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Review

OXFORD

A meta-review of the evidence on addiction recovery mutual help organizations

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Abstract

Background: **Mutual help organizations (MHOs) for alcohol and substance use disorders are peer-based programs offering recovery-specific social support. A wide-ranging, diverse body of published MHO literature examines their clinical and public health utility. We conducted a meta-review ("overview of reviews") to synthesize this evidence and identify trends, limitations, and gaps across existing syntheses.**

Methods: **We searched five electronic databases (August 2023) using tailored search strings to identify reviews of MHOs. We coded review characteristics and quality ratings (A Measurement Tool to Assess Systematic Reviews 2) in duplicate and quantified overlap of primary studies [corrected covered area (CCA)].**

Results: **Twenty-five reviews (one scoping, 15 systematic, and 9 meta-analyses) were included, encompassing 163 111 participants and 645 unique primary studies, with minimal overlap (CCA = 1.76%). Overall methodological quality was mixed. Most reviews focused on 12-step MHOs/12-step facilitation (20; 80%), particularly Alcoholics Anonymous (13; 52%). Few focused on adolescents (2), individuals with co-occurring disorders (3), or Indigenous populations (1). Over half (56%) did not report race/ethnicity; those that did reported ranges from 0% to 81% White (M = 58.4%). Sex/gender was reported in 48% (M = 71.5% male). All meta-analyses examined alcohol and/or other substance use outcomes; some also assessed related outcomes, e.g. social connection, physical/mental health, education/employment, criminal justice involvement, and cost-effectiveness/healthcare utilization.**

Conclusions: **Despite numerous reviews, the synthesis literature is limited in methodological rigor, with a narrow focus on 12-step MHOs. Reporting of outcomes and demographic data is inconsistent, but improves over time. Given variation in individuals' recovery pathways, future syntheses should examine newer, non-12-step MHOs, distinct populations, and outcomes beyond alcohol/substance use behaviors.**

Keywords 12-step, meta-review, mutual help organization, overview

Introduction

Substance use disorders (SUD), used throughout this review to refer collectively to alcohol and other drug use disorders, are among the most pervasive public health challenges globally (U.S. Department of Health and Human Services (HHS), Office of the Surgeon General 2016, Degenhardt et al. 2018). SUDs confer a massive burden of disease, disability, suicide, early death, and rising healthcare expenditure. In the USA alone, alcohol-related deaths surpassed 170 000 annually in 2021 and there were over 105 000 deaths due to opioid and other drug related poisonings in 2022 (Spencer et al. 2023, Esser et al. 2024). Although many who meet criteria for SUD achieve remission without formal treatment (Robert Granfield and William Cloud 1999, Cunningham and McCambridge 2012, Kelly et al. 2017), many require combinations of acute medical stabilization, behavioral therapies, and long-term recovery support services (RSS) to achieve and sustain remission (Stringfellow et al. 2022). For this reason, community RSS that are freely available and easy to access, such as mutual help organizations (MHOs), are often recommended alongside or following treatment.

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Nature, prevalence, and scope of mutual-help organizations

MHOs consist of individuals with a common experience or problem coming together to share their experiences and provide support to one another (Humphreys 2004). MHOs have existed for over 170 years in the US (White 1998), with the most common being 12-step organizations [e.g. Alcoholics Anonymous (AA), Narcotics Anonymous (NA); (Bergman et al. 2024)]. 12-step are the most prevalent form of RSS and can be accessed in nearly every US community in person and/or online (Kelly 2022). The prevalence of different MHOs varies widely, with 12-step meetings numbering over 70 000 in North America, while the MHO Moderation Management consists primarily of online meetings (Lembke and Humphreys 2012, General Service Office 2021, Narcotics Anonymous 2025). MHOs have a significant international presence as well, with groups such as AA and NA reporting meetings in 180 and 143 nations, respectively (General Service Office 2021, Narcotics Anonymous 2025).

SUD recovery-focused MHOs typically seek to help individuals attain and sustain SUD abstinence or remission (and/or to moderate their substance use to a level where harms are substantially reduced). They do this primarily through creating a space for initial belonging and connection between recovering peers that leads to mutual support in and between meetings, identification with a fellowship or community, and the use of strategies and philosophies often stemming from lived recovery experience. Most MHOs are completely peer-run, led by individuals in recovery, although some have professional involvement [e.g. in the initial organization or running of groups, such as SMART Recovery (Humphreys et al. 2004, Horvath and Yeterian 2012, Kelly and Yeterian 2013)].

MHOs may facilitate increases in "recovery capital," the resources which support initiation and maintenance of long-term recovery (Robert Granfield and William Cloud 1999, Cloud and Granfield 2004, Kelly and Hoeppner 2015). Greater recovery capital can increase hope and optimism, build resilience and improve coping, and help buffer and reduce biobehavioral stress and allostatic load, all factors which support continued remission (Kelly and Hoeppner 2015, Best and Hennessy 2022). RSS such as MHOs can directly provide different types of social recovery capital through peer relationships including emotional support (e.g. empathy), tangible support (e.g. linkages to jobs, housing), informational support (e.g. advice), and social support (e.g. sense of belonging; (Kelly et al. 2019, LaBelle et al. 2023, Day et al. 2025).

