adverts, field recruitment, referrals from organisations and snowballing (n=14) or via existing community programmes and clinics (n=7). Two studies adopted online only recruitment methods and in two studies, participants were approached outside gay bars.

Participants in most studies were gay and bisexual men and/or men who have sex with men (GBMSM) (n = 20). Studies of GBMSM varied in relation to whether alcohol consumption was part of the inclusion criteria. In nine studies, participants had to report specific levels of alcohol consumption [34, 35, 39, 43, 44, 47, 48, 54, 57]. In two studies, participants had to be GBMSM in addition to reporting any substance use [49, 50] or seeking treatment for substance abuse [51] and methamphetamine use [40]. Seven studies did not use alcohol consumption as part of the participant inclusion criteria, so this needs to be considered when interpreting study findings [41, 42, 46, 53, 55, 56].

In five studies, the participants (all GBMSM) were also HIV positive [39, 42, 52, 54, 56]. In one study, in addition to being GBMSM, participants were homeless [48] and in another, selection criteria required participants to experience/report symptoms of depression or anxiety [46].

Only five studies in this review did not focus exclusively on GBMSM. In one study, participants were GBMSM and female-to-male trans* people who use methamphetamine [33]. In two studies, participants were trans* women [36, 45]. In one study, participants were lesbian and gay people with alcohol abuse or dependence, and their non-dependent partners [37]. In one study that described two programmes, participants were lesbian and bisexual women over 40 years old in one programme and over 55 years old in the other [38]. One study included primarily GBMSM but also people with other identities including queer and pansexual [53].

It is worth noting that in one study [47] eligibility criteria required participants to be over the age of 16. Although the current review excluded studies that included participants under the age of 18, this
study was included as the majority of participants were over the age of 18 and the median age was 27. Similarly, another study [56] delivered the intervention to people living with HIV, but the authors compared outcomes among MSM and heterosexual men so the study was included.

**Study outcomes:** The alcohol-related outcomes in the majority of studies related to heavy drinking (e.g. hazardous drinking, heavy drinking days) and quantity and frequency of alcohol consumption (e.g. number of drinking days, weekly alcohol intake). Only 3 studies used objective measures of alcohol use (i.e. blood alcohol concentration, [34, 35]; breathalyser and a urine screen, [48]) while the rest recorded self-reported alcohol use via methods such as the AUDIT and Timeline Follow Back. Studies also assessed alcohol-related harm, using instruments such as the Addiction Severity Index (ASI), Short Inventory of Problems and the AUDIT C.

Other commonly measured outcomes included other substance use (e.g. cocaine, methamphetamine) and sexual risk behaviours (e.g. condomless sex; sex under the influence of alcohol). More details on outcomes can be found in Supplementary material 2.

**Intervention effectiveness:** The majority of interventions (n=19) reported significant changes in alcohol outcomes. In this review, we differentiate between two types of alcohol-related outcomes: reduction in alcohol use and reduction of alcohol-related harms. Interventions were effective in producing desired outcomes in relation to hazardous drinking [34, 44, 46], heavy drinking days [37, 39, 44, 46, 54, 57], weekly alcohol intake [38, 39, 53], alcohol use/intake [35, 42, 49, 51, 52, 55-57] number of drinks per day [43], frequency of alcohol intoxication [50], number of days of alcohol use [56], alcohol abstinence [50] and alcohol addiction [33]. While 19 interventions reported significant changes in alcohol-related outcomes, six of these require further explanation. Carrico et al. [33] reported reduction in alcohol addiction scores but not in drinking to intoxication or number of binge drinking days. Croff et al. [35] did not find significant difference in alcohol outcomes between intervention and control conditions overall, but did find greater intervention efficacy for participant bar patrons at high-risk of alcohol harm (i.e. those with highest planned rates of alcohol intoxication). Morgenstern et al. [43] compared two interventions and a usual-care control group, and found that one intervention was more effective than usual care but the other was not. Liu et al. [42] and Shoptaw et al. [51] reported decrease in alcohol consumption in both intervention and comparison conditions. Smith et al. [53] reported significant reduction in alcohol frequency per week between pre-treatment and 3-month follow-up, but not between pre- and post-treatment or post-treatment and follow-up.

