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The effectiveness of psychosocial interventions at reducing the frequency of alcohol and drug use in parents: findings of a Cochrane Review and meta-analyses

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Abstract

Background and aim: Parental substance use is a major public health and safeguarding concern. There have been a number of trials examining interventions targeting this risk factor. We aimed to estimate the effectiveness of psychosocial interventions at reducing parental substance use.

Design: We used systematic methods to identify trials; pooling data using a random-effects model. Moderator analyses examined influence of parent gender, presence of child in treatment and intervention type.

Setting: No restrictions on setting.

Participants: Substance using parents of children below the age of 21 years.

Interventions: Psychosocial interventions including those that targeted drug and alcohol use only, and drug and alcohol use in combination with associated issues.

Measurements: Frequency of alcohol use and frequency of drug use.

Findings: We included eight unique studies with a total of 703 participants. Psychosocial interventions were more effective at reducing the frequency of parental alcohol use than comparison conditions at 6-month [standardized mean difference (SMD) = -0.32, 95% confidence interval (CI) = -0.51 to -0.13, $P = 0.001$] and 12-month follow-up (SMD = -0.25, 95% CI = -0.47 to -0.03, $P = 0.02$) and frequency of parental drug use at 12 months only (SMD = -0.21, 95% CI = -0.41 to -0.01, $P = 0.04$). Integrated interventions which combined both parenting and substance use targeted components were effective at reducing the frequency of alcohol use (6 months: SMD = -0.56, 95% CI = -0.96 to -0.016, $P = 0.006$; 12 months: SMD = -0.42, 95% CI = -0.82 to -0.03, $P = 0.04$) and drug use (6 months: SMD = -0.39, 95% CI = -0.75 to -0.03, $P = 0.04$; 12 months: SMD = -0.43, 95% CI = -0.80 to -0.07, $P = 0.02$). Interventions targeting only substance use or parenting skills were not effective at reducing frequency of alcohol or drug use at either time-point.

Conclusion: Psychosocial interventions should target both parenting and substance use in an integrated intervention.

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KEYWORDS

alcohol, drugs, meta-analyses, parent, psychosocial intervention

INTRODUCTION

Parental substance use is a prevalent and substantial child protection concern world-wide [1, 2], which is associated with adverse childhood experiences and poor outcomes for children [3]. Research has shown that children of parents who use substances are more likely to sustain an unintentional injury [4–6], as well as injuries of greater severity, than children whose parents do not use substances [7]. These children are more likely to experience childhood mental health problems [8, 9], with both mothers' and fathers' substance use being significantly associated with childhood externalizing disorders such as conduct disorder and oppositional defiant disorder [10, 11] and internalizing disorders such as depression and anxiety disorder [12]. The children themselves are significantly more likely to engage with early-onset substance use [13, 14], harmful substance use [8] and street-involvement (defined as homelessness or those young people who experience physical, psychological or social risks of street-culture) [15] than children whose parents do not use substances. Furthermore, parental substance use is significantly associated with the development of mental disorders and substance use disorders when children enter adulthood [16, 17].

Research estimates that between 5 and 30% of children in European countries live with at least one parent who uses substances [18]. In England it is estimated that 162 000 children live with a dependent opiate user [19] and between 189 119 and 207 617 live with an alcohol-dependent parent [20]. Twelve per cent of children in the United States [21] and 14% of children in Australia have at least one parent who uses illicit drugs [22]. Due to the potentially negative impact on the child, parental substance use is often identified as a risk factor in child welfare and child protection assessments. In England, 21% of all 'child-in-need' assessments identify drug use and 18% identify alcohol use as a concern [23]. Furthermore, 52% of child protection cases in England have parental substance use identified as a risk factor [24] and up to two-thirds of all cases in the United States [25]. Children whose mothers used both alcohol and drugs have been found to be nine times more likely to be placed in care than children of parents who did not use substances [26], with great social and economic cost [27]. There have been a number of trials of interventions for parents who use substances that sought to address this risk factor, reduce the need for protective services and to promote family re-unification. However, at present there is no agreed way to intervene. As such, there is a need to review the literature systematically, in order to identify effective psychosocial interventions to reduce parental substance use.

We undertook a review and meta-analysis of published and unpublished studies. Our primary objective was to estimate the effectiveness of psychosocial interventions at reducing the substance use (alcohol and/or illicit drugs excluding tobacco) of parents with children of dependent age (from birth to 21 years). Our secondary objectives were to test whether interventions can increase drug and/or alcohol treatment engagement, retention and completion and affect the

welfare of the child and analyse risk of bias, study quality and publication bias. This paper reports on the primary meta-analysis of the review, providing clear communication of findings with the greatest importance to the field.

METHODS

The following electronic databases were searched from inception until July 2020, using free text keywords and thesaurus headings: MEDLINE (Ovid); Embase (Ovid); PsycINFO (Ovid); Applied Social Science (ASSIA); Sociological Abstracts; Social Science Citation Index (SSCI); Scopus; the Cochrane Drugs and Alcohol Group Specialised Register via the Cochrane Register of Studies (CRS-Web); the Cochrane Central Register of Controlled Trials (CENTRAL) in the Cochrane Library; and CINAHL—Cumulative Index to Nursing and Allied Health Literature. This was supplemented by searching for grey literature on key websites, hand-searching reference lists of relevant studies as well as contacting authors who publish in the field to identify ongoing trials and unpublished work. The full search strategy is reported in the Cochrane Review [28].

Two reviewers independently screened all titles and abstracts using specified inclusion and exclusion criteria, retrieving full papers for all potentially eligible studies and evaluating in full text. No language or date restrictions were applied. Relevant data were extracted independently by two reviewers, including study design, sample characteristics, intervention details, outcome measures and intervention effects. Discrepancies at each stage were resolved by discussion or by consulting a third researcher if consensus could not be reached.

Eligibility

We included randomized controlled trials (RCTs) and trials which have a quasi-randomized design of psychosocial interventions, with a minimum follow-up period of 6 months from the start of the intervention. Participants were parents who use substances (alcohol and/or illicit drugs). This included mothers and fathers of children under the age of 21 years, regardless of custodial or residency status of the children. Studies intervening with all levels of risky alcohol and/or drug use were eligible for inclusion. We included studies which identified risky by a reliable, valid, formal assessment (validated screening tool, assessment by a health or child welfare practitioner) or diagnostic tool [Diagnostic and Statistical Manual of Mental Disorders (DSM)-III, DSM-III-R, DSM-IV, International Classification of Diseases (ICD)-8, ICD-9, ICD-10] or both. The administration of agonist or detoxifying prescriptions was considered as a proxy measure of substance use in participants and therefore trials that include people taking them were eligible for inclusion. A variety of control or comparison groups were

eligible for inclusion: no intervention, waiting-list/delayed treatment control arms, attention control, alternative active intervention and treatment as usual.

Risk of bias

We assessed the risk of bias of included studies using the Cochrane risk of bias tool [26]. This two-part, domain-based tool addresses seven domains: random sequence generation and allocation concealment (selection bias); blinding of participants and providers (performance bias); blinding of outcome assessor (detection bias); incomplete outcome data (attrition bias); selective outcome reporting (reporting bias); and other sources of bias. The first part of the tool involves describing what was reported to have happened in the study. The second part of the tool involves assigning a judgement relating to the risk of bias for that entry, in terms of low, high or unclear risk. To make these judgements we used the criteria indicated by the *Cochrane Handbook for Systematic Reviews of Interventions* adapted to the addiction field [29]. We addressed the domains of sequence generation and allocation concealment (avoidance of selection bias) in the tool by a single entry for each study. We considered incomplete outcome data (avoidance of attrition bias) for all outcomes.

Appraising study quality

We assessed the overall quality of the evidence for the primary outcome using the Grades of Recommendation Assessment, Development and Evaluation (GRADE) system. The GRADE Working Group developed a system for grading the quality of evidence which takes into account issues not only related to internal validity, but also to external validity, such as directness of results [30]. The GRADE system assigns four levels of evidence that should be interpreted as follows:

- High: we are very confident that the true effect lies close to that of the estimate of the effect
- Moderate: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
- Low: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect
- Very low: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

Data from RCTs start at the high level of evidence and are then lowered by one or two levels depending on seriousness, for the following reasons:

- study limitation for risk of bias
- Inconsistency between study results
- Uncertainty about directness

- Imprecision of the pooled estimate
- Strong suspicion of publication bias.

Measure of treatment effect and synthesis of results

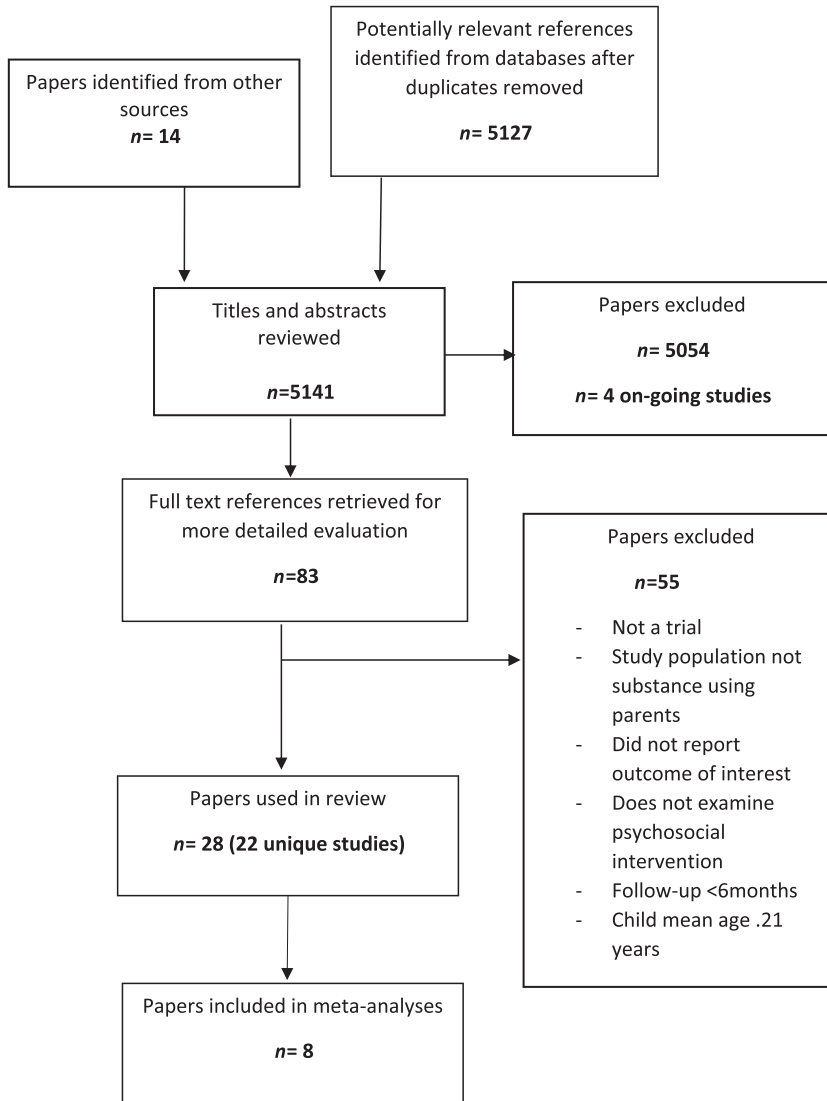
We pooled the data for our primary outcome using a random-effects model to allow for heterogeneity between and within studies. Frequency of alcohol and/or drug use was identified a priori as the primary outcome due to its international relevance. We meta-analysed the intervention effects separately for alcohol and drugs and completed subgroup analysis on intervention type, parent gender and involvement of the child in intervention using Review Manager version 5. We analysed continuous outcomes by calculating standardized mean differences (SMD) with 95% confidence intervals (CI). SMD values of at least 0.2, 0.5 and 0.8 are indicative of small, medium and large effect sizes, respectively [31]. If two interventions were compared against a control group, data from both intervention arms were included in the main comparison and the number of participants in the control group was halved for each comparison in accordance with Cochrane recommendations [29]. We used data from intention-to-treat analyses and contacted authors to try to obtain missing data. We assessed the magnitude of heterogeneity using the I^2 statistic and the statistical significance of the heterogeneity using P -values derived from χ^2 tests [31].

RESULTS

After excluding duplicates, we identified 5141 potentially relevant records. Of these, we excluded 5054 on the basis of the title and abstract and a further 59 after full paper review. Twenty-two studies reported in 28 papers met our inclusion criteria, eight of which were included in our meta-analysis. All included studies were parallel individually randomized controlled trials (see Fig. 1 study flow diagram). The eight unique studies included in the meta-analysis included a total of 703 adult participants.

Description of studies

A summary of included studies are detailed in Tables 1 and 2. All the included studies were conducted in the United States [32–39]. More than half ($n = 5$) the studies intervened with mothers only [33–39]; two studies intervened with fathers only [35, 36] and a further study intervened with parents regardless of gender [32], although the majority of the parents within these studies were mothers. There were broadly three types of intervention examined within the included studies; interventions which targeted parenting only [32–34, 39]; interventions which targeted the drug and alcohol use only [35, 38]; and those which target parenting and drug and alcohol use within an integrated intervention [35–38]. Full details of the interventions are reported in the Cochrane Review [32]. All studies examined interventions that were delivered within a community setting. Comparison



conditions were varied. More than half the studies ($n = 5$) compared the experimental intervention to usual treatment or care [32–34, 37, 38]. Other studies examined the experimental intervention against attention control [39] or an alternative intervention of parenting education [35] and individual behavioural therapy [36]. Sample sizes ranged from 30 [36] to 183 [38], with participants recruited from drug and alcohol treatment settings [32, 35, 36, 39] and child welfare settings, [33, 34, 37] and a further study recruiting from a homeless shelter [38]. The mean age of the participants was 32.2 years; average percentages of ethnicity across studies showed higher proportions of white (non-Hispanic)/Caucasian (46.6%) than the next largest ethnicity group (African American/black; 37%).

Risk of bias

The main risk of bias within the included studies was performance (subjective) bias. This was due mainly to inability to blind participants and providers to interventions which are interaction-based. While

unclear reporting was common, very few trials were at high risk of bias on domains other than performance. Full details of the assessed risk of bias are reported in the Cochrane Review [28].

Effectiveness of psychosocial interventions

We conducted separate random-effects meta-analyses of studies which examined the frequency of alcohol use and the frequency of drug use (see Table 3). Pooling of studies showed that psychosocial intervention reduced the frequency of which parents consumed alcohol with a small effect more than the comparison interventions at 6 months, with effects maintained at 12 months. There was low heterogeneity at both time-points (6 months: $I^2 = 0\%$; $P = 0.66$; 12 months: $I^2 = 0\%$; $P = 0.53$). The frequency of drug use did not reduce more than the control interventions at 6 months; however, a significantly higher level of reduction was found at 12 months. Again, heterogeneity was low at both time-points (6 months: $I^2 = 0\%$; $P = 0.58$; 12 months: $I^2 = 12\%$; $P = 0.34$).

TABLE 1 Summary of included studies: frequency of alcohol use

Trial	Participants	Intervention	Comparison	Standard mean difference
Drug- and alcohol-focused interventions				
Kelley (2002) Setting: substance use treatment	135 fathers 65% Caucasian; mean age 37.1 years; mean age 10.4 years	Intervention 1: individual cognitive behavioural therapy (IBT) (32 sessions CBT for substance use)	Couples-based psycho-educational attention control (lectures on substance use)	-0.04 [-0.74, 0.67] (6 m) -0.09 [-0.80, 0.61] (12 m)
Slesnick (2013) Setting: homeless family shelter	60 mothers 75% African American; mean age 26.3 years; mean age of children 3.68 years	Community reinforcement approach (CRA) (integrates independent housing, 26 case management sessions and 20 CRA)	Emergency shelter for up to 3 weeks and linkage to housing and support services in the community	-0.57 [-1.11, -0.03] (6 m)
Parenting-focused interventions				
Dakof (2010) Recruitment setting: family drug court	62 mothers, 42% black; mean age 30.2 years; at least 1 child removed (potential reunification)	Engaging Moms Program (EMP): multi-dimensional family therapy (attachment; family and romantic relationships; parenting skills; and emotional regulation, problem solving and communication skills)	TAU (standard family drug court case management service)	0.01 [-0.53, 0.55] (6 m) 0.19 [-0.32, 0.71] (12 m)
Donohue (2014) Setting: child protection services	72 mothers, 47% Caucasian; mean age 29.04 years, mean age of child 3.92 years	Family behaviour therapy (FBT) (20 sessions; home safety, child stimulation; parenting skills; financial management; HIV and STD prevention)	TAU (variety of community-based services identified by child protection services)	-0.17 [-0.70, 0.37] (6 m)
Slesnick (2016) Setting: substance use treatment	183 mothers, 53.6% were white non-Hispanic; mean age 33.9 years; child mean age 11.54 years	Ecologically based family therapy (EBFT) (12 sessions targeting family dysfunctional interactions)	Women's health education (WHE) (attention control) (sexual behaviour and health; pregnancy and childbirth)	-0.31 [-0.64, 0.02] (6 m) -0.35 [-0.68, -0.01] (12 m)
Integrated parenting substance use interventions				
Kelley (2002) Setting: substance use treatment	135 fathers, 65% Caucasian; mean age 37.1 years; child mean age 10.4 years	Intervention 2: Behavioural couples therapy (BCT) (12 sessions BCT targeting communication and interactional skills; 20 sessions IBT for substance use)	Couples-based psycho-educational attention control (lectures on substance use)	-0.37 [-1.07, 0.32] (6 m) -0.46 [-1.15, 0.24] (12 m)
Lam (2009) Setting: substance use treatment	30 fathers, 63% white; mean age 34.1 years; child mean age 8.9 years	Intervention 1: behaviour couples therapy (BCT) (12 sessions BCT targeting communication and problem-solving skills; 12 sessions individual CBT for substance use)	Individual-based therapy (IBT) (24 sessions of standard individual CBT for substance use)	-0.68 [-1.37, 0.01] (6 m) -0.38 [-1.05, 0.30] (12 m)
Lam (2009) Setting: substance use treatment	30 fathers, 63% white; mean age 34.1 years; child mean age 8.9 years	Intervention 2: parent skills and BCT (PSBCT) (6 BCT sessions; 6 parent-skills training sessions; 12 individual-based CBT for substance use)	Individual-based therapy (IBT) (24 sessions CBT for substance use)	-0.61 [-1.30, 0.07] (6 m) -0.43 [-1.11, 0.25] (12 m)

Abbreviations: CBT = cognitive behavioural therapy; STD = sexually transmitted diseases; TAU = treatment as usual.

TABLE 2 Summary of included studies: frequency of drug use

Trial	Participants	Intervention	Comparison	Standard mean difference
Drug- and alcohol-focused interventions				
Kelley (2002) Setting: substance use treatment	135 fathers 65% Caucasian; mean age 37.1 years; child mean age 10.4 years	Intervention 1: individual cognitive behavioural therapy (IBT) (32 sessions CBT for substance use)	Couples-based psycho-educational attention control (lectures on substance use)	-0.08 [-0.81, 0.65] (6 m) -0.08 [-0.81, 0.65] (12 m)
Slesnick (2013) Setting: homeless family shelter	60 mothers 75% African American; mean age 26.3 years; mean age of children 3.68 years	Community reinforcement approach (CRA) (integrates independent housing, 26 case management sessions and 20 CRA)	Emergency shelter for women and children for up to 3 weeks and linkage to housing and support services in the community	0.05 [-0.48, 0.59] (6 m)
Parenting-focused interventions				
Catalano (1999)	144 parents, 75% female; 77% white; mean age 35.6 years; mean age of children 10.4 years	Focus on families (33 sessions of parent skills training with home-based case management services; methadone)	Standard methadone treatment	0.10 [-0.24, 0.44] (6 m) -0.47 [-0.82, -0.12] (12 m)
Dakof (2010) Recruitment setting: family drug court	62 mothers 42% black; mean age 30.2 years; at least 1 child removed (potential reunification)	Engaging Moms Program (EMP): multi-dimensional family therapy (attachment; family and romantic relationships; parenting skills; and emotional regulation, problem solving, and communication skills)	TAU (standard family drug court case management service)	0.0 [-0.55, 0.55] (6 m) 0.00 [-0.51, 0.51] (12 m)
Donohue (2014) Recruitment setting: child protection services	72 mothers, 47% Caucasian; mean age 29.04 years, mean age of child 3.92 years	Family behaviour therapy (FBT) (20 sessions; home safety; child stimulation; parenting skills; financial management; HIV and STD prevention)	TAU (variety of community-based services identified by child protection services)	-0.18 [-0.71, 0.36] (6 m)
Slesnick (2016) Setting: substance use treatment	183 mothers 53.6% were white non-Hispanic; mean age 33.9 years; child mean age 11.54 years	Ecologically based family therapy (EBFT) (12 sessions targeting family dysfunctional interactions)	Women's health education (WHE) (attention control) (sexual behaviour and health; pregnancy and childbirth)	0.23 [-0.10, 0.56] (6 m) 0.11 [-0.22, 0.44] (12 m)
Integrated parenting substance use interventions				
Kelley (2002) Setting: substance use treatment	135 fathers 65% Caucasian; mean age 37.1 years; child mean age 10.4 years	Intervention 2: behavioural couples therapy (BCT) (12 sessions BCT targeting communication and interactional skills; 20 sessions IBT for substance use)	Couples-based psycho-educational attention control (lectures on substance use)	-0.60 [-1.34, 0.14] (6 m) -0.44 [-1.18, 0.29] (12 m)
Lam (2009) Setting: substance use treatment	30 fathers 63% white; mean age 34.1 years; child mean age 8.9 years	Intervention 1: behaviour couples therapy (BCT) (12 sessions BCT targeting communication and problem-solving skills; 12 sessions individual CBT for substance use)	Individual-based therapy (IBT) (24 sessions CBT for substance use)	-0.32 [-0.99, 0.36] (6 m) -0.38 [-1.05, 0.30] (12 m)

(Continues)

TABLE 2 (Continued)

Trial	Participants	Intervention	Comparison	Standard mean difference
Lam (2009) Setting: substance use treatment	30 fathers, 63% white; mean age 34.1 years; child mean age 8.9 years	Intervention 2: parent skills and BCT (PSBCT) (6 BCT sessions; 6 parent-skills training sessions; 12 individual-based CBT for substance use)	Individual-based therapy (IBT) (24 sessions CBT for substance use)	-0.27 [-0.94, 0.41] (6 m) -0.43 [-1.11, 0.25] (12 m)
Salanda (2015) Setting: child protection services	31 mothers, 87% Caucasian; mean age 30.48 years; mean 1.77 children	Families actively improving relationships (FAIR) (parenting skills and substance use focused programme with low value incentives for progress)	TAU (variety of community-based services identified by child protection services)	-0.42 [-1.28, 0.44] (6 m) -0.51 [-1.37, 0.36] (12 m)

Abbreviations: CBT = cognitive behavioural therapy; CI = confidence interval; SMD = standardized mean difference; TAU = treatment as usual.

Impact of intervention type

We examined the effect of the intervention upon frequency of alcohol and drug use by type of psychosocial intervention, analysing separately those interventions which sought to target the substance use behaviour: those that targeted parenting behaviour and those that integrated parenting and drug and alcohol interventions. Results showed that parenting interventions with an integrated substance use component were associated with reduced frequency of parental alcohol use with a medium effect at 6 months and a small effect at 12 months. Integrated parenting and substance use interventions were similarly found to reduce the frequency of drug use with a small effect at 6 and 12 months. Neither psychosocial interventions which targeted the individual parent's substance use only nor those targeting parenting skill and family relationships only were found to reduce the frequency of alcohol or frequency of drug use at either time-point. Interventions which involved children in one or more sessions did not reduce the frequency of parental alcohol use or drug use at 6 or 12 months. Only those interventions which did not directly involve the child in sessions were found to reduce frequency of parental alcohol use, with a small effect at 6 months and the frequency of both parental alcohol use and drug use with a small effect at 12 months.

Impact of family member role

We investigated intervention effect by the parental role of the targeted intervention recipient. Results showed that at 6-month follow-up both interventions which target mothers and those which target fathers were associated with a reduction in the frequency of parental alcohol use with a small effect size. At 12-month follow-up effects for mothers were lost, but were maintained for fathers. Frequency of drug use reduced, with a small effect size in fathers at 6- and 12-month follow-up. Neither time-point showed reductions for mothers.

Quality of evidence

According to GRADE criteria, the evidence for the treatment effect for all psychosocial interventions was of moderate quality. The quality of the evidence was low for drug- and alcohol-only interventions, parenting-only interventions and integrated interventions and low to very low for parent gender and involvement of child in the intervention.

DISCUSSION

We found moderate-quality evidence that psychosocial interventions which have been tailored for a parent population may be superior to treatment as usual or other comparison conditions at reducing the frequency of parental alcohol use and longer-term drug use. Similar to previous reviews of effective interventions for substance-using

TABLE 3 Results of meta-analyses

Analysis	Result	Studies and participants
1.1 Frequency of alcohol use: all psychosocial interventions (6 months)	SMD -0.32, 95% CI -0.51 to -0.13, $P = 0.0010$	6 studies; 377 participants
1.2 Frequency of alcohol use: all psychosocial interventions (12 months)	SMD -0.25, 95% CI -0.47 to -0.03, $P = 0.02$	4 studies; 366 participants
2.1.1 Frequency of alcohol use: substance-focused interventions (6 months)	SMD -0.35, 95% CI -0.867 to 0.16, $P = 0.18$	2 studies; 89 participants
2.1.2 Frequency of alcohol use: substance-focused interventions (12 months)	SMD -0.09, 95% CI -0.80 to 0.61, $P = 0.18$	1 study; 36 participants
2.2.1 Frequency of alcohol use: parenting-focused interventions (6 months)	SMD -0.21, 95% CI -0.46 to 0.04, $P = 0.10$	3 studies; 273 participants
2.2.2 Frequency of alcohol use: parenting-focused interventions (12 months)	SMD -0.11, 95% CI -0.64 to 0.41, $P = 0.67$	2 studies; 219 participants
2.3.1 Frequency of alcohol use: integrated interventions (6 months)	SMD -0.39, 95% CI -0.75 to -0.03, $P = 0.04$	2 studies; 131 participants
2.3.2 Frequency of alcohol use: integrated interventions (12 months)	SMD -0.43, 95% CI -0.80 to -0.07, $P = 0.02$	2 studies; 131 participants
3.1.1 Frequency of alcohol use: child present in sessions (6 months)	SMD -0.21, 95% CI -0.46 to 0.04, $P = 0.10$	3 studies; 273 participants
3.1.2 Frequency of alcohol use: child present in sessions (12 months)	SMD -0.11, 95% CI -0.64 to 0.41, $P = 0.67$	2 studies; 219 participants
3.2.1 Frequency of alcohol use: child not present in sessions (6 months)	SMD -0.47, 95% CI -0.76 to -0.18, $P = 0.002$	3 studies; 202 participants
3.2.2 Frequency of alcohol use: child not present in sessions (12 months)	SMD -0.34, 95% CI -0.69 to 0.00, $P = 0.05$	2 studies; 147 participants
4.1.1 Frequency of alcohol use: mother (6 months)	SMD -0.27, 95% CI -0.50 to -0.04, $P = 0.02$	4 studies; 328 participants
4.1.2 Frequency of alcohol use: mother (12 months)	SMD -0.11, 95% CI -0.64 to 0.41, $P = 0.67$	2 studies; 219 participants
4.2.1 Frequency of alcohol use: father (6 months)	SMD -0.43, 95% CI -0.78 to -0.09, $P = 0.01$	2 studies; 147 participants
4.2.2 Frequency of alcohol use: father (12 months)	SMD -0.34, 95% CI -0.69 to 0.00, $P = 0.05$	2 studies; 147 participants
5.1 Frequency of drug use: all psychosocial interventions (6 months)	SMD -0.02, 95% CI -0.18 to 0.15, $P = 0.85$	8 studies; 625 participants
5.2 Frequency of drug use: all psychosocial interventions (12 months)	SMD -0.21, 95% CI -0.41 to -0.01, $P = 0.04$	6 studies; 514 participants
6.1.1 Frequency of drug use: substance-focused interventions (6 months)	SMD 0.01, 95% CI -0.42 to 0.44, $P = 0.97$	2 studies; 87 participants
6.1.2 Frequency of drug use: substance-focused interventions (12 months)	SMD -0.08, 95% CI -0.81 to 0.65, $P = 0.83$	1 study; 32 participants
6.2.1 Frequency of drug use: parenting-focused interventions (6 months)	SMD 0.10, 95% CI -0.11 to 0.30, $P = 0.36$	4 studies; 407 participants
6.2.2 Frequency of drug use: parenting-focused interventions (12 months)	SMD -0.13, 95% CI -0.52 to 0.26, $P = 0.52$	3 studies; 351 participants
6.3.1 Frequency of drug use: integrated interventions (6 months)	SMD -0.39, 95% CI -0.75 to -0.03, $P = 0.04$	3 studies; 131 participants
6.3.2 Frequency of drug use: integrated interventions (12 months)	SMD -0.43, 95% CI -0.80 to -0.07, $P = 0.02$	2 studies; 131 participants
7.1.1 Frequency of drug use: child present in sessions (6 months)	SMD 0.07, 95% CI -0.13 to 0.26, $P = 0.50$	5 studies; 269 participants

(Continues)

TABLE 3 (Continued)

Analysis	Result	Studies and participants
7.1.2 Frequency of drug use: child present in sessions (12 months)	SMD -0.17, 95% CI -0.51 to 0.17, $P = 0.32$	4 studies; 373 participants
7.2.1 Frequency of drug use: child not present in sessions (6 months)	SMD -0.20, 95% CI -0.49 to 0.09, $P = 0.18$	3 studies; 196 participants
7.2.2 Frequency of drug use: child not present in sessions (12 months)	SMD -0.34, 95% CI -0.69 to 0.01, $P = 0.06$	2 studies; 141 participants
8.1.1 Frequency of drug use: mother (6 months)	SMD 0.07, 95% CI -0.12 to 0.25, $P = 0.48$	6 studies; 484 participants
8.1.1 Frequency of drug use: mother (12 months)	SMD -0.17, 95% CI -0.51 to 0.17, $P = 0.32$	
8.2.1 Frequency of drug use: father (6 months)	SMD -0.31, 95% CI -0.66 to 0.04, $P = 0.08$	2 studies; 141 participants
8.2.2 Frequency of drug use: father (12 months)	SMD -0.34, 95% CI -0.69 to 0.01, $P = 0.06$	2 studies; 141 participants

Abbreviation: SMD = standardized mean difference.

mothers [40–42], our review found that those interventions which integrated parenting skill and family functioning content with an adjunctive substance use component were effective at reducing the frequency of parental alcohol and drug use, whereas interventions that targeted drug and alcohol use or parenting alone were not. However, the quality of evidence is low to very low. Parenting may act as a stressor for substance use [43], as well as providing a motivation to reduce or abstain from substance use [44]. Addressing parenting explicitly within the context of alcohol and drug use may offer a mechanism for change. As such, our findings give support to the view that strategies that target the family may benefit recovery [45]. However, the family can both augment and nullify the influence of the intervention [46]. A further finding of our meta-analyses is that parents may be better able to reduce the frequency of their alcohol and drug use if the intervention they receive does not directly involve their children. These findings present a challenge to a previous narrative review which concluded that the involvement of children in women-centred substance misuse treatment may be beneficial [47]. It should be noted, however, that this narrative review examined the wider benefit of children residing with their mothers within residential treatment programmes (and not necessarily being involved in the therapeutic sessions provided to the mother). Conversely, all studies included in our meta-analysis examined community interventions where the child was directly involved in one or more of the therapeutic sessions. Given how stigmatized parental substance use is, the presence of the child in the sessions may have inhibited the engagement of the parents in the intervention, due either to the desire to shield the child from the realities of their use or to deflect the judgement placed upon the parent. Furthermore, there was not enough detail in the studies to control for the age of the children when attending these sessions; this variability may influence the effectiveness (and appropriateness) of having the child present.

Fathers' substance use, in particular, seemed to benefit from psychosocial intervention while only short-term reductions in the

frequency of alcohol use were found in mothers, although this finding is based on low-quality evidence. Within a society wherein mothers are typically viewed as the primary care-giver, this finding might seem at odds with a theory of change based upon parenting and the family as conducive of behaviour change. It is possible that a measure of effectiveness based upon frequency of alcohol and/or drug use may fail to detect important reductions in levels of use, particularly in women who have been found to use more frequently but in lower risk patterns [48]. Additionally, it should be noted that the intervention the mothers typically received focused upon their parenting skills, and did not include an integrated substance use component. The two studies examining intervention with fathers contributed four intervention groups to our analysis. All interventions included content which focused upon the individual substance use needs of the father and two of the intervention groups also included integrated content focused upon parenting and family issues. The interventions provided to fathers were also more intensive, with a mean of 28 sessions compared to a mean of 18 sessions provided to mothers.

Recovery capital [49, 50], while philosophically associated with natural recovery [49, 51], provides a useful theoretical framework through which to view the results of our review. Recovery capital is the sum of the internal and external resources that are available for a substance user to draw upon within their efforts to initiate and sustain recovery. It broadly consists of three components: personal recovery capital, which includes physical capital (health, finance, values and attributes); family and social recovery (relationships and connections to conventional institutions); and community recovery capital (treatment and other organized support). Individuals with greater recovery capital have greater capacity to achieve change. Conversely, individuals may accrue negative recovery capital [52]: characteristics or events which lessen the individual's ability to recover. Previous research has found that drug users typically experience a greater number of negative events than alcohol users [53, 54]. While the studies in our review did not provide sufficient information to

reliably assess this, in the absence of clear difference between the intervention type or intensity between these two groups of parents, this may provide some explanation as to why our review found that the frequency of alcohol use reduced more than the frequency of drug use in almost all our analyses. When considering the evidence of effectiveness by parent gender, the fathers participating in the studies included in our review often possessed components of recovery capital. They were more often employed and, as an eligibility criterion for these studies, all were in a relationship with a female who did not use substances, and as such benefited from a supportive and structured social context [55] and retained their children in their care. These partners received couples' therapy alongside the substance-using male partner; an intervention that has been found to be effective at reducing substance use in general adult populations not specific to parents [56]. Conversely, the mothers often possessed little recovery capital; they were typically single or in a relationship with a male drug user [38, 39] and they had low levels of education, employment and income [33, 35, 37–39]. Moreover, the mothers within our review had often accrued negative recovery capital [52], such as previous periods of incarceration [28]; were currently homeless [38]; had mental health problems [32]; or had experienced trauma such as childhood physical or sexual abuse [33, 39]. A number of studies and reviews have highlighted the challenges of intervening with female substance users, who have been found to have different needs to their male counterparts, including elevated histories of childhood trauma and abuse, physical and mental health difficulties and socio-economic problems [47, 57–59]. Parents who use substances are highly stigmatized [60], with these stigmatized views being experienced most acutely by mothers, for whom substance use is framed to be incompatible with an identity as a 'good mother' [61, 62]. This stigma compounds the negative recovery capital possessed by female substance users, who experience more guilt and shame than their male counterparts, as such presenting a greater barrier to change [48]. Many of the female participants of the studies had been recruited following their involvement in child protection services wherein their ability to provide adequate care for their children was being questioned [33, 34, 37]. Moreover, many of the mothers had previously lost custody of one or more children [33, 37, 39], increasing their vulnerability and likelihood of re-occurring care proceedings [63]. The combined effect was that the mothers who used substances in the studies included in our review did not have equal capacity (recovery capital) and resource (intervention content and intensity) to reduce their substance use.

Limitations

The majority of the participants within the studies were mothers, with only two studies included in our primary meta-analysis targeting fathers. The baseline characteristics reported within these studies did not include evidence of additional vulnerability over and above the participant's substance use. Moreover, male participants were excluded if they were in a relationship with a female partner who met

the diagnostic criteria for a substance use disorder or if they or their partner had a mental health disorder. As such, the findings of this review may not be applicable to fathers who experience other psychological or social risks. While the findings of this review suggest that mothers did not reduce the frequency of their drug use, or sustain short-term reductions from alcohol use, the mothers included in the trials were often vulnerable and impacted by multiple other risk factors. Mothers who do not have additional vulnerability, or those with supportive relationships with a partner who does not use substances, may benefit from an intervention. Despite the eligibility of all levels of risky alcohol and/or drug use by parents, all the studies included in our review examined the effectiveness of interventions delivered to parents using substances at dependent levels. Given the extensive harms to both the parent and child from substance use below the diagnostic thresholds [1], this is an important area for future research. All the included studies were conducted in the United States, where important family law, health-care and cultural differences exist.

The quality of the evidence in the review ranged from moderate to very low. Almost all the studies included in this review were at high risk of performance bias, and half were at high risk of detection bias. Small sample sizes often resulted in a reduced certainty of outcome throughout the body of evidence. We intended to analyse a funnel plot to investigate publication bias; however, as there were fewer than 10 trials in our primary meta-analysis, the minimum number of trials required to enable a funnel plot was not met [64, 65].

CONCLUSION

It is not enough to provide substance-using parents with an intervention which targets their drug and alcohol use. Psychosocial interventions which integrate both parenting interventions with interventions which target drug and alcohol use may be necessary to reduce substance use in this population. However, mothers who use substances may need more intensive intervention, possibly with a trauma focus, to overcome their multiple vulnerabilities and lower levels of recovery capital. While involving other family members in the intervention may be helpful in bringing about change in the parent's substance use, there is suggestion that the child should not be present during the intervention sessions.

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DECLARATION OF INTERESTS

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AUTHOR CONTRIBUTIONS

Ruth McGovern: Conceptualization; data curation; formal analysis; funding acquisition; methodology; project administration.

James Newham: Formal analysis. **Michelle Addison:** Data curation.

Matt Hickman: Conceptualization; methodology. **Eileen Kaner:** Conceptualization; methodology; supervision.

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