There is a robust and vast literature of primary studies examining MHOs, and many evidence syntheses, such as systematic reviews and meta-analyses. These syntheses vary in focus, rigor, and findings creating a large and heterogeneous evidence base. Although systematic reviews and meta-analyses can be incredibly important to synthesize the literature and inform practice and policy, the variability and volume of existing reviews suggest the need for a more comprehensive, rigorous review approach that synthesizes the quality and findings of the existing review base to provide a path moving forward.

This synthesis of MHO reviews is a meta-review or overview of reviews (Hennessy et al. 2019, Pollock et al. 2023). Meta-reviews are important to understanding heterogeneity in the MHO review literature and they can help to identify the strongest evidence base through rigorous summary and quality grading of reviews as well as be useful for comparing how similar but distinct aspects operate (e.g. synthesize information on different MHOs types to better understand the MHO research landscape; Biondi-Zoccai 2016). In short, when done rigorously, meta-reviews describe and synthesize the state of the existing evidence on a topic as reflected in extant reviews to guide recommendations for the overall field and for researchers to identify future areas for synthesis.

Aim

In this meta-review, we aimed to examine the scope and focus of previous evidence syntheses on MHOs for alcohol and other SUDs/problems to understand the breadth and quality of evidence on different types of MHOs. As part of this aim, we assessed overall trends and the degree of overlap across syntheses to guide future syntheses. Second, we compiled reported recovery outcomes from the identified meta-analytic literature to better understand the strength of association between MHO participation and participant outcomes. Additionally, because MHOs may not benefit all individuals equally, and the type and extent of benefits may vary with different participant characteristics we examined whether evidence syntheses documented these participant characteristics (Kelly et al. 2012, Kelly and Hoeppner 2013).

Materials and methods

This meta-review was not pre-registered but followed an internal protocol adherent to best practice recommendations, including a systematic search of five databases, quality assessment, overlap examination, and standardized coding conducted in duplicate (Hennessy et al. 2019, Pollock et al. 2023).

Inclusion criteria

The inclusion criteria were broad to allow for any type of systematic review that examined MHO impact on recovery, regardless of specific research questions. Eligible reviews focused on any type of MHO for addiction recovery, including but not limited to the broad family of 12-step MHOs (e.g. AA) or newer MHOs (e.g. SMART Recovery). The reviews had to focus on participants with alcohol or substance use problems and not behavioral addictions (e.g. gambling). Authors needed to indicate it was a systematic review, meta-analysis, or similar systematic approach to evidence synthesis. Narrative or unsystematic reviews (e.g. without a transparent search across databases or a formal set of inclusion/exclusion criteria) were not eligible. Eligible reviews examined outcomes related to any type of MHO participation. Those focused solely on program description/history were ineligible. Eligible outcomes included alcohol and other substance use behaviors (i.e. frequency/quantity, abstinence), SUD remission (early and sustained), cost-effectiveness and health care, employment, criminal justice involvement, well-being (e.g. happiness, self-esteem), quality of life and functioning, and measures of recovery capital.

Search strategy

To identify reviews, we systematically searched five electronic databases (as of 18 August 2023): PubMed, EMBASE, CINAHL, CENTRAL, and PsycInfo. Search strategies combined keywords for MHOs with substance use terms and a standardized set of

evidence synthesis terms recommended for meta-reviews (Hennessy et al. 2019); see Supporting Information 1 for full strategies). There were no publication date or language restrictions. We reference harvested from included reviews and expert contacts. Reviews were screened in duplicate at the title/abstract and full-text stages using the online Covidence platform ("Covidence systematic review software," 2023) with any discrepancies resolved by discussion.

Data extraction

Data from eligible reviews were extracted in duplicate by four staff using an instrument developed for this purpose in the Research Electronic Data Capture electronic data capture tools (Harris et al. 2009). Discrepancies were resolved by discussion. Included reviews authored by a review team member were coded by alternate review team members.

The coding form included categories for characteristics at the review level (review design, aims, scope), study level (demographic participant characteristics, MHO and comparator group characteristics), and outcome level (type of outcome, measurement of outcome). The coding form and data extracted from included studies are available at request.

To address the second primary aim of this review, to understand the strength of association between MHO participation and participant outcomes, we only coded outcome results from the included meta-analyses. This decision was due to lack of clear, objective outcome measures in the systematic reviews without a meta-analysis (e.g. results sections presented as lengthy narrative text with increased potential for cherry-picking outcomes). All coded outcomes were assigned to 1 of 10 categories: (i) Substance use, (ii) Physical and/or mental health, (iii) Social connection, (iv) Education and employment, (v) Criminal justice involvement, (vi) Cost effectiveness and healthcare service usage, (vii) Self-esteem, (viii) Quality of life, (ix) Recovery capital, and (x) Other psychosocial outcomes.

Quality assessment

All reviews were assessed for quality using A Measurement Tool to Assess Systematic Reviews [AMSTAR 2; (Shea et al. 2017)] in duplicate by BA-level trained research coordinators who were supervised by faculty. The four reviews authored by a member of the review team were rated by alternate review team members (Hennessy and Fisher 2015, Beck et al. 2017, Kelly et al. 2020, 2009).

Reviews were scored based on overall adherence to the 16 items in the AMSTAR 2 checklist. We determined six of the seven suggested critical items to be critical given our scope. The seventh critical item suggested by Shea and colleagues, reporting of a list of excluded studies with justifications, was likely infeasible given historical publication practices. We utilized the NA option when authors reported rationale around why a specific methodological step could not be implemented (e.g. too few studies to quantitatively examine publication bias).