**Comparison groups:** Eight studies did not have a comparison group as they adopted a before and after single group design. Six studies compared the intervention to standard care or treatment as
usual [39, 42, 43, 52, 56, 57] and two to a waitlist control condition [46, 55]. Three studies compared the intervention participants to participants in other active interventions or programmes [37, 38, 51], one of which compared a combination of individual and couples’ intervention versus individual-only intervention (individual intervention serving as control) [37]. In the remainder of studies, the comparison intervention included no alteration of a physical bar environment and normative feedback (versus bars that added water coolers in addition to health messaging on pacing alcohol intake and normative feedback [34], brief feedback intervention on fossil fuels [35], placebo [44], rapid HIV test [50] and referral to community programmes in addition to information provision [54]. One study did not provide details on the control group [48].

**Study quality:** Overall, five studies were deemed to be of strong quality, seven were moderate and 13 weak based on the QATQS tool. The most common domains of weak quality were lack of blinding (n=12) and presence and inadequate control of confounders (n=9) (Supplementary material 3).

**Narrative synthesis**

**What are the key components of effective alcohol interventions for LGBTQ+ people?**

*Mode of intervention delivery*

Nineteen interventions reported significant improvements in alcohol outcomes. Twelve of the effective interventions were delivered face-to-face to individuals on a one-to-one basis, rather than in groups [34, 35, 37-39, 42 -44, 46, 50, 52, 56]. One modified the physical environment of a bar to offer free water, messaging on pacing alcohol intake and a personalised feedback on blood alcohol concentration level [34]. Another offered individuals optional group support sessions, in addition to the one-to-one sessions [52]. The duration of these individual interventions varied from 1 session [35, 42, 50], 3 sessions over 6 weeks [52] or over 6 months [39], 5 sessions [56], 10 sessions [46], 12 sessions [38, 43, 44] and 32 sessions [37]. In one study it was unclear how many sessions were offered to participants [48].

Only two of the effective interventions were delivered solely within a group environment, providing 8 [53] and 48 sessions [51]. Three studies included a combination of individual and group sessions [33, 49, 54]. The Velasquez et al. [54] intervention included 4 individual and 4 group sessions, but it was unclear how many sessions were offered to participants in the other two studies.

One effective intervention was delivered online [55] and one included a face-to-face component, followed by a digital component [57].
In comparison, three of the six interventions that did not lead to significant reduction in alcohol consumption, were delivered face-to-face and on a one-to-one basis [49, 47, 48], two were delivered face-to-face in a group environment [36, 45] and one was delivered online [41]. The number of intervention sessions varied from 1 to 18.

Theory/approach

Twenty three of the included interventions were informed by theory or a theoretical approach, most commonly Motivational Interviewing (MI) alone [39, 57] or in combination with another theory/approach [54], Cognitive Behavioural Therapy (CBT) alone [36, 51], or in combination with another theory/approach [41, 46, 53] and a combination of MI and CBT [40, 43, 44]. Other theory/approaches used to inform effective interventions included: The Information Behavioural Skills Model (IBM) [42, 52] and minority stress theory [46, 53]. Seven studies adopted a theoretical approach unique among studies in this review: the Matrix model [33], the Health Belief Model [35], the Health at Every Size Model [38], the Social Ecological Model [34], developmental and learning theory [55], Social Action Theory [56] and the Trans theoretical model [54]. One study adopted behavioural couples therapy [37]. Santos et al.’s [50] intervention was informed by Bandura’s theory of self-regulation, DiClemente and Prochaska’s stages of behaviour change, and Gold and colleagues’ concept of self-justifications for high-risk sexual behaviours among GBMSM.

Behaviour change techniques

The number of Behavioural Change Techniques identified for each effective intervention [32], varied from 2 to 15; with a median of 6. The most commonly used techniques were goal setting (either for behaviour or outcome) (n=12) and review of goal (n=9), in addition to action planning (n=4), problem solving (n=7), and provision of feedback (n=10). Results of ineffective interventions were similar: the number of behaviour change techniques identified for each intervention were 3 [45, 48], 6 [40, 47], 8 [36] and 10 [41]. Goal setting was mostly commonly used (n=4 studies), followed by review of the goal (n=3) and problem solving (n=2).

How were interventions tailored to meet the needs of LGBTQ+ people?

