Are Members of Mutual Aid Groups Better Equipped for Addiction Recovery?

European cross-sectional study into recovery capital, social networks and commitment to sobriety

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[Abstract]

An increasing body of evidence shows that informal mutual aid groups benefit those in addiction recovery. However, attention for mutual aid groups in practice and policy varies internationally and is only recently emerging in continental Europe. Existing evidence is mostly limited to studies of *Alcoholics Anonymous* groups in the United States. The aim of this cross-sectional study is to examine the relationship between membership of a variety of mutual aid groups and recovery capital, participation in social networks and commitment to sobriety for individuals in drug addiction recovery (N=367), living in the UK, the Netherlands and Belgium. A convenience sample of participants completed an extensive assessment about their recovery experiences. 69% of participants reported lifetime (ever) membership of different mutual aid groups. Analyses reveal that membership of mutual aid groups is strongly associated with more participation and (self-reported) changes in social networks, greater levels of recovery capital, and a stronger commitment to sobriety. The findings suggest that participation in mutual aid groups may support addiction recovery through multiple mechanisms of change in favor of recovery. These findings highlight how mutual aid support may complement formal addiction treatment.

Keywords: Substance-Related Disorders, Recovery, Mutual Aid Groups, Addiction Treatment, Self-Help

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Introduction

Even though drug addiction is often conceptualized as a chronic relapsing disorder (McLellan, Lewis, O'Brien, & Kleber, 2000), many people experience recovery. Reviews estimate that more than half of individuals with a lifetime alcohol or drug dependence will achieve stable recovery (Sheedy & Whitter 2009; White 2012). Many studies included in these reviews focus on abstinence as a (single) success indicator for recovery. However, in recent years, a more holistic concept of addiction recovery has emerged that integrates elements from the mental health field (Davidson and White 2007; Kaskutas et al. 2014). Established recovery markers include personal, social and clinical outcomes (Best, Savic, et al., 2018; Dennis, Scott, & Laudet, 2014; Laudet & White, 2010; van der Stel, 2014). As such, addiction recovery is characterized as a long-term developmental pathway with transitions and stages, including early (<1 year), sustained (1-5 years), and stable (>5 years) recovery (Betty Ford Institute 2007; Martinelli et al. 2020). Consequently, it is argued that the study of entire pathways of recovery, including multiple interventions, treatment and support services, is at least equally important as studying specific interventions (Hser et al. 1997; Kelly et al. 2017).

These recovery pathways are partially shaped by various addiction treatment and support systems, including support by experienced peers, referred to as *mutual aid* (White, 2004). Mutual aid groups, also known as self-help groups, are based on *mutual aid* principles, defined as a "process of giving and receiving non-professional, non-clinical assistance to achieve long-term recovery from alcohol and/or other drug-related problems" (White, 2009, p2). Persons in early recovery can benefit particularly from personal guidance by someone with a similar *lived* experience (White 1996). These 'guides' have developed sensitivities and skills important to support a shift from a culture of addiction towards one supportive of recovery. The idea that lived experiences can be helpful to provide insights into the mechanisms and commitment to drive change is not limited to the addiction field. The mental health field has a long history of this being practiced (Mead and MacNeil 2006; O'Connell et al. 2020) and recently this idea has also emerged in the context of desistance from crime (Best et al. 2019; Lenkens et al. 2019; Seppings 2015).

Recognition of the benefits of attending mutual aid groups is well established and evidence is expanding (Best, Manning, Allsop, & Lubman, 2020; Costello et al., 2019; Humphreys, 2004; Kaskutas, 2009; Kelly, Humphreys, & Ferri, 2020). Moreover, it is becoming clearer *how* mutual aid groups can be beneficial for recovery. In a review, Moos (2008) identified the 'active

ingredients' that underlie mutual aid groups, namely: social bonding, norms and role models, and building self-efficacy and coping skills. Similarly, in recent landmark publications on the benefits of *Alcoholics Anonymous* (AA), effectiveness of AA on establishing abstinence and mechanisms of behavior change in AA are revealed: increasing social networks, boosting self-efficacy and coping skills, and supporting motivation over time (Kelly 2017; Kelly et al. 2020). These findings suggest that it is not just the treatment philosophy of mutual aid groups (e.g. Twelve Steps) that facilitates recovery, but also highlight the importance of mutual aid principles (e.g. experienced peers helping others) and being a member of social groups. Experiencing membership of a social group can provide people with important social connections and positive identities. This is in line with many studies that focus on the importance of social support in recovery pathways (Best et al. 2012; Dobkin et al. 2002; Kaskutas, Bond, and Humphreys 2002; Litt et al. 2009; Longabaugh et al. 2010; Pagano et al. 2004).

In Europe, there is a variety of addiction-related mutual aid organizations which vary markedly in their histories, structures, philosophies, procedures and membership (Humphreys 2004). A limitation of most existing studies is that they are particularly focused on alcohol-related Twelve Step groups (AA) in the United States. Other Twelve Step groups (e.g. *Narcotics Anonymous:* NA) and alternative mutual aid groups (e.g. SMART recovery or other [local] types of recovery groups) have received far less public, professional and scientific attention and scrutiny (Dekkers, Vos, and Vanderplasschen 2020; White et al. 2020; Zemore et al. 2017). For example, no clinical trial has yet compared addiction treatment with and without NA involvement, despite most NA-studies involving treatment populations (White et al., 2020). As a result, it is unclear whether the findings described above apply to mutual aid groups and mutual aid principles in general, or just to AA, and whether these findings hold across different international contexts. Furthermore, while Twelve Step groups are more common they are not appealing to everyone (Zemore et al. 2017). Thus, examining alternative groups is equally important.

In the current study, we focused on recovery capital, participation in social networks and commitment to sobriety as outcomes. Recovery capital, defined as a set of internal and external resources that help persons recover, was included because the accumulation of recovery capital is thought to influence resiliency and coping skills and can help to mitigate the biobehavioral stress associated with addiction (Cloud and Granfield 2008; Granfield and Cloud 1999; Laudet and White 2008; Vilsaint et al. 2017). Consequently, recovery capital can boost recovery coping

skills and self-efficacy, which was found to be linked to mutual aid group participation (Kelly 2017; Moos 2008). Moreover, assessment of recovery capital can be an important marker for recovery, as the concept focuses on measuring strength-based indicators, as opposed to the traditional deficit-based forms of assessment of pathology and harm (Best, Vanderplasschen, and Nisic 2020; Groshkova, Best, and White 2013; McLellan et al. 1992; Vilsaint et al. 2017). Furthermore, participation and changes in social networks were studied, as this was also found to be one of the underlying mechanisms of benefits from mutual aid groups (Kelly 2017; Moos 2008). Lastly, *commitment* to sobriety was analyzed, as this is found to be a good predictor of future behavior (Kelly and Greene 2014). Being "committed to change" denotes that recovery is a top priority and implies a strong desire (Kelly and Greene 2014). Furthermore, in this context, 'sobriety' is broader than abstinence and more consistent with the concept of recovery as described above (Helm 2019).

To examine these outcomes, we analyzed the extent to which support from group-based mutual aid shapes recovery pathways of persons in drug addiction recovery. We specifically examined associations with *mechanisms of behavior change for recovery* that are linked to mutual aid in studies focusing on alcohol addiction: recovery capital, social networks and commitment to recovery (Best et al., 2016; Kelly, 2017; Moos, 2008). We hypothesized that, for persons in drug addiction recovery, membership (present or in the past) of mutual aid groups is associated with more participation in social networks, more commitment to recovery, and more recovery capital. Because there is relatively little information about members of mutual aid groups in Europe, we performed several additional analyses on treatment and support utilization, current group membership and differences between members of Twelve Step groups versus other groups. Accordingly, we aim to answer the following research questions (RQs):

1. [RQ1] Which types and combinations of treatment and support are used by people in drug addiction recovery?
2. [RQ2] Is lifetime (ever) membership of mutual aid groups associated with greater recovery capital, more participation in social networks, and more commitment to sobriety in persons with a history of illicit drug addiction?
3. [RQ3] Is current membership of mutual aid groups more positively associated with recovery capital, social networks, and commitment to sobriety compared to lifetime, but non-current, membership?

4. [RQ4] Are the associations, between mutual aid group membership and recovery capital, social networks, and commitment to sobriety, different among lifetime members of Twelve Step groups compared to lifetime members of non-Twelve Step groups?

Method

Sample and design

The data collection method used in this study is the baseline assessment of the REC-PATH (Recovery Pathways) study. A detailed description of the project can be found in the protocol paper (Best, Vanderplasschen, et al. 2018). Briefly, REC-PATH is a prospective multi-country cohort study designed to map pathways to drug addiction recovery in the United Kingdom (UK), Netherlands, and Belgium (Flanders).

Initial recruitment took place between January and June 2018 using the brief Life in Recovery (LiR) survey in the UK (N=311), Netherlands (N=230), and Belgium (Flanders, N=181) (Martinelli et al. 2020). We used social media, newsletters, conferences, alcohol and drug magazines, printed flyers and posters, and contacted prevention and treatment organizations to disseminate the call for participants. 'Anyone in recovery for at least three months or who has stopped or reduced problematic drug use for at least three months' was eligible to participate and invited to visit the project website. On the project website (https://www.rec-path.co.uk/), potential participants could access information about the study and give informed consent to access the survey. Some respondents (e.g. without access to internet) received printed information, consent, and survey forms. Among this convenience sample, persons that left contact details and who agreed to further participation, were contacted and completed an extensive assessment between March and October of 2018 in the UK (N=118), Netherlands (N=136), and Belgium (N=113). The inclusion criteria were that participants identified themselves as being in recovery for at least three months and were 18 years or older. The data were collected online (n=210), by telephone (n=90) or face-to-face (n=67), depending on the participant's preference. Participants received a compensation of ten EUR or GBP for completing the extensive assessment. The study protocol and measures were standardized across the three countries. The assessment was analyzed cross-sectionally for this paper. Ethics approval was provided by the METC Erasmus MC (Netherlands); SHU Ethics Committee (UK); Ghent University Ethics Committee (Belgium).

Variables

Sample characteristics

The following descriptive items were included to provide more details on the study sample: "What is your employment status?" [in paid employment/in sheltered employment/training or education is main occupation/unemployed/retired/other], "Do you experience any chronic mental health problems?" [yes/no], "At what age did you first realize you had a problem with substance use?" [age]. We also asked if participants had "ever attended" a mutual group [yes/no], which is different from the independent variable described above, as attendance does not imply involvement while membership does. To measure days of use and abstinence from illicit drugs and alcohol, participants were asked to fill in: "Days used in the last 30 days" [Alcohol, Heroin, Cocaine, etc.]. The response categories of 'heroin', 'cocaine', 'crack', 'amphetamines', 'ecstasy/MDMA', 'cannabis', and 'other illicit substance' were combined as 'illicit drugs'. If a participant used zero days of the last 30, they were scored as abstinent.

Independent variable

Lifetime mutual aid group membership was measured by combining response categories from the item "Have you ever considered yourself a member of". *Alcoholics Anonymous (AA), Narcotics Anonymous (NA), Other 12-step group, Non 12-step self-help group, SMART recovery group* were the response categories. If 'yes' was answered to any of these response categories, it was scored as 'yes' in the dichotomous variable 'Member of mutual aid group'. To describe different combinations of treatment and support, participants were asked "Have you ever attended?" followed by "Specialist Community (out-patient) treatment, or counseling (including medication reduction or maintenance treatment and low threshold services)" and "Residential rehabilitation or rehab (including residential detoxification and therapeutic communities)". If no treatment or mutual aid group membership was reported, this was scored as 'natural recovery' (Blomqvist 1996). Furthermore, *current* membership was assessed by asking "Are you currently attending? [AA/NA/Other 12-step groups/Non 12-step groups/SMART]?"

Dependent variables

Social networks were measured through the Exeter Identity Transition Scales (EXITS) (Haslam et al. 2008), which are divided in three subscales: (1) current membership of different (social) groups (α=0.918), (2) maintaining different groups after initiating recovery (α=0.875) and (3)

joining new groups since recovery initiation (α=0.945). Each subscale had four items which could be scored from one to seven: 'strongly disagree' to 'strongly agree'. For example: "I belong to lots of different groups" and "After starting my recovery journey, I have joined one or more new groups".

Recovery Capital was measured through the Brief Assessment of Recovery Capital (BARC-10) (Vilsaint et al. 2017) and consisted of ten items (α=0.838) with a six point Likert-scale: strongly disagree (1) to strongly agree (6). For example, "I get lots of support from friends" and "I regard my life as challenging and fulfilling without the need for using drugs or alcohol".

Commitment to recovery was measured through the Commitment to Sobriety Scale (Kelly and Greene 2014) and consisted of five items (α=0.762) with a six point Likert-scale: strongly disagree (1) to strongly agree (6). For example: "I am totally committed to staying free from problematic use" and "I will do whatever it takes to recover from my addiction".

Covariates

Gender, age, country of residence and education level were also measured through self-report. Education level had four categories: (1) "Never went to school / never completed primary school", (2) "Primary level of education", (3) "Secondary level of education" and (4) "Higher education". The first two response categories were combined as "none/primary level of education" because of the low numbers in the first category.

Recovery stage was measured by asking respondents "How long do you consider yourself to be in recovery?" There were three response categories: "less than one year" [early], "one to five years" [sustained] and "more than five years" [stable].

Analyses

Survey data were processed and analyzed using SPSS 25. We assessed internal consistency (Cronbach's alpha) of each outcome (sub)scale through reliability analyses. Chi square tests, Independent sample T-tests and Spearman's rho tests were performed to test differences in sample characteristics (sociodemographic and descriptive variables) between lifetime members of mutual aid groups and non-members of mutual aid groups. Frequency analyses were performed to show which combinations of treatment and support were used by participants (RQ1). Two-tailed independent T-tests were performed to determine differences on each dependent variable (social networks, recovery capital and commitment to sobriety) between lifetime members and non-members (RQ2) and between current members and (lifetime but)

non-current members of mutual aid groups (RQ3). Multivariate regressions were performed to estimate associations between mutual aid group membership (independent variable) and social networks, recovery capital and commitment to sobriety (dependent variables), adjusted for the covariates mentioned above (RQ2). To explore differences on the dependent variables, we performed separate two-tailed independent T-tests between lifetime members of Twelve Step groups, non-Twelve Step groups, and lifetime members of both groups (RQ4).

Results

Of the total sample, 69% reported lifetime membership of mutual aid groups. Table 1 reports the sample characteristics of the total sample split by mutual aid membership. The proportion of men (65%) and women (35%) did not differ significantly between both subsamples. Non-members of mutual aid groups were on average younger than lifetime members, with a mean age of 38 and 43 years, respectively. Of the lifetime members, a larger proportion was from the UK (40%) and the Netherlands (43%), compared to 17% from Belgium. Education levels of participants also differed between subsamples. Lifetime members reported higher levels of education compared to non-members. No significant differences between both groups were found for reported mental health problems and mean 'age when participants first realized they had a problem with substance use' (Table 1). Paid employment (64% vs 45%) and current abstinence from drugs (94% vs 75%) and alcohol (81% vs 52%) were all reported more often by lifetime mutual aid members. The average number of days on which alcohol (1.6 vs 5.6) and illicit drugs (0.8 vs 3) were used in the past 30 days was lower for lifetime members of mutual aid groups compared to non-members.

[insert Table 1]

Types and combinations of treatment and support (RQ1)

Table 2 shows the combinations of treatment and support, or recovery pathways, that were used by participants. Most participants reported having utilized multiple forms of treatment and support. About 41% of participants reported lifetime membership of mutual aid groups in combination with attendance of residential and outpatient treatment. The combination of mutual aid group membership and residential treatment was reported by 14%. Mutual aid group membership combined with outpatient treatment was reported by 9% of participants. About 5% of participants had solely been a member of mutual aid groups. The same proportion of

participants had solely attended outpatient treatment (5%) or solely attended residential treatment (5%) and 5% reported not having used any treatment or support (natural recovery). The proportion of participants that had used outpatient and residential treatment was 16%.

[insert Table 2]

Mutual aid group membership and recovery capital, social networks, and commitment to sobriety (RQ2)

Table 3 shows mean scores of the social group membership (EXITS), recovery capital (BARC) and Commitment to Sobriety (sub)scales and differences between lifetime members of mutual aid groups versus non-members. On each (sub)scale, lifetime members scored significantly ($p<0.001$) higher than non-members. The only exception is the 'EXITS Maintaining Social Groups' subscale which showed no significant difference ($p=0.177$) between both groups.

In Table 4, multiple regression analyses are reported showing the relation between mutual aid group membership and the outcome (sub)scales. For these analyses, age, gender, recovery stage, country and education level were included in the model as covariates. All (sub)scales, except for 'maintaining social groups' ($\beta=0.057$, 95% CI=-0.058, 0.172, $P=0.330$) were significantly ($P \leq 0.01$) associated with the independent variable: lifetime membership of mutual aid groups.

[insert Table 3 and 4]

Differences between current and lifetime members (RQ3)

Table 3 also shows the scores of current members of mutual aid groups and reports on the differences between current versus non-current (but lifetime) members. Current members consistently score higher on each (sub)scale, except on the 'EXITS Maintaining Social Groups' subscale. The difference between current and non-current members is significant ($p<0.001$) for the 'EXITS Joining New Groups' subscale and the Commitment to Sobriety Scale.

Differences between Twelve Step and non-Twelve Step group members (RQ4)

Table 5 shows the (sub)scale scores of participants that reported lifetime membership of either Twelve Step or non-Twelve Step groups and lifetime members of both groups. For Twelve Step

group members and members of both Twelve Step and non-Twelve Step groups, the mean score is significantly higher for all subscales compared to non-members, except for 'EXITS Maintaining Social Groups', consistent with the main analyses. For non-Twelve Step group members, only the 'EXITS joining new groups' subscale and BARC-10 was significantly higher compared to non-members. Furthermore, Twelve Step members had significantly higher mean scores on the 'Commitment to Sobriety' scale compared to non-Twelve Step members. Members of both groups scored significantly higher on the 'Commitment to Sobriety' scale compared to non-Twelve Step members. No other significant differences were found.

[insert Table 5]

Discussion

Previous studies on alcohol-related mutual aid groups demonstrated that the underlying mechanisms of change in mutual aid groups are found in changing social networks (from user networks to recovery networks), increasing recovery capital and maintaining commitment to recovery (Best et al., 2016; Kelly, 2017; Laudet & White, 2008; Moos, 2008). The current study examined whether these key domains are also associated with membership of mutual aid groups for people in (illicit) drug addiction recovery in a European context. Our findings show that lifetime members of mutual aid groups report greater levels of recovery capital, more participation and changes in social networks, and a stronger commitment to sobriety compared to non-members. This suggests that lifetime mutual aid group members may be better equipped to sustain addiction recovery. While recovery pathways for participants also involved other forms of treatment and recovery support, the robustness of the findings is strengthened by the finding that current members of mutual aid groups consistently report more recovery resources than lifetime (but non-current) members. Furthermore, our findings extend mutual aid research to a European context and suggest that positive recovery outcomes are not limited to Twelve Step groups and can be found in other mutual aid groups as well.

As hypothesized, membership of mutual aid groups was found to be associated with more participation and changes in social networks after initiating recovery. At first glance this finding seems unsurprising, because those who join a mutual aid group coincidentally join a new social network. However, this finding highlights that participants see mutual aid groups and the people in the groups as social contacts, which is a fundamentally different role than a treatment professional usually fulfills. We did not find a significant association for 'maintaining social groups' after initiating recovery. Both non-members and lifetime members scored low on this

subscale, suggesting that many participants may have cut ties with social groups after initiating recovery. The changes in socials networks usually concern a change from negative social networks to positive networks (i.e. from a heavy user network to a network of peers in recovery) and are found crucial in facilitating abstinence, self-efficacy, and other benefits for recovery (Best et al. 2016; Kelly 2017). Our findings suggest that, for non-members, negative networks have been dropped to an equal degree compared to lifetime members. However, new networks took their place to a lesser extent compared to lifetime members. This important characteristic of mutual aid groups is also emphasized in a recent scoping review, in which the authors conclude that mutual aid membership is beneficial because it extends support beyond structured treatment and allows access to recovery supportive environments (Parkman, Lloyd, and Splisbury 2015). This transition to recovery supportive social networks is also key to the recently outlined Social Identity Theory of Recovery (SIMOR: Best et al., 2016) and was found in prior studies on AA (Kelly, Stout, Magill, & Tonigan, 2010; Kelly, Magill, & Stout, 2009). In essence, mutual aid groups can complement formal treatment by acting as a conduit to community resources through extending recovery supportive social networks (Fiorentine and Hillhouse 2000).

Our findings also show that lifetime members of mutual aid groups were more committed to sustaining recovery, compared to non-members. In his review, Kelly (2017) shows that AA participation helps to support recovery motivation over time. However, to consider yourself a member of a mutual aid group also requires commitment to attend meetings revolving around working on recovery. Thus, at least some motivation is already required. The relation between commitment to recovery and mutual aid group membership is therefore likely to be bi-directional.

Furthermore, we found that members of mutual aid groups reported more recovery capital and, thus, are better equipped to sustain recovery. Recovery capital captures growth of positive strengths and meaningful gains that help people advance in their recovery journeys and the BARC is considered a good indicator of that advancement (Best & Laudet, 2010; Laudet & White, 2008; Vilsaint et al., 2017). This finding may mean that persons with greater recovery capital are more likely to join mutual aid groups, because they possess a more resourceful network or are better able to find suitable support for their addiction problems, for example. It may also indicate that mutual aid group participation helps members to achieve long-term

recovery by increasing recovery resources, such as coping skills and self-efficacy (White, 2009).

Currently, evidence for the effectiveness of mutual aid groups is primarily based on Twelve Step groups (i.e. AA and NA) that share a strict regime and recovery philosophy (Humphreys, 2004; Kaskutas, 2009; Kelly, 2017; Kelly et al., 2020; Parkman et al., 2015; White et al., 2020). Research on alternative mutual aid groups is still very sparse (Zemore et al. 2017). In our study we also encountered members of other non-Twelve Step groups, such as SMART or other (local) types of recovery groups, sometimes associated with formal treatment programs. Additionally, we performed separate analyses on subsamples with members from non-Twelve Step groups. While this analysis was exploratory in nature and had a limited number of participants in non-Twelve Step groups, our findings indicate consistent results across all lifetime members compared to non-members. For members of non-Twelve Step groups, slightly lower outcomes were found compared to Twelve Step group members and members of both Twelve Step and non-Twelve Step groups. These findings support the notion that, besides particular group philosophies, mutual aid group principles and the more generic model of peer support may also be effective (Kelly 2017; Moos 2008). This suggests that, to some extent, AA research may be generalized to other mutual aid groups. Nevertheless, we also found differences between Twelve Step and alternative group members, such as the slightly lower outcomes for non-Twelve Step members, and more studies are needed to explore these differences.

In this paper, we examined lifetime membership of mutual aid groups as part of entire addiction recovery pathways, sometimes referred to as treatment careers (Hser et al. 1997). Traditionally, the study of addiction interventions is performed more directly, separated and with a short-term scope, in order to reduce external effects. This can be seen as a limitation of our study, since we cannot assess to what extent the findings are attributable to membership of mutual aid groups, or to other treatment and support that was used in combination with mutual aid groups. However, to compensate for this, we also examined the difference between lifetime only and current group membership and found stronger associations in the latter subsample, suggesting that mutual aid group membership is to some extent associated with the outcomes. Moreover, we argue that the reality of addiction recovery is often much more complex and chaotic compared to the theoretical and rational paradigms from which it is often studied, in which one-dimensional inputs produce predictable outcomes. Our findings underline this notion as most

participants used multiple treatment and support mechanisms. Increasingly, studies show that recovery is more like a build-up of gradually emerging trajectories instead of happening at some 'turning point' (Dekkers, De Ruysscher, & Vanderplasschen, 2019, 2020; Hser, 2007; Laudet & White, 2010, 2008; McLellan, Lewis, O'Brien, & Kleber, 2000; van der Stel, 2014; White, Boyle, & Loveland, 2002, 2003). Furthermore, recovery can be a long-term process with successive stages that can take up several years (Dennis et al. 2005; Dennis, Foss, and Scott 2007; Martinelli et al. 2020). Therefore, long-term evaluation of recovery pathways, is at least equally important as studying the outcomes of single interventions (Hser et al. 1997), as this longitudinal framework allows us to better capture and reveal the long-term and cumulative effects of recovery experiences.

Implications

In Europe, many strategies have emerged in the last decade to address drug addiction, including the expansion of professionally delivered treatment (European Commission 2012). In this context, the addiction recovery movement has suggested to integrate peer-based support services in the formal treatment system and community-based care, including mutual aid groups (Van Deurzen 2015; GGZ Nederland 2009; GGZ NL 2013; UK Drug Policy Commission 2008). So far, limited attention and studies into efficacy of peer-based support services was realized (Ashford et al. 2019; Bassuk et al. 2016; Hayashi et al. 2010; Kerr et al. 2017; Reif et al. 2014). However, the expanding evidence on the benefits of mutual aid group participation should justify further exploration of its inclusion into system-wide practice of addiction services and to encourage services to refer to mutual aid groups, both Twelve Step and other groups. Furthermore, our findings are in line with studies of effectiveness of mutual aid groups on addiction recovery in the United States (Kelly 2017; Kelly et al. 2020; Moos 2008; White et al. 2020). Therefore, we argue that in Europe, a variety of mutual aid groups need to be facilitated and recommended to persons seeking to initiate or sustain addiction recovery.

Limitations

The cross-sectional design and voluntary nature of mutual aid groups make it difficult to study the true causal effects of mutual aid group participation. On the one hand, this may mean that people with more recovery capital, social networks and motivation are more likely to 'fit in' mutual aid groups, have better access to it, or are better equipped to find them. On the other

hand, our findings may indicate that mutual aid groups help develop and sustain these resources. The latter explanation is in line with theories and emerging evidence around mutual aid (Costello et al., 2019; Humphreys, 2004; Kaskutas, 2009; Kelly et al., 2020; White, 2009).

In this study, participants self-defined the inclusion criteria of being in addiction recovery, which can be seen as both a weakness and strength of this study. A weakness, since it is difficult to operationalize the concept and there is some debate around the term 'recovery' (Doukas and Cullen 2009). However, multiple phrasings and explanations of 'recovery' were presented in our recruitment messages. Moreover, the subjective definition is a strength rather than a limitation because defining recovery as 'abstinence of any illicit substance' (Laudet and White 2008, 2010) fails to do justice to the holistic concept of recovery as developed in the field of addiction (Davidson and White 2007; Laudet and White 2010; van der Stel 2014; White 2007). If addiction recovery is regarded as a personal process, it might be better to not predefine it in one-dimensional inclusion criteria.

A final limitation of this study is the use of a convenience sample. We are not able to assess the generalizability of these findings to UK, Dutch or Belgian (or any other country) recovery populations, including mutual aid group participants, primarily since no data are available on this population. We found a difference in mutual aid group membership between countries, albeit using similar recruitment methods: a significantly smaller proportion was Belgian. Part of this difference may be explained by differing addiction recovery populations or recovery networks in each country.

Conclusion

Previous research focusing on alcohol addiction recovery and Twelve Step groups demonstrated that the benefits of mutual aid groups work through social networks, recovery capital and commitment to recovery. In the current study, we recruited persons in drug addiction recovery in three European countries (the UK, Netherlands, and Belgium). About two third of the sample reported lifetime membership of a variety of mutual aid groups, including Twelve Step groups. We found that lifetime members of mutual aid groups had greater recovery capital, more and changed social networks, and higher commitment to sobriety, compared to non-members. Prior studies show that mutual aid groups help to develop and sustain these outcomes (Kelly 2017; Moos 2008). Our study contributes to the

literature on addiction recovery by expanding these findings to a population of persons in (illicit) drug addiction recovery, members of non-Twelve Step groups, and to a European context across multiple national sites. Given the cross-sectional study design and the convenience sample, further studies are needed to confirm our findings, which are theoretically consistent with prior research

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Table 1. Sample Description split by lifetime membership of mutual aid groups

	Lifetime members of mutual aid Groups N=253 (68.9%)	Non-members of mutual aid groups N=114 (31.1%)	Differences [A, B, C]
Gender, %women	34.8	35.3	$P = 0.921$[A]
Age *Mean in years (SD)*	*42.9 (10.7)*	*38.46 (10.4)*	$P < 0.001$[B]
Country, %			$P < 0.001$[A]
UK	39.7	15.7	
Netherlands	43.4	23.5	
Belgium	17.1	43.3	
Education level, %			$P < 0.001$[C]
None/primary	4.8	17.4	
Secondary	39.7	48.8	
Higher	55.6	34.8	
Recovery Stage, %			$P = 0.002$[C]
< 1 year	11.9	24.3	
1-5 years	39.3	40.9	
> 5 years	48.8	34.8	
Chronic mental health problems, % yes	34.7	42.6	$P = 0.144$[A]
In paid employment, %	63.5	45.2	$P = 0.001$[A]
Abstinent from illicit drugs, %	94	74.8	$P < 0.001$[A]
Days used illicit drugs in past 30 days, *Mean (SD)*	*0.83 (4.32)*	*2.96 (7.52)*	$P < 0.001$[B]
Abstinent from alcohol, %	80.6	52.2	$P < 0.001$[A]
Days used alcohol in past 30 days, *Mean (SD)*	1.64 (4.86)	5.48 (8.53)	$P < 0.001$[B]
At what age did you first realize you had a problem with substance use? *Mean*	*25.2*	*23.8*	$P = 0.129$[B]
Have you ever *attended* a mutual aid group? (yes)	100	31.6	$P < 0.001$[A]
Have mutual aid groups played a role in enabling your recovery? (yes)	95.3	10.5	$P < 0.001$[A]
Are you currently attending a mutual aid group? (yes)	71.9	4.4	$P < 0.001$[A]

[A] Chi2 test
[B] Independent sample T-test
[C] Spearman's rho

Table 2. Recovery pathways: combinations of treatment and support ever used

	Total (n=367) n (%)
Natural recovery[A]	17 (4.6)
Only Member of Mutual Aid group	20 (5.4)
Only Patient of outpatient treatment	18 (4.9)
Only Attended residential treatment	21 (5.7)
Mutual Aid + Outpatient	33 (9.0)
Mutual Aid + Residential	50 (13.6)
Outpatient + Residential	58 (15.8)
Member/Patient/Attended all three types of treatment and support	150 (40.9)

[A] Never used any treatment or support

Table 3. Differences in Social group membership, Recovery Capital and Commitment to sobriety by mutual Aid group membership

(Sub)Scale	Lifetime Member of Mutual Aid (N=253)	Non-Member of Mutual Aid (N=115)	Differences between lifetime vs non-members T-test (2-tailed)[1]	Current Members (N=182)	Lifetime but non-current members (N=71)	Differences between current vs non-current members among lifetime members T-test (2-tailed) [1]
EXITS: Member of different groups (α=0.918), Mean (SD)	4.44 (1.72)	3.73 (1.82)	3.61 *p* <0.001	4.54 (1.62)	4.18 (1.93)	1.51 *p* = 0.132
EXITS: Maintaining social groups (α=0.875), Mean (SD)	2.58 (1.62)	2.33 (1.46)	1.41 *p* =0.159	2.57 (1.59)	2.63 (1.72)	-0.31 *p* =0.761
EXITS: Joining new groups (α=0.945), Mean (SD)	5.60 (1.60)	4.38 (1.89)	6.42 *p* <0.001	5.80 (1.32)	5.08 (1.32)	3.30 *p* =0.001
Recovery Capital (BARC-10) (α=0.838), Mean (SD)	5.23 (0.63)	4.77 (0.77)	6.11 *p* <0.001	5.26 (0.58)	5.15 (0.74)	1.29 *p* =0.197
Commitment to Sobriety (α=0.762), Mean (SD)	5.58 (0.59)	5.11 (0.87)	6.10 *p* <0.001	5.68 (0.48)	5.33 (0.74)	4.492 *p* <0.001

α = Cronbach's Alpha
[1] = T-value

Table 4: Multiple linear regression analyses of the relationship between social group membership, recovery capital and commitment to sobriety and lifetime membership of a mutual aid group

		Social group membership, β (95% CI)			Recovery Capital, β (95% CI)	Commitment to sobriety, β (95% CI)
Independent Variables:		Member of different groups	Maintaining social groups	Joining new groups		
Lifetime membership of mutual aid groups		0.188*** (0.074, 0.301)	0.055 (-0.061, 0.171)	0.292*** (0.183, 0.402)	0.211*** (0.105, 0.319)	0.288*** (0.177, 0.394)
Age		0.008 (-0.110, 0.125)	0.056 (-0.064, 0.177)	-0.085 (-0.198, 0.029)	0.044 (-0.068, 0.155)	0.156** (0.043, 0.267)
Gender,	Men	Ref	Ref	Ref	Ref	Ref
	Women	0.070 (-0.034, 0.174)	-0.122* (-0.228, -0.016)	0.056 (-0.044, 0.156)	-0.021 (-0.119, 0.077)	0.041 (-0.058, 0.140)
Recovery Stage,	Early	Ref	Ref	Ref	Ref	Ref
	Sustained	0.104 (-0.048, 0.256)	0.008 (-0.148, 0.163)	0.089 (-0.057, 0.236	0.230** (0.086, 0.373	0.104 (-0.043, 0.248)
	Stable	0.145 (0.023, 0.313)	-0.084 (-0.257, 0.088)	0.148 (-0.014, 0.311)	0.266*** (0.107, 0.425)	0.039 (-0.122, 0.200)
Country,	UK	Ref	Ref	Ref	Ref	Ref
	Netherlands	0.142* (0.017, 0.267)	-0.017 (-0.145, 0.110)	0.122* (0.002, 0.243)	-0.143* (-0.262, -0.026)	-0.058 (-0.177, 0.062)
	Belgium	0.163* (0.019, 0.306)	-0.038 (-0.185, 0.109)	0.080 (-0.059, 0.218)	-0.175** (-0.310, -0.039)	-0.043 (-0.180, 0.094)
Education,	Low	Ref	Ref	Ref	Ref	Ref
	Secondary	0.143 (-0.049, 0.336)	-0.070 (-0.267, 0.127)	0.132 (-0.053, 0.318)	0.103 (-0.078, 0.285)	0.018 (-0.166, 0.202)
	Higher	0.154 (-0.051, 0.359)	0.010 (-0.200, 0.220)	0.226* (0.029-0.425)	0.055 (-0.139, 0.249)	-0.124 (-0.319, 0.073)

* $P < 0.05$
** $P < 0.01$
*** $P < 0.001$
Ref = Reference category
β = Standardized Beta coefficient
CI = Confidence interval

Table 5: Explorative analysis of Social group membership, recovery capital and commitment to sobriety among members of Twelve Step groups and members of Non-Twelve Step groups

(Sub)Scale	Lifetime members of only Twelve Step group(s) (n=148)	Lifetime members of only non-Twelve Step group(s) (n=47)	Lifetime members of both group(s) (n=58)
EXITS: Member of different groups (α=0.918), Mean (SD)	4.38 (1.63)	4.29 (1.94)	4.71 (1.74)
EXITS: Maintaining social groups (α=0.875), Mean (SD)	2.64 (1.71)	2.37 (1.28)	2.63 (1.64)
EXITS: Joining new groups (α=0.945), Mean (SD)	5.64 (1.49)	5.22 (1.89)	5.82 (1.61)
Recovery Capital (BARC-10) (α=0.838), Mean (SD)	5.28 (0.59)	5.04 (0.75)	5.26 (0.61)
Commitment to Sobriety (α=0.762), Mean (SD)	5.65 (0.54)	5.27 (0.77)	5.68 (0.43)

α = Cronbach's Alpha

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