Review overlap

The corrected covered area (CCA) was estimated to determine the relative overlap of primary studies across the included reviews (Pieper et al. 2014), with CCA score thresholds of slight overlap (0%–5%), moderate overlap (6%–10%), high overlap (11%–15%), and very high overlap (greater than 15%). Reviews with moderate or high overlap, but no shared authorship team were compared at the outcome level using guidelines from Hennessy and Johnson (2020). Reviews with $<$10% overlap and unique outcome data were considered as separate. For meta-analyses by the same author teams indicating use of similar methods, information from all relevant reports was used in assessing quality and other characteristics.

Synthesis

We conducted a narrative synthesis, guided by thematic synthesis of each included review's scope, quality, and the overlap information. For systematic reviews without meta-analysis, we conducted a thematic examination of the review aims due to variation in scope, quality, and nature of outcomes reporting. For meta-analyses, we descriptively synthesized quantitative results within the 10 pre-established outcome categories using the metric originally reported by the reviews. Heterogeneity statistics (e.g. Tau or I^2) are included with the narrative as available (i.e. only 78% of meta-analyses included heterogeneity statistics). We supplement this synthesis with quantitative descriptive summaries and examine trends over time and across topics.

Results

Of the 732 identified records, 271 records were identified as duplicates, leaving 461 papers for abstract screening. In total, 386 records were identified as ineligible during title/abstract screening, 45 records were identified as ineligible during full-text screening, and 4 were not retrievable. Two additional reviews were identified (Emrick et al. 1993, Bøg et al. 2017) for a total of 28 reviews. Yet, 3 of these 28 reviews were an update of a prior review and superseded it [i.e. Sussman (2010) update of Kelly et al., 2007; (Tonigan et al., 2016) as a poster version of Tonigan (2018)] or was a published distillation of the original review [i.e. Kelly et al. (2020) was a distillation of the original Kelly et al. (2020) review]. In these cases, the most recent and published versions were included, leaving 25 unique reviews in this meta-review. See the PRISMA flow diagram (Fig. 1). We use standard practice for reporting the number of studies within reviews (*K*) and the number of participants within studies (*N*).

Review characteristics

Of the 25 included reviews, 1 was a scoping review, 15 were systematic reviews, and 9 were meta-analyses (see Table 1 and Supporting Information 3). Reviews included an average of 25.8 primary studies (range 3–107 studies). Of the 22 (88.0%) reporting aggregated participant sample size, the average was 7414.1 (median = 4951; SD = 8265.7; range 75–32 858).

Most included reviews focused on 12-step specific groups, with 7 reviews including any type of 12-step group, 13 reviews specifically focused on AA, and one review including both AA and NA. One review focused on indigenous peoples attending any support groups, but only identified primary studies of AA (Dale et al. 2019). Only one review focused exclusively on a non-12 step MHO, SMART recovery (Beck et al. 2017).

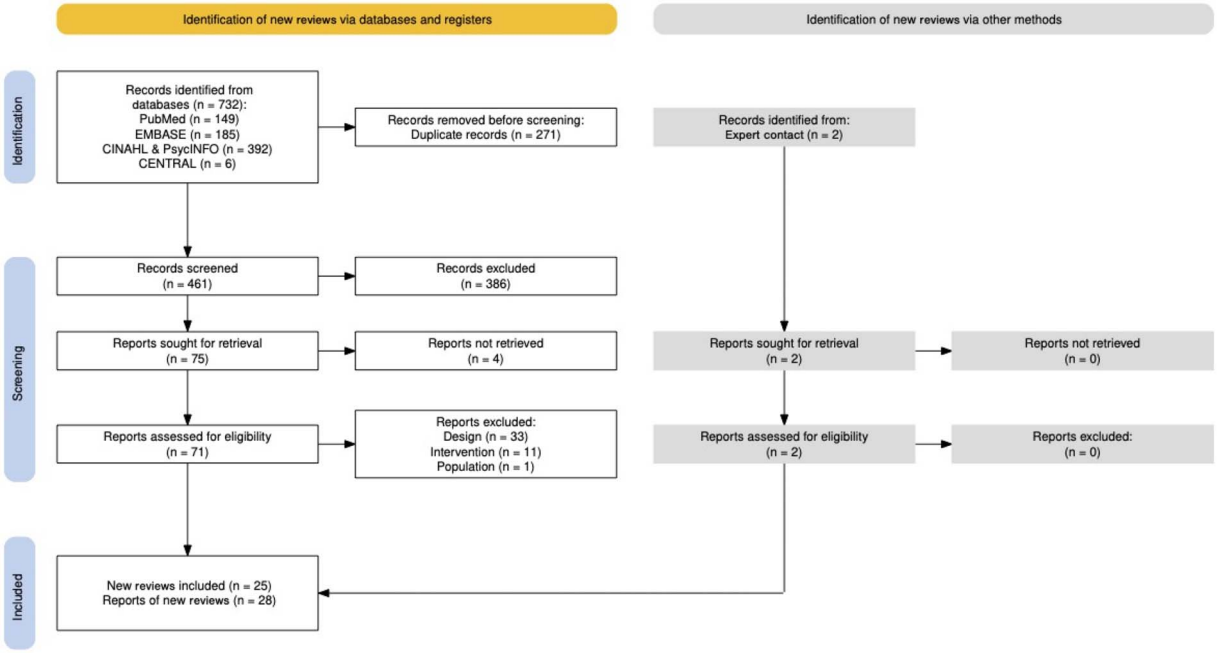


Figure 1 PRISMA review flow diagram (Haddaway et al. 2022).

Table 1 Summary of review characteristics.

Characteristic	Summary
Publication year	1993–2021 (Median = 2013)
Review design	Systematic review: 15 (60%) Meta-analysis: 9 (36%) Scoping review: 1 (4%)
Intervention(s)	AA: 13 (52%) Any type of 12-step group: 7 (28%) Any self-help group/MHO: 3 (12%) AA and NA: 1 (4%) SMART recovery: 1 (4%)
# of Primary studies (k)	3–107 (Mean = 29.8, SD = 31.05; Median = 20)
Sample size (*N*)	Reported in 22 reviews. Total sample size ranged from 75–32 858 (Mean = 7414.1, SD = 8265.7; Median = 4951)
Sex	Reported in 12 reviews (3 reported only range). Percent male ranged from 0–92% (Mean = 71.5%)
Race/Ethnicity	Reported in 9 reviews (2 reported range only). Proportion of white participants ranged from 0–81% (Mean = 58.4%)
Age	Reported in 11 reviews (3 reported only range). Mean age ranged from 16–43.7 (Mean = 36.5)

In cases where reviews sought all types of 12-step interventions but only identified one type during the review process (e.g. AA), we labeled the review focus based on the type of MHO described in the identified primary studies.

The geographic settings of underlying studies were not consistently reported. One review reported limiting its inclusion criteria to studies conducted in the United States only to ensure relevance to the environmental context of adolescent recovery programs (Hennessy and Fisher 2015).

Participant characteristics across included reviews

Summaries of participant demographic characteristics such as sex/gender, race/ethnicity, age, and primary substance were inconsistently reported. Sex composition of primary studies was reported by 12 reviews (48%), with samples that were predominantly male (71.5%). Race/ethnicity was reported by 11 reviews (44%), with 2 reporting the range (Sussman 2010, Kelly et al. 2020) and 9 reporting, at minimum, the proportion of white participants. The samples in these nine reviews ranged from 0% to 81% white [M = 58.4%, weighted median = 62%; (Krentzman 2008, Dale et al. 2019)].

Age was reported by 10 reviews [40%; M = 36.5; range 16.2–43.7 years; (Hennessy and Fisher 2015, Beck et al. 2017)]. Three reviews reported only the range of the primary studies' average ages (13.6%). Primary substance of use was reported by 16 reviews (64%), most often alcohol only (62.5%), followed by alcohol and other substances (31.3%), and 1 review (6.3%) reporting multiple substances.

Review quality

There was 1 review of high quality, 5 low quality, and 19 reviews of critically low quality (see Fig. 2). More than half of the included reviews met several domains: 56% used comprehensive inclusion criteria (e.g. Participants, Intervention, Comparator, Outcome: PICO), 60% discussed heterogeneity, and 56% reported potential conflicts of interest.

The two most frequently unmet criteria were examining/reporting on sources of funding for primary studies and duplicate study selection. Regarding the six critical items, most reviews lacked a pre-established protocol (76%), comprehensive search strategy (68%), satisfactory technique for assessing primary study risk of bias (RoB; 72%), and failed to discuss RoB in relation to the results

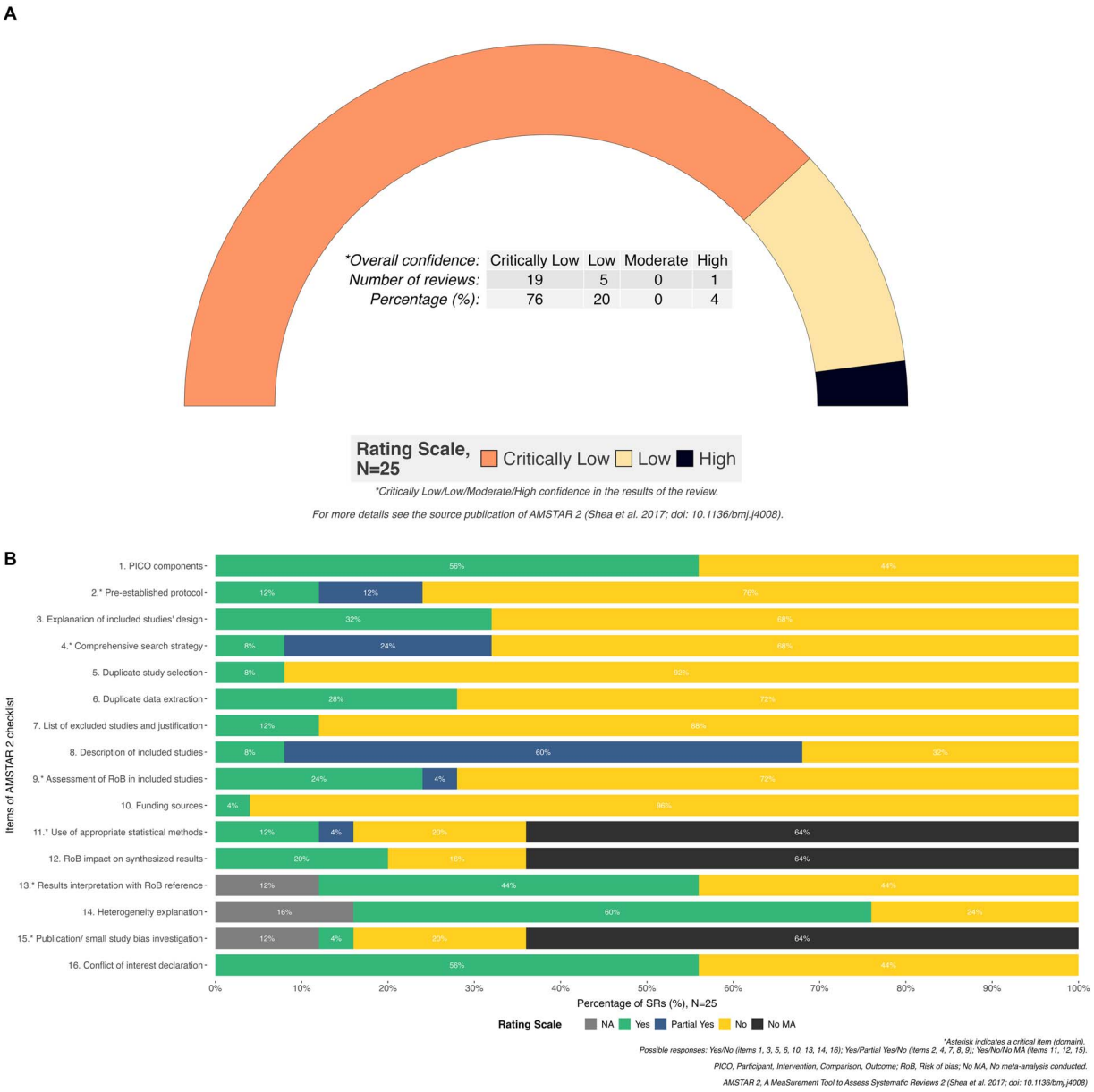


Figure 2 (A) Summary of AMSTAR 2 overall confidence ratings (B) proportion of reviews satisfying AMSTAR 2 items (Shea et al. 2017, Bougioukas et al. 2024). Notes. Based on AMSTAR 2, reviews were determined to be of high quality ($\leq$1 non-critical weakness), moderate quality ($>$1 non-critical weakness), low quality (1 critical flaw $\pm$ noncritical weaknesses), or critically low quality ($>$1 critical flaw $\pm$ noncritical weaknesses).

(44%). Among meta-analyses, 55.6% did not use appropriate statistical methods or investigate publication bias. See Supporting Information 2 for individual item ratings for each article.

The quality of underlying primary studies was formally assessed by nine reviews. Eight used a standard assessment tool (i.e. Cochrane RoB) and one utilized the Grading of Recommendations, Assessment, Development, and Evaluation (Schünemann et al. 2013) tool (Kelly et al. 2020). Four discussed and/or assessed publication or reporting bias (Hennessy and Fisher 2015, Bøg et al. 2017, Tonigan et al. 2018, Kelly et al. 2020).

Review aims

Systematic reviews without meta analysis

The focus of several of the systematic reviews without meta-analyses were on questions regarding populations that may or may not benefit from MHOs, such as individuals with co-occurring SUD and psychiatric conditions (Bogenschutz 2007, Aase et al. 2008), demographic sub-groups such as adolescents (Sussman 2010, Bekkering et al. 2016) or indigenous peoples (Dale et al. 2019). One review (Ullman et al. 2012), examined the experience of women in AA and similar MHOs.

Four reviews examined intermediate outcomes and mechanisms (e.g. self-efficacy, social networks, spirituality) through which the specific MHO, AA, may confer benefit to its members (Groh et al. 2008, Kelly et al. 2009, Tusa and Burgholzer 2013, Adelman-Mullally et al. 2021). One review (Glassman et al. 2020) synthesized qualitative studies focused on AA members' experiences.

Review overlap

Across the 25 reviews, there was a total of 544 unique primary studies. The overall CCA of 1.76% indicates very low overlap (see

Table 2 Summary of overlap by reported outcome type.

	Substance use	Physical and/or mental health	Social connection	Education, employment	Criminal justice involvement	Cost-effectiveness, service usage	Other
Bøg and colleagues (2017)	✓	✓	✓	✓	✓	✓	
Emrick (1993)	✓	✓	✓	✓	✓		✓
Forcehimes and Tonigan (2008)	✓						✓
Giannelli (2019)	✓	✓	✓				
Hennessy and Fisher (2015)	✓						
Kelly (2020)	✓					✓	✓
Kownacki and Shadish (1999)	✓						
Tonigan (1996)	✓						✓
Tonigan (2018)	✓						

Supporting Information 4). Following guidance from Hennessy and Johnson (2020), we calculated overlap for subsets of meta-analyses reporting similar outcomes (Table 2) to assess the distinctness of samples that contribute to effect sizes. Overlap is presented in tandem with the outcomes below. Of note, when our team reviewed the aims/focus/target population of the meta-analyses, the only overlap at the effect size level were for substance use outcomes and not other markers of recovery.

Meta-analytic outcomes

Substance use outcomes

All nine meta-analyses focused on 12-step MHOs, with most focused solely on AA, and reported at least one substance use outcome (Supporting Information 5). There was substantial variation in the description of AA involvement (e.g. affiliation, attendance, participation) and type of substance use outcomes reported (e.g. abstinence, severity of dependence, substance quantity, and substance behavior outcomes).

The two meta-analyses that broadly focused on 12-step interventions showed differences in the relationship between MHO involvement and substance use in adults and adolescents. In adults, no significant difference was shown between 12-step and dialectic behavioral therapy (DBT) on individual's self-reported substance use [(Giannelli et al. 2019); Standardized Mean Difference (SMD) = 0.04, 95% CI (−0.78, 0.86); $k = 1$, $n = 23$] or urinalysis [SMD = −0.30, 95% CI (−1.12, 0.53); $k = 1$, $n = 23$]. 12-step involvement was correlated with an improvement in self-reported abstinence among adolescents [(Hennessy and Fisher 2015); Fisher's z = .28, 95% CI (0.06, 0.51); $k = 4$].

When examining AA specifically, MHO involvement was generally associated with reduced alcohol consumption and improvement in related outcomes. Reviews examined AA participation in a variety of ways; i.e. involvement, attendance frequency or quantity, and affiliation. Two meta-analyses demonstrated that AA involvement was correlated with reduced drinking (Emrick et al. 1993; Tonigan et al. 1996). The reviews reported similar effect sizes ($r = 0.29$ and $r = 0.22$ respectively). Given the high overlap of primary studies between these two reviews (CCA = 69.9%), the mitigated Tonigan (1996) effect size is likely due to the inclusion of an additional 14 articles reflecting 3254 participants (compared to the 1086 in Emrick et al. 1993).

One review demonstrated that dually diagnosed individuals increase abstinence through AA involvement [(Tonigan et al. 2018); $r_w = 0.249$, 95% CI (0.203, 0.293); $k = 22$ (24 effects), $n = 8075$], a similar effect size to the earlier review of a broader AA sample (Tonigan et al. 1996).

AA attendance frequency was associated with improved drinking behavior outcomes in two reviews (Emrick et al. 1993, Kownacki and Shadish 1999). These reviews had low primary study overlap (CCA = 7.01%), likely due to differences in primary study inclusion criteria. Further, Kownakci and Shadish (1999) demonstrated that AA resulted in better alcohol-related outcomes than other or no treatment conditions in non-randomized controlled trials (RCTs) [$d = 0.40$, 95% CI (0.19, 0.61)], but worse alcohol-related outcomes in RCTs [$d = -0.54$, 95% CI (−0.98, −0.11)].

Two meta-analyses uniquely demonstrated that AA affiliation reduced individuals' daily alcohol consumption quantity as there was no overlap [CCA = 0%; (Emrick et al. 1993, Kelly et al. 2020)]. Three meta-analyses examined AA affiliation and dependence severity (Emrick et al. 1993, Tonigan et al. 1996, Kelly et al. 2020), finding that AA affiliation significantly reduced severity [(Kelly et al. 2020); Mean Difference (MD) = −0.05, 95% CI (−0.09, −0.01); $k = 2$; $n = 336$] and was positively associated with reduced alcohol dependence [$r = 0.18$ (SD = 0.25); $k = 10$, $n = 1219$; (Emrick et al. 1993); $r = 0.08$ (SD = 0.14); $k = 15$; $n = 2601$; (Tonigan et al. 1996)]. There was moderate overlap between these three reviews (CCA = 25.9%), accounted for by the high overlap between Emrick and Tonigan (CCA = 69.6%) and no overlap between Kelly and Emrick (0%).

Finally, one meta-analysis examined self-efficacy as a moderator, finding that the positive relationship between AA and substance outcomes [$r_w = .30$ (SD = .05); $k = 6$] was maintained but weakened when accounting for self-efficacy [(Forcehimes and Tonigan 2008); $r_w = 0.21$ (SD = .06); $k = 6$].

Physical and/or mental health outcomes

Three meta-analyses reported at least one physical and/or mental health outcome (Emrick et al. 1993, Bøg et al. 2017, Giannelli et al. 2019) with mixed results for MHO conditions (Supporting Information 6).

Giannelli (2019) reported findings from two primary studies but did not synthesize them together given their disparate outcome operationalization. When DBT was compared to treatment

as usual (TAU) plus 12-step programs, there was an improvement in depression and overall psychopathology for the DBT condition.

Emrick (1993) reported that AA attendance was correlated with worsened cognitive function ($r = -0.53$, $k = 2$) and with worse physical symptoms ($r = -0.13$, $k = 2$). They found positive correlations between AA attendance and psychological adjustment ($r = 0.25$, $k = 13$), mental functioning ($r = 0.14$, $k = 2$), and mental health ($r = 0.05$, $k = 7$).

Bøg (2017) found no significant effect when comparing the results of 12-step and other psychosocial interventions on psychiatric symptoms at post-treatment, 6-month follow-up, or 12-month follow-up. The same was observed when comparing 12-step with no intervention at post-treatment and 6-month follow-up timepoints.

Social connection outcomes

Three meta-analyses examined at least one social outcome (Emrick et al. 1993, Bøg et al. 2017, Giannelli et al. 2019) (Supporting Information 6). Bøg (2017) found that when compared to no intervention, 12-step interventions were significantly associated with worse social functioning at post-treatment ($k = 1$) but not at 6 months. Further, when comparing 12-step interventions with other psychosocial interventions there were no significant effects on social functioning at post-treatment, 6 months, or 12 months. Giannelli et al. (2019) reported no differences in social adjustment between DBT and TAU+12-step programs when measured at 16-months.

Emrick (1993) reported a positive correlation between AA attendance and social improvement within the family ($r = 0.13$; $k = 6$) and between AA affiliation and use of external support ($r = 0.43$; $k = 4$), social contact ($r = 0.13$; $k = 4$), and social stability ($r = 0.02$; $k = 3$).

Education/employment outcomes

Two meta-analyses reported at least one education and/or employment outcome (Emrick et al. 1993, Bøg et al. 2017; Supporting Information 6). Bøg and colleagues (2017) found that when compared to other psychosocial interventions, 12-step interventions did not improve employment outcomes at post-treatment [Hedge's g = 0.03, 95% CI (−0.24, 0.30); $k = 3$; $n = 211$], 6 months [Hedge's g = −0.07, 95% CI (−0.36, 0.22); $k = 3$; $n = 191$], or 12 months [Hedge's g = −0.18, 95% CI (−0.52, 0.15); $k = 2$; $n = 140$]. Similarly, when compared to no intervention, 12-step interventions were not associated with improved employment at post-treatment and 6 months ($k = 1$).

Emrick (1993) reported positive relationships between AA attendance and employment ($r = 0.12$; $k = 5$) and between AA affiliation and socioeconomic status ($r = 0.04$; $k = 4$).

Criminal justice involvement outcomes

Two meta-analyses reported at least one criminal justice involvement outcome (Emrick et al. 1993, Bøg et al. 2017; Supporting Information 6). Bøg and colleagues (2017) found that when compared to other psychosocial interventions, 12-step interventions were not significantly different with regard to criminal behavior outcomes at post-treatment, 6 months, or 12 months. When comparing 12-step interventions with no intervention there were no significant differences on criminal behavior outcomes at post-treatment or 6 months.

Emrick (1993) reported positive relationships between AA attendance and legal situation improvement ($r = 0.10$; $k = 2$) and between AA affiliation and fewer legal problems ($r = 0.07$; $k = 2$).

Cost-effectiveness and healthcare service usage outcomes

One meta-analysis reported cost-effectiveness outcomes (Kelly et al. 2020; Supporting Information 6). The authors found AA and 12-Step Facilitation (TSF) to be superior in healthcare cost savings ($k = 4$) when compared to outpatient treatment, cognitive behavior therapy (CBT), and no treatment ($k = 4$).

One meta-analysis reported a healthcare service outcome (Bøg et al. 2017). When comparing 12-step with other psychosocial interventions, 12-step was associated with increased treatment retention, an effect not observed when comparing 12-step with no intervention.

Other psychosocial outcomes

Four meta-analyses reported other distinct psychosocial outcomes (Supporting Information 6), finding mostly positive outcomes. There were positive correlations between AA attendance and religious life activity [($r = 0.12$, $k = 5$) and perceived locus of control ($r = 0.13$, $k = 2$); (Emrick et al. 1993)] and psychosocial adjustment [$r = 0.18$, $k = 17$; (Tonigan et al. 1996)], and between 12-step and self-efficacy [$r = 0.21$, $k = 11$; (Forcehimes and Tonigan 2008)]. Kelly et al. (2020) reported no advantage in alcohol-related consequences following AA/TSF when compared to other psychosocial treatments at end of treatment, 6-, 12-, or 24-months.

Outcomes not examined

Of the 10 outcome types we planned to code, 3 were not reported by any of the included meta-analyses: Recovery Capital, Quality of Life, and Self-Esteem outcomes. Three categories (Social Connection, Education and Employment, and Criminal Justice Involvement) were only reported by two reviews which focused on different interventions [12-step for illicit drug use, (Bøg et al. 2017); AA, (Emrick et al. 1993)].

Discussion

The quantity and quality of research investigation in the area of MHOs is by far the most advanced of any RSS (Eddie et al. 2025, Hennessy et al. 2025, Kelly et al. 2025, Vilsaint et al. 2025). This has allowed for extensive evidence syntheses seeking to analyze the effects of MHOs. Our meta-review identified 25 unique reviews, representing 645 studies, and approximately 163 111 participants. To date, the degree of methodological rigor among evidence syntheses of MHOs has been quite low, with only one high quality systematic review and meta-analysis published in the Cochrane Library (Kelly et al. 2020). Based on our assessment, there are several key areas for future reviewers to improve (Table 3). They must better attend to the critical issues of developing and following a pre-established protocol, using a comprehensive search strategy that covers multiple electronic databases and additional sources for grey literature, use an appropriate tool for assessing risk or bias or study quality and integrate those findings to the discussion of results. Similarly, for authors also conducting a meta-analysis, there must be better attention to following guidelines and standards for reporting key characteristics of studies (e.g. demographics; (Nakagawa et al.

Table 3 Key findings and future directions of MHO evidence syntheses.

Domain	Key findings	Future directions for syntheses and primary studies
Population	• Reviews summarized data from 163 111 participants across 645 unique primary studies. • Significant variability in reporting of primary study sample demographic characteristics. • Reported samples were, on average, male (71.5%), white (58.4%), and in early adulthood (Mean age = 36.5).	• Complete and standardized reporting of aggregate demographic characteristics and explicit reporting of missing information to contextualize findings in specific populations. • Extract and report extended sample characteristics, such as SUD severity, comorbid mental and/or physical health conditions (including chronic pain), and socioeconomic factors to allow for more precise subgroup analyses. • Examine MHO experiences of younger (adolescent) and older adult samples. • Examine the effects of MHO participation in combination with other treatment modalities (e.g. medication management).
Intervention	• Majority of syntheses focused on 12-step MHOs (20), and particularly AA (13). • Only one review focused on a non-12-step MHO.	• Broaden scope beyond 12-step interventions as other MHOs become more established and primary study research is conducted. • Examine the effect of participation in different modalities of MHOs (e.g. virtual).
Outcomes	• Wide variation in domains examined and manner of reporting outcomes across syntheses. • Substance use outcomes show positive benefits from AA for both the general population and individuals with comorbid mental health/SUDs in measures of substance use. • Mixed and/or limited synthesis evidence of MHO impact on substance-related outcomes (e.g. mental health, social connection).	• Prioritize standardized outcome measurement and reporting to allow for accurate comparison between studies and precise synthesis of existing data. • Investigate the impact of MHO participation on other psychosocial outcomes to reflect the broadening definition of recovery (primary research); preregister syntheses to examine broader outcomes and document when these are not available in the primary literature.
Mechanism	• Few reviews examined the mechanisms of action in MHOs.	• Integrate mediator and moderator analyses as well as mechanisms of behavior change to better understand how MHOs impact populations of interest.
Synthesis quality	• Review quality was generally poor (1 high, 5 low, 19 critically low). • Common gaps: lack of pre-registered protocols, weak search strategies, little or no assessment of risk of bias, and rare examination of publication bias. • Only a minority used standardized appraisal tools (e.g. Cochrane ROB); just one applied GRADE. • Strengths included some use of PICO criteria, discussion of heterogeneity, and reporting of conflicts of interest.	• Improve rigor by pre-registering protocols, using comprehensive searches, conducting duplicate study selection, and integrating risk of bias into analyses. Apply standardized appraisal frameworks (e.g. ROB, GRADE) consistently. • Routinely assess and report on publication bias, funding, and conflicts of interest.

2020, Sakaluk et al. 2023), use of appropriate statistical methods, and the examination of reporting or publication bias. Of course, some of these noted limitations with the included reviews result from poor primary study reporting, but it is not always clear that is the case. If review authors registered their review plan in advance and clearly reported which variables they would seek from primary studies (as well as which variables were sought but not identified), that would situate reporting quality issues with primary studies.

Regarding the substantive content of the reviews, as anticipated most syntheses were conducted on the largest and most available MHO—AA, while research on the newer non-12-step MHOs is limited. This gap is likely due to the lack of primary research examining other types of MHOs, which will hopefully increase in the coming years as other MHOs become more established. There were also only a few attempts to synthesize literature examining the mechanisms by which MHOs operate, an important next step in determining the key components of behavior change/maintenance (Hagger et al. 2020, Witkiewitz et al. 2022). There was variability in reporting primary study participant characteristics, such as demographics and severity. While this could stem from reporting comprehensiveness in underlying studies, missing information was not reported at the synthesis level, making it difficult to draw conclusions about to what extent MHOs reach diverse populations of recovering individuals.

Alcohol and other substance use outcomes were widely reported across syntheses, though the specific domains assessed varied widely. Focusing only on the meta-analyses to allow for quantitative analysis, AA was largely shown to improve alcohol use outcomes when participation was not coerced. This effect was seen in both the general population and among individuals with comorbid mental health and SUD. Yet, evidence for the impact of AA on physical and/or mental health, social connection, education and employment, and criminal justice involvement

were mixed or inconsistent. Summarizing the effects reported by multiple meta-analyses within a single outcome category (e.g. physical and/or mental health), is complicated by variation in the specific domains and measures used as well as when they were measured across time. And, although a reduction in use or abstinence is a key recovery outcome, recovery has in recent years been defined as encompassing an additional broad array of outcomes and including good health, citizenship, and empowerment (Ashford et al. 2019, Witkiewitz, 2020, Hagman et al. 2022, Zemore et al. 2023). This summary highlights a pervasive focus in the literature on alcohol and substance use behaviors as outcomes in MHO examinations. These findings reflect a need for evidence syntheses, and likely the underlying studies, to focus on a variety of holistic outcomes in addition to use behaviors.

Limitations

As a result of the variability in the way outcomes were reported in the systematic reviews, we did not code narrative findings from systematic reviews lacking meta-analysis. While this represents a pragmatic decision enabling clear synthesis, it limits our reporting of other potentially important findings from the descriptive systematic reviews.

Conclusions

In sum, there is consistent and convergent evidence of mixed methodological rigor to indicate that MHO clinical linkages and post-treatment participation, primarily 12-step based, could be cost-effective and helpful in improving alcohol and other drug (AOD) use behaviors and related outcomes, on average, when compared to other clinical interventions for SUD. In line with the broader field's approach to understanding and measuring broader functioning and well-being aspects of recovery beyond AOD use, other clinically meaningful outcomes need to be measured, documented, and synthesized. Additionally, despite the large number of participants identified in these reviews (over 100 000), they represent only a fraction of the population accessing this specific type of recovery support service. For example, estimates suggest that AA alone has nearly 2 million members (General Service Office 2021) and it remains unclear how generalizable the current documented estimates of participation and derived benefits may be to this broader population. Continued work to examine the experience of a wider group of individuals using AA and to synthesize these findings will be important to advance recovery science. Future reviews should more precisely examine who benefits, to what degree, in what ways, from which MHO, over what time period, and to address these questions among non-12-step MHOs which have been seldom studied and thus remain unable to be synthesized.

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Supplementary data

Supplementary data is available at *Alcohol and Alcoholism* online.

Conflicts of interest

The authors report no known conflicts of interest.

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Data availability

Additional supplementary materials are available online. The coding form and data extracted from included studies are available from the corresponding author upon request.

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