The extent to which effective interventions were developed or adapted to address the needs of LGBTQ+ people varied. Five of the 19 effective interventions were developed after consultation with the target population and/or intervention deliverers. This included focus groups with HIV counsellors and intervention feedback from HIV-diagnosed MSM for an intervention delivered to HIV positive MSM [52]; interviews, pre-testing and piloting with substance using MSM to deliver an intervention to substance-using MSM [50]; survey with MSM to explore potential intervention acceptability...
among MSM [34]; focus groups with young MSM and service providers who work with young MSM and an advisory panel [53]; community-based participatory research with local LGBTQ+ organisations to deliver an intervention to lesbian and bisexual women [38]. One of the effective studies included an established community programme, specifically designed for trans* women, where service providers had extensive experience working with LGBTQ+ clients [43].

Two of the effective interventions were informed by existing literature to incorporate issues relevant to LGBTQ+ people (methamphetamine culture and HIV education among gay and bisexual men, [51]; effectiveness of intervention components for MSM, [43]). Another two interventions used some form of tailoring for the target population by providing participants with feedback comparing their alcohol consumption to other MSM locally [39, 54].

Three effective studies reported adapting their intervention for the target study population but did not provide sufficient details about this: one intervention was specifically designed for problem drinking MSM [44]; one was adapted to focus on issues for gay and bisexual men [46], and one was a “homegrown” intervention focusing on the needs of MSM [49].

In comparison, three of the six interventions that did not find significant changes in alcohol outcomes were developed or adapted for LGBTQ+ people. In two studies, the interventions were existing treatment programs (an LGBTQ+ specific alcohol and drugs treatment service, [40]; an outpatient programme, specialising in working with MSM clients, [45]) and one study adapted an existing intervention (targeting HIV risk and drug use in young MSM) by incorporating gay-specific issues and consulting with the original intervention participants to gather suggestions for adapting the intervention to an online format [41].

Six of the effective interventions and three of the ineffective did not appear to have been specifically designed or adapted for LGBTQ+ people.

Six of the 20 effective interventions and two of the six ineffective interventions included peer counsellors or therapists with similar characteristics to the study population (i.e. HIV-positive MSM, [42, 54]; young GBMSM [53]; 2 out of 3 therapists identified as LGBTQ+ in Pachankis [46]; LGBTQ+ identified counsellors [37, 52]; peer coordinators [47] and trans* health educators [45]).

**Is it appropriate to include all LGBTQ+ people in the same intervention?**

The current systematic review aimed to find out if it is appropriate to include all LGBTQ+ people in the same intervention. The majority of studies delivered the intervention to MSM, including gay and bisexual men, suggesting it is feasible and appropriate to treat these groups collectively. One study included primarily MSM (n=123) and only two trans* (female to male) participants [33]; although it
found significant changes in alcohol outcomes, the number of trans* people was too small to
determine whether the intervention was appropriate. Another study included 33 GBMSM and 13 of
those endorsed multiple identities including queer and pansexual, in addition to gay, bisexual, and
same-gender-loving [53]. Overall, it remains unclear whether it is appropriate to treat LGBTQ+
people collectively within an alcohol reduction intervention.

Discussion

This systematic review synthesized evidence on interventions to reduce alcohol use among LGBTQ+
adults. The review includes 25 studies, which focus primarily on GBMSM in the USA. The studies
varied in terms of intervention theory/approach and components, and the extent to which
interventions were tailored for the LGBTQ+ population. This review adds to the evidence base by
exploring not only the potential components of effective interventions, but also the extent to which
interventions were developed or adapted to meet the unique needs of LGBTQ+ people. This
systematic review is also the first to address if it is feasible to include all LGBTQ+ people in the same
intervention.

Our review found that MI and CBT were commonly used to inform both effective and
ineffective alcohol interventions. These findings are consistent with a previous review of alcohol interventions
among MSM [24] and the broader literature [58, 59]. While many studies draw on theories from the
general alcohol literature, these may not address the specific challenges LGBTQ+ people face [2].
Thus, it may be important to draw on theories, relevant to the target population for the intervention
(e.g. queer theory, transgender theory, minority stress, syndemic theory) [24, 25].

A multiplicity of adaptations towards their target population were identified for both effective and
ineffective interventions. While effective interventions were perhaps more likely to have been
adapted for the target group, no critical adaptation(s) can be identified. Interventions can be further
tailored through community-based participatory research where people with similar characteristics
to potential intervention participants (e.g. MSM, trans* people) are involved in development and
delivery. Future research could explore what processes are required to adapt an intervention for
LGBTQ+ people and assess how successful this cultural ‘tailoring’ has been (e.g. by measuring
intervention acceptability) The wider context of intervention delivery also needs to be taken into
consideration. For example, communication factors, welcoming body language and visual clues (e.g.
leaflets endorsing LGBTQ+ service access) can facilitate sexual disclosure and engagement among
LGBTQ+ people accessing healthcare [60] and potentially boost intervention efficacy.

Most studies focused on one-to-one interventions, making it difficult to evaluate the effectiveness of
group-based interventions. Accordingly, the potential of group sessions in addition to individual
sessions, to further enhance intervention effectiveness should be explored [25]. Support groups for LGBT+ people have been shown to have positive impacts on health promotion, social support and community resilience [61, 62]. For example, the availability of relevant support groups in schools can provide sexual and gender minority youth an opportunity to access information and establish social connections with others [63]. This can aid the development of a collective voice against discrimination and violence [63] and help young LGBT+ people develop resilience. A recent systematic review suggests that connectedness is key at a societal level, where being part of a group of peers can promote wellbeing, networking and solidarity among LGBTQ+ youth [64]. However, the composition of such groups may be critical [65]. For example, Neale et al. [66] found that some women with complex alcohol and drug use histories felt safe and supported in women-only treatment services while others reported conflict and mistrust therein, which undermined treatment experiences. Similarly, Alcoholic Anonymous (AA) and other 12-step programmes have been shown to be effective for increase abstinence [67] but they may not always offer a secure environment for lesbians [68]. Thus, gender and sexuality dynamics need to be considered when developing group alcohol interventions for LGBTQ+ people.

Only one intervention in this review altered the physical environment, while also including messaging about pacing alcohol intake and individual feedback on alcohol consumption [34]. This is consistent with wider literature on the effectiveness of choice architecture interventions, where objects within a micro-environment (e.g. pub) are altered with the intention of changing health-related behaviours [69, 70]. The utility of such structural interventions, informed by theories such as Nudge theory [71], for LGBTQ+ people needs to be explored further, given the central role of alcohol in the LGBTQ+ social environment. In addition, social norms interventions addressing people’s misperceptions about how much their peers drink [72], may be particularly appropriate for addressing alcohol use in LGBTQ+ people, given the strong influence of (often inaccurate) perceptions of how much peers drink (i.e. social norms) [15]. This is particularly important given recent evidence that the alcohol industry is using ‘dark nudges’ such as reinforcing the message that ‘most people drink’ [73].

The review identified only two online interventions and one that included a combination of face-to-face and digital components. There is growing evidence to suggest that online interventions are effective in engaging with MSM in relation to HIV prevention [74, 75]. However, the impact of Covid-19 on online interactions and service use across the community, means that online interventions may now be more acceptable or potentially no longer tolerable so their utility needs to be explored carefully.
Implications

This review suggests that CBT and MI may be appropriate for the design of interventions to reduce drinking among LGBTQ+ people. Such approaches are already used by health professionals in health and social care settings [76, 77]. MI may be particularly relevant when working with LGBTQ+ people, due to its person-centred approach that allows individuals to explore different determinants of behavior. This raises the question of whether mainstream alcohol services can be adapted to effectively address the multiple determinants of alcohol use among LGBTQ+ people. A report by the National LGBT Health Education centre [78] suggests that the provision of culturally competent care to LGBTQ+ people does not need to differ from provision of patient-centred care. Given that LGBTQ+ people face unique barriers to accessing health services (e.g. fear of prejudice, heteronormative attitudes from health professionals) [79, 80], education and training programmes can be adopted to prepare health professionals to adapt existing information and/or deliver CBT and MI-based interventions that are adapted for LGBTQ+ patients. Similarly, given the effectiveness of alcohol brief interventions in primary care settings [81], training may be provided to increase cultural competence among healthcare staff and help them engage with LGBTQ+ people. The use of theory informed interventions can help health professionals to work with LGBTQ+ patients to address issues, such as LGBTQ+ specific stressors (e.g. stigma and discrimination; [10]), socially influenced risk behaviours (e.g. problem alcohol/drug use) and triggers that reinforce these risks, such as peer influence and misperceptions about peers’ drinking [9, 15]. Moreover, a benefit of cultural competence in healthcare staff is a self-reported increase in confidence and comfort in delivering care for LGBTQ patients [82]. Training to help health professionals identify when gender and/or sexuality issues are peripheral or central to problematic substance use may be particularly important [83].

This review also found that goal setting is a commonly used Behaviour Change Technique in effective alcohol interventions, though in itself this is not sufficient to guarantee intervention success. This has clinical implications as health professionals need to be able to help patients set personalised goals for reducing alcohol consumption as part of the intervention. Consideration of the nature of the goal may be particularly important for LGBTQ+ people, as moderated drinking goals may be more relevant than abstinence [84].

The review also has implications for mainstream healthcare service delivery. Experiences of stigma, discrimination and victimisation among LGBTQ+ people can affect uptake rates of preventative health screening programs and accessing healthcare services [85]. Healthcare professionals need to be equipped with knowledge and skills to address social determinants of LGBTQ+ health and move
beyond a “deficit-based” model of care, to one that adopts an assets-based approach when addressing the underlying determinants of ill-health [86]. The review also has implications for public health advocates and policy makers. Although only one intervention in this review included structural alteration of the physical environment, similar interventions could be implemented at a population level. For example, reducing the availability of alcohol and introducing restrictions on alcohol marketing have been shown to be highly cost-effective strategies to reduce alcohol-related harm [87]. LGBTQ+ people may benefit from such strategies, given the centrality of alcohol on the LGBTQ+ bar scene and targeted marketing of alcohol to LGBTQ+ people [9, 88]. However, interventions need to consider the importance of the commercial LGBT+ scene in providing ‘safety’ away from heteronormative assumptions, connection and identity validation [16, 89] as well as the commercial nature of these spaces. Interventions need to address unhealthy behaviours, prominent in the commercial scene (e.g. alcohol and drug use) while preserving its role in fostering connectedness without alienating bar owners’ commercial interests (e.g. promoting premium non-alcoholic drinks).

Gaps in previous research

It is difficult to determine whether it is appropriate to include all LGBTQ+ people in the same intervention as the review did not identify an intervention delivered to diverse groups of people, although such an approach may seem more pragmatic in practice settings. Examining the relationship between the multiple dimensions of sexual orientation (sexual identity, sexual behaviour, and sexual attraction) and alcohol is important as certain groups (e.g. people with bisexual identity and/or behaviour) may experience additional risks for problem substance use [2]. The review has highlighted the scarcity of interventions addressing problem alcohol use in women who have sex with women, and in trans*people. Research is needed to address their alcohol-related needs, alongside specific investigation of the appropriateness of delivering such interventions in conjunction with other sexual and gender minority populations.

The majority of studies in this review (n=21) were conducted in the USA. However, attitudes towards and acceptance of homosexuality and gay rights vary across and within countries [90]. Further research is needed to understand the social determinants of health among LGBTQ+ people and to explore whether interventions need to be adapted for different geographic and cultural contexts.

The methodological quality of included studies requires consideration. Although their results are likely to be valid and reliable due to the overall strong design and lack of selection bias, there are inconsistencies in controlling for confounders and ensuring blinding of participants and researchers.
Twelve of the 25 studies were deemed to be of weak quality. Future studies should be careful to ensure blinding (where possible) and control for potential confounders.

**Limitations**

This systematic review was performed with high level of methodological rigour. During the study selection process, 20% of titles and abstracts were screened independently by two reviewers. Although Cochrane Handbook for Systematic Reviews of Interventions [91] suggests it is acceptable for the title and abstract screening to be undertaken by one person, we acknowledge this as a limitation. The review included only studies in English that have been published in peer-reviewed journals. It is possible that there is a body of unpublished literature, and studies in other languages, which may offer additional evidence on the effectiveness of interventions to reduce alcohol consumption in LGBTQ+ people.

**Conclusion**

This review found that interventions, informed by theory and adapted for the target population, are likely to be effective in reducing alcohol use and related harms in LGBTQ+ people. Research on interventions with sexual minority women, trans* people and people with other identities is needed. Further research is also needed to explore online interventions and to determine whether interventions are best targeting specific subgroups by, gender, or sexual identity.

**References**


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