Group problem-solving skills training for self-harm: randomised controlled trial
Carmel McAuliffe, Breda C. McLeavey, Tony Fitzgerald, Paul Corcoran, Bernie Carroll, Louise Ryan, Brian O’Keeffe, Eva Fitzgerald, Portia Hickey, Mary O’Regan, Jillian Mulqueen and Ella Arensman

Rates of self-harm have shown a steady increase in recent years, particularly in men. Self-harm is the most important risk factor for suicide and the risk of suicide is further increased among those who self-harm repeatedly, particularly among females. Rates of repeated self-harm are significant and increasing. Yet there has been a lack of research evidence of effective treatment interventions for self-harm, which limits the power of treatment guidelines. Poorer problem-solving ability has been found among people engaging in self-harm, particularly those who self-harm repeatedly. There is substantial evidence that problem-solving ability mediates the relationship between stress and self-harm, whereby individuals with poor problem-solving ability under chronic stress are more likely to become hopeless and/or suicidal. Evidence also suggests that good problem-solving protects against self-harm, independently of depression or hopelessness levels. Among people who self-harm, coping responses characterised by greater passivity and avoidance are associated with an increased risk of repeated self-harm.

Promising results have been found for problem-solving therapy in reducing repetition of self-harm. In an early study of interpersonal problem-solving skills training, 39 patients who had self-poisoned were randomly assigned to five sessions of individual interpersonal problem-solving skills training or to a brief problem-oriented approach. Although similar improvements were found in levels of hopelessness and presenting problems for both treatment conditions, those assigned to interpersonal problem-solving skills training had a lower rate of repetition at 12-month follow-up compared with the control group. The difference in repetition between treatment groups was not statistically significant however as, like many of the early trials, the sample size was too small. A later trial involving 120 adults who had recently self-harmed reported a significantly lower repetition rate among those assigned to a cognitive therapy arm comprising ten out-patient cognitive therapy sessions that included a problem-solving component, compared with usual care. The investigators also reported a significant improvement in self-reported levels of depression and hopelessness, but there was no difference between treatment conditions on rates of suicidal ideation. Generalisation of the study outcomes is difficult because of the high self-harm repetition rate in the control group. Another trial examined a 12-session cognitive–behavioural therapy (CBT) programme with 90 adolescents and young adults (aged 15–35 years) who had recently engaged in self-harm. The programme was based on a model of maintenance factors of self-harm drawing on the assumption that they can be modified by adjusting negative thinking and problem-solving deficits. The authors reported a significant reduction in repetition of self-harm in the CBT group. Even though the study outcomes support the efficacy of brief CBT for self-harm, it is not clear whether the outcomes can be generalised because of the relatively young target population and the pattern of frequent self-harm repetition prior to enrolment in the study. The failure of an earlier trial using a manual-assisted cognitive therapeutic approach to demonstrate a reduction in repeat episodes, in which over a third of the active treatment sample received a treatment manual alone without any treatment sessions, suggests that reliance purely on a self-help approach among repeaters of self-harm is ineffective in reducing repetition.

Again, generalisation of the study outcomes was hampered by only including patients with a history of self-harm acts.

In the present study, the effectiveness of a brief group problem-solving skills training (PST) programme for self-harm was examined among both younger and older adults who have self-harmed, and including those with and without a history of self-harm. When the PST programme was previously compared against standard care in the treatment of individuals who have self-poisoned using individual psychotherapy, lower rates of repeated self-harm were reported in the PST group. The intervention was based on a problem-solving model of self-harm and its repetition, originally developed for the treatment of
depression. Compared with treatment as usual (TAU) alone, the PST programme was expected to be significantly more effective in: (a) reducing the rate of repetition of self-harm and suicidal ideation; (b) improving psychological and social functioning as assessed by standardised measures of interpersonal problem-solving skills, self-efficacy and perceived social support; and (c) reducing levels of depression, anxiety, hopelessness and impulsivity.

### Design

Following initial assessment, participants were randomly assigned to treatment conditions on the basis of a computer-generated sequence of numbers. Allocation was concealed using sealed opaque envelopes. Randomisation was stratified according to the gender and repeater status of participants as well as the study site at which participants were recruited. Participants were randomly assigned to either six sessions of group PST in addition to TAU (standard care) as offered by mental health services or to TAU only. The trial was approved by the clinical research ethics committee of the Cork University Teaching Hospitals and the HSE Mid-Western Area Regional Ethics Committee.

### Participants

Consecutive patients aged 18–64 were included in the trial if, during the previous 3 days, they had engaged in self-harm defined according to the definition devised by the World Health Organization (WHO) Working Group of the WHO/EURO Multicentre Study on Suicidal Behavior as ‘an act with non-fatal outcome, in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage, and which is aimed at realizing changes which the subject desired via the actual or expected physical consequences’. All participants received a psychiatric review by a liaison psychiatrist in line with standard practice in all recruiting emergency departments and acute psychiatric units. On the basis of the psychiatric review notes, patients were excluded from the trial if they had a history of psychosis, intellectual disability, sensory disability or organic cognitive impairment; were currently alcohol or drug dependent; were in prison at the time of the episode; or were not living at a fixed abode. The baseline assessment schedule or drug dependent; were currently alcohol or who scored above the cut-off for dependence on the Short Alcohol Dependent Data questionnaire (SADD).

### Intervention: Problem-solving skills training

The PST programme (B. McLeavey, personal communication, 2001) consisted of six 2 h closed group sessions, held weekly, of structured, manualised interpersonal problem-solving skills training, facilitated...
by a trained therapist and a co-therapist. A ’Practice at Home Journal’ was provided for participants to carry out homework assignments using their own interpersonal problems (B. McLeavey, personal communication, 2001). Treatment fidelity was ensured by strict adherence to the skills training manual, completion of a session-adherence self-report worksheet by therapists at the end of each weekly session and weekly supervision by a research psychologist who had delivered the training to the therapists. Supervision included screening of session-adherence self-report worksheets. The programme was held in a central community-based venue in both trial sites (Cork and Limerick). To minimise attrition rates, problem-solving therapists made routine between-session telephone calls to participants in the PST group to remind them of the date and time of their next appointment.

**Treatment as usual**

Treatment as usual involved assessment by mental health professional staff and by crisis nurses. Psychosocial assessment of all patients was carried out by a psychiatrist (liaison psychiatry or mental health team) to determine mental health needs and level of risk to self or others. Patients who had no contact with mental health services during the previous year and not requiring referral to mental health acute or community-based services were referred to the crisis nurse service for further psychosocial assessment and suicide risk assessment. A collaborative management plan of care, including a problem-solving approach and relapse prevention techniques, was agreed between the crisis nurse and the patient. Those who were referred on by the psychiatrist to mental health acute or community-based services were commonly offered pharmacological treatment and review by the mental health team and less frequently counselling or psychotherapy.

**Power analysis**

Based on the power calculation, 219 participants were required in each treatment condition of the trial in order for the study to have 80% power to identify a reduction from 20% to 10% in the proportion who repeated self-harm as being statistically significant at the 5% significance level. The expected effect was based on an earlier smaller trial of problem-solving therapy in the same setting in which the rate of repeated self-harm among those assigned to PST was 11% at 12 months v. 25% among those assigned to standard care.24

**Statistical analysis**

For the primary outcome measure (repeated self-harm), separate binary regression models were estimated for each follow-up period. These models were estimated for participants who provided self-report data on the outcome measure at 6-week (313 of 354) and 6-month (234 of 326) follow-up. The model for the outcome of hospital-treated repeated self-harm was based on all 433 participants. The covariates included were the treatment condition and whether the participant had a history of self-harm prior to the index act. For the PST group the association between the waiting time (time from the index presentation to starting PST) and repeated self-harm was examined using a binary regression that included the log-transformed waiting time and history of self-harm prior to the index episode.

For each of the other outcome measures, treatment effect (PST v. TAU) was estimated using a linear mixed-effects model,32 which utilised all available data from baseline and follow-up. Treatment effect was not assessed for the problem-solving skills measures, Means-Ends Problem-Solving Procedure (MEPS)33 and the Optional Thinking test (OT),34 as these measures were only assessed at 6-week follow-up and were incomplete for 45% of participants. The linear mixed-effects models included a random intercept to allow for correlations between repeated measures on the same individual. The covariates included were the treatment condition, follow-up period and the interaction of treatment condition and follow-up period. The interaction term allows the effect of treatment to differ between 6-week and 6-month follow-up. Data were analysed using Stata version 12.1 for Windows.

**Results**

During the recruitment phase, 2661 patients presenting with self-harm were screened for the trial (Fig. 1). Over half of the patients screened (1527, 57%) were ineligible. Reasons for ineligibility included being alcohol dependent (16%), outside the age range (13%), with a current or previous psychosis (8%), living outside the trial area (7%), drug dependent (3%), not medically fit within the required time to complete the initial assessment (2%), of no fixed abode (2%) and having an intellectual disability (1%). Of the 1134 eligible patients (43%), 433 (38%) were randomised whereas 701 (62%) refused to participate. Most of the 433 participants (313, 72%) were recruited from the local hospital emergency departments and the remaining 120 (28%) were recruited from acute mental health in-patient units. A total of 222 patients were randomised to group problem-solving skills training (PST group) and 211 were randomised to treatment as usual (TAU group). The median length of time from index episode to starting PST was 40 days.

Baseline characteristics of participants in each treatment group are reported in Table 1. Participants assigned to TAU (n = 211) were similar to those in the PST group (n = 222) with regard to all measures. A higher proportion of those assigned to TAU had self-harmed using an overdose at index episode.

**Outcome measures at baseline, post-assessment and follow-up**

The treatment groups did not differ in rates of repeated self-harm at 6-week, 6-month and 12-month follow-up (Table 2). Similar numbers of repeat presentations to hospital were recorded for participants in both treatment conditions in the 12 months following the index presentation. For the 54 of the 222 participants assigned to PST who made a repeat self-harm presentation to hospital, 38 (70.4%) represented once, 9 (16.7%) represented twice, 2 (3.7%) represented 3 times, 3 (5.6%) represented 4 times, 1 (1.9%) represented 8 times and 1 (1.9%) represented 13 times. For the 50 of the 211 participants assigned to TAU who represented because of self-harm, 30 (60.0%) represented once, 10 (20.0%) represented twice, 3 (6.0%) represented 3 times, 3 (6.0%) represented 4 times, 3 (6.0%) represented 5 times and 1 (2.0%) represented 18 times. Three participants were known, based on hospital records, to have died by suicide during the 12-month follow-up period (two in the TAU group and one in the PST group). Repetition was not associated with waiting time in the PST group.

Compared with those in the TAU group, participants in the PST group did not show a significantly different change on any of the secondary outcome measures at 6-week or 6-month follow-up, with the exception of the Practical Support subscale from the Social Life Scale 35,36 on which there was a positive treatment effect at 6 weeks (P = 0.004) and at 6 months (P = 0.01). The Practical Support subscale is a measure of the extent to which a person needs practical help and receives practical help from the person closest to them.
Drop-out rates

There was a significant difference in the rate of drop-out from the trial (in terms of those failing to present at follow-up) between the two groups. Drop-out rates were higher in the TAU group 23% v. 14% in the PST group (P = 0.009) at 6-week assessment and 30% in the TAU group v. 20% in the PST group (P = 0.02) at 6-month follow-up. There was no difference in baseline measurement between those who attended the 6-week assessment and those who did not, with the exception of scores on the Beck Anxiety Inventory35,36 on which participants in the PST condition showed a significantly greater improvement at 6 weeks and at 6 months. There was a significant difference in the rate of drop-out from the main trial (in terms of those failing to present at follow-up) between the two groups. Drop-out rates were higher in the TAU group 23% v. 14% in the PST group (P = 0.009) at 6-week assessment and 30% in the TAU group v. 20% in the PST group (P = 0.02) at 6-month follow-up. There was no difference in baseline measurement between those who attended the 6-week assessment and those who did not, with the exception of scores on the Beck Anxiety Inventory35,36 on which participants in the PST condition showed a significantly greater improvement at 6 weeks and at 6 months. There was a significant difference in the rate of drop-out from the trial (in terms of those failing to present at follow-up) between the two groups. Drop-out rates were higher in the TAU group 23% v. 14% in the PST group (P = 0.009) at 6-week assessment and 30% in the TAU group v. 20% in the PST group (P = 0.02) at 6-month follow-up. There was no difference in baseline measurement between those who attended the 6-week assessment and those who did not, with the exception of scores on the Beck Anxiety Inventory35,36 on which participants in the PST condition showed a significantly greater improvement at 6 weeks and at 6 months. There was a significant difference in the rate of drop-out from the trial (in terms of those failing to present at follow-up) between the two groups. Drop-out rates were higher in the TAU group 23% v. 14% in the PST group (P = 0.009) at 6-week assessment and 30% in the TAU group v. 20% in the PST group (P = 0.02) at 6-month follow-up. There was no difference in baseline measurement between those who attended the 6-week assessment and those who did not, with the exception of scores on the Beck Anxiety Inventory35,36 on which participants in the PST condition showed a significantly greater improvement at 6 weeks and at 6 months.
Participants in both the PST and TAU groups showed significant improvements on most outcome measures. In both groups, participants improved significantly on 9 out of 11 outcome measures comparing baseline to 6-week follow-up. At 6-month follow-up no further significant changes were observed for these outcome measures, indicating that improvements made in both treatment conditions were maintained over time.

### Practical problems with the implementation of design and lack of differential treatment effects

The theoretical model underlying the experimental treatment (PST) condition was that the development of improved interpersonal-problem-solving skills in participants would lead to reduced vulnerability to repeated self-harm. Although significant improvements were found in these skills among participants in both groups, no significant differences were found between those in the PST group and those in the TAU group on any of the outcome measures of problem-solving at 6-week or 6-month follow-up. Several procedural aspects of the trial may have had a therapeutic effect on the patient’s condition and therefore may have contributed to the lack of differential treatment outcomes between the groups. As described earlier, participants in both the PST and TAU groups were encouraged to identify a significant other (for example a friend or family member) who would support their initial connection with the treatment programme. Following randomisation, significant others (PST and TAU groups) were informed by letter that their relative or friend had nominated them as their significant other to support their involvement in the treatment programme. Following recruitment, all participants (PST and TAU groups) were contacted by telephone on a weekly basis to minimise pretreatment attrition. The participants themselves were also notified by telephone and by letter of their treatment allocation. