

# Motivational intervention to enhance post-detoxification 12-Step group affiliation: a randomized controlled trial

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## ABSTRACT

**Aims** To compare a motivational intervention (MI) focused on increasing involvement in 12-Step groups (TSGs; e.g. Alcoholics Anonymous) versus brief advice (BA) to attend TSGs. **Design** Patients were assigned randomly to either the MI or BA condition, and followed-up at 6 months after discharge. **Setting and participants** One hundred and forty substance use disorder (SUD) patients undergoing in-patient detoxification (detox) in Norway. **Measurements** The primary outcome was TSG affiliation measured with the Alcoholics Anonymous Affiliation Scale (AAAS), which combines meeting attendance and TSG involvement. Substance use and problem severity were also measured. **Findings** At 6 months after treatment, compared with the BA group, the MI group had higher TSG affiliation [0.91 point higher AAAS score; 95% confidence interval (CI) = 0.04 to 1.78;  $P = 0.041$ ]. The MI group reported 3.5 fewer days of alcohol use (2.1 versus 5.6 days; 95% CI =  $-6.5$  to  $-0.6$ ;  $P = 0.020$ ) and 4.0 fewer days of drug use (3.8 versus 7.8 days; 95% CI =  $-7.5$  to  $-0.4$ ;  $P = 0.028$ ); however, abstinence rates and severity scores did not differ between conditions. Analyses controlling for duration of in-patient treatment did not alter the results. **Conclusions** A motivational intervention in an in-patient detox ward was more successful than brief advice in terms of patient engagement in 12-Step groups and reduced substance use at 6 months after discharge. There is a potential benefit of adding a maintenance-focused element to standard detox.

**Keywords** Alcoholics Anonymous, detoxification, Norway, patient education, randomized controlled trial, self-help groups, Twelve-Step facilitation.

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## INTRODUCTION

To maintain sobriety after treatment, it is important for substance use disorder (SUD) patients to receive abstinence-specific support [1,2]. As the availability of formal services may be limited, 12-Step groups (TSGs)—such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA)—represent important community-based recovery resources [3]. The large multi-site Matching Alcoholism Treatments to Client Heterogeneity (MATCH) study examined the 12-Step facilitation approach (TSF) as a means to acquaint alcohol use disorder patients with TSGs and to foster patient commitment to post-treatment participation in these groups [4]. Compared to the other two tested conditions [cognitive

behavior therapy (CBT) and motivational enhancement therapy (MET)], TSF was significantly more effective at increasing TSG involvement and promoting abstinence [5]; for example, patients in the TSF condition had an approximately 10% higher abstinence rate at the 3-year follow-up [4]. Such findings have led to consideration of TSG affiliation as a proximal treatment outcome that is expected to relate to better long-term outcomes [6].

TSF-related interventions are more common in treatment systems highly influenced by 12-Step philosophy, such as those in the United States [7]. However, even these systems find it challenging to disseminate the manual-based TSF intervention to the clinical community [8], leading to the development and dissemination of shorter TSF interventions [9,10].

A recent systematic review reported that studies after Project MATCH have not been entirely consistent, and a formal meta-analysis was not possible due to the heterogeneity of TSF studies [11]. For example, one study found that AA attendance was nearly doubled (from four to eight monthly meetings) by standard treatment (ST), emphasizing the importance of AA attendance, whereas attendance was unchanged among patients in a minimal treatment condition; the ST group also had a significantly higher abstinence rate at follow-up (36 versus 19%) [12]. In contrast, another study reported that addition of intensive AA referral techniques to alcohol behavioral couples therapy significantly increased TSG attendance compared to control groups (78 versus 40–45%), but did not improve outcomes [13].

Few controlled trials have examined TSF-like interventions in detoxification (detox) units [14–16]. Detox comprises medical management of withdrawal, problem assessment and increasing motivation for further treatment, and can function as the initial phase of SUD treatment. However, for many patients, detox lacks formalized follow-up treatment [17]; thus, engaging patients in voluntary TSGs could be especially valuable after detox. Previous detox studies show mixed findings regarding TSE. Two US-based studies found that a condition designed to enhance TSG participation did not significantly improve the subsequent TSG attendance of detox in-patients [14,16]. A recent British study found that, compared to no referral, active TSG referral significantly increased attendance of 12-Step meetings at 3 months after in-patient detox but did not change abstinence rates [15].

The present randomized trial compared a TSF-inspired motivational intervention (MI) aimed at increasing TSG attendance with brief advice (BA) to attend TSGs. TSF approaches are generally uncommon in Norway [17]. Thus, this study allows assessment of the generalizability of US-based findings to other countries that are not deeply invested in the 12-Step treatment model. We hypothesized that, compared to the BA condition, the MI condition would result in greater TSG affiliation. Based on TSF results in previous research [9], we also expected that the MI would be more effective at increasing TSG affiliation for those with less prior TSG experience. Our secondary outcome hypothesis was that the MI condition would result in better substance use outcomes at a 6-month follow-up.

## METHODS

### Study setting

The Norwegian specialized addiction treatment system is predominantly publicly financed, and in-patient services are provided to patients free of charge. Treatment centers

do not typically integrate 12-Step principles, with fewer than 5% of treatment programs using the 12-Step philosophy [7].

Detox services are provided by specialized addiction treatment centers, which are usually organized within public hospitals. There are three main courses of action after detox: further planned in-patient treatment, opioid maintenance treatment (OMT) and discharge back to the patient's home [17]. The present study focused on the third group, because these patients would be able to access TSGs. For patients in this third group, detox is aimed at providing medically supervised withdrawal and increasing motivation for future treatment; however, follow-up treatment appointments are often not made at discharge.

Participants in the present study were recruited from a detox department at the Addiction Unit, Sørlandet Hospital in Kristiansand, Norway between September 2008 and August 2010. This institution mainly serves Vest-Agder, the southernmost county in Norway (population 166 000). The availability of TSG meetings in the county was good (17 weekly meetings per 100 000 inhabitants), with frequency varying from one weekly meeting in rural areas to up to two daily meetings in the largest town, Kristiansand (population 88 000). Compared to other parts of Norway, providers in Vest-Agder county have a more positive attitude towards TSGs [18], as demonstrated by the atypical practice of inviting TSG volunteers to the unit weekly to inform patients about their groups [17]. Due to the 12-Step orientation of a publicly owned treatment ward, patients in this county have more experience with TSGs than elsewhere in Norway [19].

## Intervention

### *Motivational intervention (MI)*

In addition to standard detox, the MI group received a motivational intervention comprising two weekly educational 30-minute sessions. These sessions were designed to acquaint patients with TSGs and to enhance their perception of TSGs as a beneficial source of post-detox assistance. First, patients were educated about addiction as a chronic condition that requires long-term care. This introduction included a brief and patient-friendly presentation of recent neurobiological findings concerning the mechanisms of addiction. The purpose was to help patients understand that there are biological determinants of their experienced loss of control over substance use.

Secondly, patients watched a 10-minute motivational DVD made by AA, which introduced the fellowship. Based on the film and the patient's own experiences with TSGs, existing obstacles to and possible misconceptions about

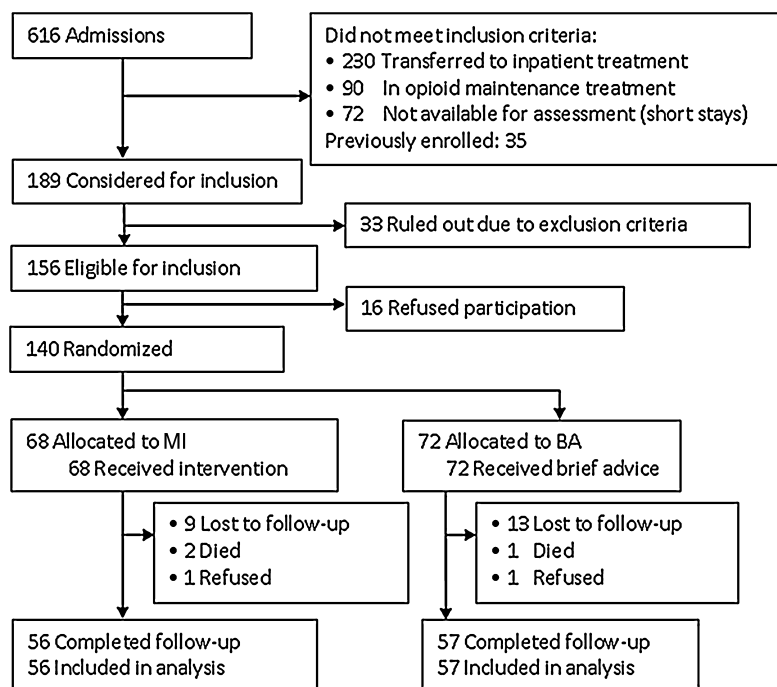


Figure 1 Patient flowchart

meeting participation were briefly explored and discussed. The distinction between religion and spirituality in the 12-Step program was of particular concern; this aspect of TSGs has been found to be a barrier to participation, and may be a stronger obstacle to TSG participation in European countries than in the United States [7,20].

Finally, after the educational sessions, patients were encouraged to make a telephone call to Norway's nationwide AA/NA number and invite TSG volunteers to the detox unit for individual conversation. They were also asked to make appointments with these volunteers to attend their first TSG meeting after detox. Project staff monitored this part of the intervention (telephone call and volunteer visit). Although highly encouraged to do so, patients were not required to make this call. The intervention was carried out by the first author. An employee with personal experience in TSGs joined in to make the intervention more user-friendly and convincing.

#### Brief advice (BA)

Patients in the BA condition received standard detox. They were also given meeting lists for TSGs in their local community and a brochure about TSGs, and were briefly advised to attend meetings. The BA was delivered by the first author and a trained study assistant.

#### Inclusion and exclusion criteria

Patients were eligible for the study if they were not scheduled to receive additional in-patient or opioid maintenance

treatment after detox, they remained in detox sufficiently long for assessment (at least 2 days) and if discharge to their home was planned. Exclusion criteria included severe psychiatric disorder (assessed according to ICD-10 criteria by the ward physician at intake), cognitive impairment (inability to converse for interviews) or not having access to at least one TSG within 30 km of home ( $n = 33$  excluded). Of the remaining 156 eligible patients, 16 refused to participate. The final sample included 140 patients (Fig. 1).

After providing informed consent, participants completed the inventory described below. The study was approved by the Regional Ethics Committee of the South-East Health Region, Norway.

#### Randomization and follow-up

Because MI was delivered to patients on an in-patient ward, we did not assign individuals randomly to condition. Instead, we assigned patients to condition based on 2-week cycles; i.e. every second Monday, the condition (MI or BA) for the upcoming fortnight was determined based on notes prepared in sealed envelopes by an external researcher, who randomized the sequences in blocks of four. Patients were recruited in 40 cohorts, with a mean of 3.5 in each cohort. There was no washout period when the study condition shifted. All patients allocated to the MI condition received at least one educational session, whereas those allocated to the BA condition received none.

Patients were assessed at 6 months after completing detox. Follow-up interviews were conducted by a

research assistant blinded to the patient's condition assignment. Participants were reimbursed approximately \$40 for completing the follow-up interview.

### Instruments and outcomes

At baseline and at the 6-month follow-up, patients completed the AA Affiliation Scale (AAAS) and the semi-structured EuropASI (see below).

The primary study outcome was TSG affiliation measured with the AAAS, modified to include both AA and NA [21]. The frequencies of life-time and prior 6-month TSG attendance were coded with a 0–1 scale (for example, on the life-time scale a score of 0.25 was given for one to 30 meetings, 0.5 for 31–90, 0.75 for 91–500 and 1 for >500). Additionally, seven yes/no involvement items (e.g. read TSG literature, had a sponsor) were coded as 0 for no/never or 1 for yes and summed. The sum of meeting attendance and involvement scores resulted in a single affiliation score that ranged from 0–9, which is considered to be the preferred way of reporting TSG-related behavior [22]. The AAAS was translated to Norwegian with a standard procedure (two forward and two backward translations) in collaboration with the AAAS developers [23]. The translated version of the AAAS had good reliability, similar to that of the original scale (Cronbach's  $\alpha = 0.81$ ).

Secondary outcomes included substance use measured with the Addiction Severity Index, European version (EuropASI) [24,25]. Data on drug and alcohol use in the 30 days before the interview yielded composite scores to indicate severity [26]; scores ranged from 0 (no problem) to 1 (a severe problem). The EuropASI was also used to collect data on patient demographics, life context and treatment history, as well as information about post-detox treatment at follow-up. The Mini International Neuropsychiatric Interview (MINI), version 5.0, was used at baseline to confirm the SUD diagnosis [27].

### Sample size

In planning the study, because there were no previous European detox studies using AAAS scores, we used an American study to estimate the context-based likely number of TSG meetings at follow-up; four [standard deviation (SD) = 8] versus 10 (SD = 16) meetings in the BA and MI conditions, respectively [9]. Based on this, the sample size calculation indicated that a sample size of at least 64 was required ( $\alpha = 0.05$ ; power = 0.80) [28]. To account for attrition, we recruited 70 in each group.

### Participants

Of the 140 recruited patients, the mean age was 41 years (SD = 14 years), 33% were women and 96% were

native Norwegians or European-born. They had a mean of 11.2 years of education (SD = 2.3 years), and 47% lived alone. Almost all (96%) had been diagnosed with alcohol and/or drug dependence (six patients only met the criteria for harmful use), they had >11 years of problematic use of their major substance of abuse and 65% had had previous specialized SUD treatment. Almost half (48%) had participated previously in at least one TSG meeting. The mean TSG affiliation score was 1.69 (SD = 2.44), which was close to the 60th percentile in normative data on treated samples in the United States, indicating relatively low affiliation [21]. Table 1 shows descriptive statistics on demographic, substance use, past TSG experience and length of stay for the MI and BA groups. Follow-up rates were 56 of 68 (82%) in the MI condition and 57 of 72 (79%) in the BA condition (Fig. 1). On average, patients received 17 days (SD = 31) of in-patient SUD treatment during follow-up. Compared to those assessed at follow-up, those lost to follow-up were younger (35 versus 43 years;  $t = 2.6$ ;  $P < 0.01$ ), but otherwise similar.

### Statistical analyses

Descriptive statistics are shown for all variables. Between-group comparisons were performed using generalized estimating equation (GEE) regressions with an exchangeable working correlation matrix. We controlled for cohort to account for the sequence-based design. Effect sizes are reported as estimated marginal means and between-group differences. To account for possible imbalance between conditions due to the relatively small sample size, analyses were adjusted for baseline characteristics and the baseline value of the outcome measure. The significance level was set at  $P < 0.05$ . All statistical analyses were performed with SPSS version 16.0.

## RESULTS

### Primary outcome

Multivariable analysis revealed primary outcome scores (AAAS at the 6-month follow-up) of 2.47 [standard error (SE) = 0.30] and 1.56 (SE = 0.38) in the MI and BA groups, respectively [0.91-point difference; 95% confidence interval (CI) = 0.04–1.78;  $P = 0.041$ ; Table 2]. The baseline AAAS score was also highly significant, with every point higher on the baseline AAAS predicting a 0.48 higher AAAS score at follow-up (beta = 0.48; SE = 0.09;  $P < 0.001$ ).

### Secondary outcomes

During the follow-up period, the MI group attended twice as many meetings as the BA group (16.0 versus 8.2

**Table 1** Characteristics of study respondents ( $n = 140$ ), with data presented as  $n$  (%) or mean ( $\pm$  standard deviation).

| Characteristics   | MI group<br>$n = 68$ | BA group<br>$n = 72$ |
|---|----------------------|----------------------|
| Age, years  | 43 (13)              | 40 (14)              |
| Gender, male  | 49 (72%)             | 45 (63%)             |
| Proportion native Norwegians or European origin   | 65 (96%)             | 69 (96%)             |
| Education, years  | 11.1 (2.3)           | 11.2 (2.4)           |
| Relationship, proportion single (i.e. living alone)   | 29 (43%)             | 37 (51%)             |
| Main diagnosis (ICD-10)   |                      |                      |
| Alcohol use disorder (six patients only met criteria for alcohol abuse <sup>a</sup> )       | 27 (40%)             | 38 (38%)             |
| Both alcohol and drug use disorder  | 12 (18%)             | 14 (19%)             |
| Drug use disorder   | 29 (43%)             | 31 (43%)             |
| Years of problematic use, <sup>b</sup> major drug(s) of abuse                               | 11.5 (9.1)           | 11.3 (9.1)           |
| Days of alcohol use within last 30 days   | 12.7 (12.1)          | 12.5 (12.4)          |
| Days of drug use within last 30 days  | 18.2 (13.1)          | 16.2 (13.3)          |
| EuropASI severity   |                      |                      |
| Alcohol use   | 0.43 (0.36)          | 0.43 (0.37)          |
| Drug use  | 0.26 (0.21)          | 0.23 (0.19)          |
| Prior specialized addiction treatment; out-patient or in-patient treatment (detox excluded) | 42 (62%)             | 49 (68%)             |
| Prior participation in 12-Step groups (TSGs)  | 35 (52%)             | 32 (44%)             |
| Earlier involvement in TSGs (AAAS score; scale 0–9)   | 1.9 (2.5)            | 1.5 (2.4)            |
| Days on the ward  | 12.6 (6.5)           | 9.9 (3.2)            |

<sup>a</sup>Four of these patients were in the motivational intervention (MI) group and two in the brief advice (BA) group. Of these, three and two were reached at follow-up in the MI and BA groups, respectively. <sup>b</sup>Problematic use, as defined by EuropASI, was the consumption of five or more standard drinks at least three times weekly, or binge drinking on 2 consecutive days to a level that afflicted daily functioning; for drug use, only frequency was needed: three times weekly or 2 consecutive days. AAAS = Alcoholics Anonymous Affiliation Scale; EuropASI = Addiction Severity Index, European version.

meetings), but this finding was not statistically significant (Table 2). In the 30 days before the follow-up interview, the MI group reported 3.5 fewer days of alcohol use (2.1 versus 5.6; 95% CI =  $-6.5$  to  $-0.6$ ;  $P = 0.020$ ) and 4.0 fewer days of drug use (3.8 versus 7.8; 95% CI =  $-7.5$  to  $-0.4$ ;  $P = 0.028$ ) (Table 2). Problem severity on the alcohol and drug use composites (EuropASI) did not differ between conditions. At follow-up, 52 of 113 (46%) of participants reported having abstained from all substances during the previous 30 days, with no significant difference between conditions (Table 2). However, the

abstinence rate was significantly higher among those who had attended TSG meetings since discharge (39 of 63, 62%) than among non-attendees (13 of 50, 26%;  $\chi^2 = 14.5$ ;  $P < 0.001$ ).

#### Analyses adjusted for formal treatment

Data were re-analysed to control for days of in-patient detox/post-detox treatment. The AAAS score remained significantly higher in the MI group than the BA group (0.82 points higher; 95% CI =  $0.01$ – $1.63$ ;  $P = 0.048$ ). Estimated substance use outcomes were not significantly changed. The MI group still had fewer days of alcohol use ( $-3.3$  days; 95% CI =  $-6.2$  to  $-0.4$ ;  $P = 0.024$ ) and of drug use ( $-3.4$  days; 95% CI =  $-6.5$  to  $-0.3$ ;  $P = 0.032$ ).

## DISCUSSION

Overall, the motivational intervention (MI) facilitated patient TSG affiliation more successfully than the brief advice (BA) condition. Contrary to our expectations, higher prior TSG affiliation predicted higher TSG affiliation at follow-up. Relative to the BA group, the MI group had fewer days of alcohol and drug use in the 30 days before follow-up; however, we found no significant between-group differences in abstinence rates or problem severity scores (EuropASI). Analyses controlling for formal treatment did not alter the estimates.

In contrast to two US-based detox studies that reported no differences in favor of intensified 12-Step referral conditions [14,16], the present study showed an association between the motivational intervention and increased TSG affiliation. This difference might be explained by a possible 'ceiling effect' in US-based studies, i.e. a substantial proportion of detox patients in the United States may have stronger intentions to attend TSGs regardless of whether or not they receive specific motivational interventions [29]. Supporting this possibility, 80% of patients planned to attend TSGs regularly after discharge in the study of Kahler *et al.* [14], while only 40% of our respondents intended to do so [19]. When asked to rate possible benefits of TSGs, 75% of patients in our study regarded TSGs as potential resources to their own recovery [19], suggesting a seedbed for greater TSG utilization among our patients that the intervention was able to activate. In line with our findings, a recent UK-based study also found a significantly higher attendance rate among those who received an active-referral intervention from either a doctor or peer (56%) compared to in the non-intervention group (33%) [15]. Thus, the positive effects of TSG interventions relative to control conditions may be more apparent in European detox samples, which tend to have a lower baseline TSG exposure.

**Table 2** Between-group outcome comparisons at 6 months after the end of detox treatment ( $n = 113$ ).

|  | MI group<br>$n = 56$ | BA group<br>$n = 57$ | Unadjusted <sup>a</sup>     |                       | Adjusted <sup>b</sup>       |                       |
|--|----------------------|----------------------|-----------------------------|-----------------------|-----------------------------|-----------------------|
|  | Mean (SE)            | Mean (SE)            | Mean difference<br>(95% CI) | P-values <sup>c</sup> | Mean difference<br>(95% CI) | P-values <sup>c</sup> |
| <b>Primary outcome</b>                                   |                      |                      |                             |                       |                             |                       |
| TSG affiliation score (AAAS)                             | 2.53 (0.33)          | 1.51 (0.36)          | 1.02 (0.06/1.98)            | 0.037                 | 0.91 (0.04/1.78)            | 0.041                 |
| <b>Secondary outcomes</b>                                |                      |                      |                             |                       |                             |                       |
| TSG meetings in the 6-month follow-up                    | 16.0 (3.8)           | 8.2 (2.2)            | 7.8 (-0.8/16.4)             | 0.074                 | 5.9 (-1.4/13.2)             | 0.115                 |
| <b>Alcohol use and severity</b>                          |                      |                      |                             |                       |                             |                       |
| Days of alcohol use in the last 30 days                  | 2.2 (0.8)            | 5.4 (1.3)            | -3.2 (-6.2/-0.2)            | 0.038                 | -3.5 (-6.5/-0.6)            | 0.020                 |
| Alcohol use severity score (EuropASI)                    | 0.17 (0.03)          | 0.24 (0.03)          | -0.07 (-0.15/0.02)          | 0.112                 | -0.06 (-0.14/0.01)          | 0.095                 |
| <b>Drug use and severity</b>                             |                      |                      |                             |                       |                             |                       |
| Days of drug use in the last 30 days                     | 4.8 (1.3)            | 7.4 (1.6)            | -2.6 (-6.6/1.5)             | 0.217                 | -4.0 (-7.5/-0.4)            | 0.028                 |
| Drug use severity score (EuropASI)                       | 0.11 (0.02)          | 0.10 (0.01)          | 0.01 (-0.03/0.06)           | 0.608                 | 0.00 (-0.03/0.03)           | 0.862                 |
| <b>Patients with no alcohol or drug use past 30 days</b> |                      |                      |                             |                       |                             |                       |
| Proportions of abstainers                                | 44% (7%)             | 46% (7%)             | -2% (-22/17%)               | 0.825                 | 0% (-20/18%)                | 0.946                 |

<sup>a</sup>Controlled for cohort, otherwise unadjusted. <sup>b</sup>Mean difference adjusted for cohort, baseline score on outcome variable and baseline characteristics, including gender, age, relationship status, education and severity scores (composite score on alcohol and drugs). <sup>c</sup>P-values obtained from generalized estimating equations (GEE) regression. AAAS = Alcoholics Anonymous Affiliation Scale; EuropASI = Addiction Severity Index, European version; MI = motivational intervention; BA = brief advice; CI = confidence interval; SE = standard error; TSG = 12-Step group.

Conversely, the substantial proportion of patients with no prior TSG experience may represent a challenge in European samples compared to US samples. For example, two well-known US-based TSF studies found that only 3% [9] and 9% [10] of subjects were 12-Step-naïve compared to more than half (52%) of our sample [19]. Contrary to our expectations, here we found that higher prior TSG experience predicted a higher post-discharge affiliation score. This is in agreement with the findings of a similar UK-based study, in which each additional AAAS point at baseline meant that participants were twice as likely [odds ratio (OR) = 2.3] to attend meetings after treatment [15]. In contrast, a US-based study reported that TSF intervention was more effective at increasing TSG involvement among those with less previous TSG experience [9]. These differences could be due to the generally low rates of patients without previous TGS exposure in US-based studies. Prior non-participants might have higher engagement barriers to overcome, and this phenomenon may be more apparent in countries where TGS-related interventions are uncommon [30]. Our present findings suggest that patients without prior TGS exposure warrant more attention in TSF studies and in clinical work, especially after SUD treatment in contexts where TSG attendance and involvement are not routine.

Post-discharge TSG meeting attendees were more likely to be abstinent at follow-up relative to non-

attendees, but abstinence rates did not differ significantly between conditions. Previous TSF detox studies have reported similar findings [14–16]. TSF studies with larger samples and more intensive and longer interventions have found better abstinence rates in the intervention group [4,10]; however, such interventions are more resource-intensive and would be difficult to implement in standard detox treatment settings. None the less, the reductions in substance use in our MI condition can be interpreted as promising. Kaskutas *et al.* did not find a higher abstinence rate in their TSF condition relative to controls at the 6-month follow-up, but found a significantly higher rate at 12 months [10]. At the 3-year follow-up in Project Match, TSF clients exhibited a significant 9–12% higher abstinence rate than clients in the CBT and MET conditions [4]. Thus, connecting patients to supportive peers may generate greater benefits over a longer time-frame.

#### Methodological considerations

The present study was among the first to examine a TSF approach in the context of European SUD treatment. Study strengths include the use of standardized instruments and follow-up completion by an interviewer blinded to assignment condition. The study focused on complementary peer-based resources, which is a health

services perspective recommended by international health organizations [31].

However, the present findings must be interpreted in the context of certain study limitations, such as the limited time-frame, reliance on self-reports, lack of individual randomization and the use of the estimated number of TSG meetings to conduct the sample size calculation. Substance use outcomes were measured using the last 30 days prior to follow-up, with no data on months 1–5. No correction was made for inflated Type I error associated with multiple comparisons of secondary outcomes [32]. The intensity of the intervention (60 minutes versus a few minutes) may have been a confounding factor with the MI versus BA intervention; future studies should equate conditions for time and attention. Furthermore, our results indicate that findings may not be generalizable to regions with lower TSG availability and prior TSG experience among patients.

### Implications

Based on the present findings, the MI procedure has been implemented as standard practice in the detox unit where it was tested. In addition to increased intensity of 12-Step referral strategies, research has identified on-site AA/NA meetings as factors that enhance post-treatment TSG attendance [33]. On-site TSG meetings are common in many US treatment centers [33], and were part of the intervention plan in the UK-based TSF study [15]. However, on-site TSG meetings are currently non-existent in Norway. In combination with MI, implementing on-site TSG meetings could be another way to lower the threshold to attending a first TSG meeting and thus facilitate post-discharge attendance.

### CONCLUSIONS

The presently described motivational intervention was designed to fit into a standard detox unit program. The observed increase in TSG affiliation is encouraging, especially in light of the brevity of the intervention. This study converted treatment techniques previously unfamiliar to the treatment settings in Norway into a feasible intervention that yielded a beneficial outcome and increased the connection of patients to abstinent-supportive peers. These results indicate that other European detox facilities could also increase the chances of improving patient outcomes with only modest resource investment.

### Clinical trial registration

ClinicalTrials.gov NCT 00708890.

### Declaration of interests

None.

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### Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

**Appendix S1** Manual/description of the motivational intervention on the detox unit.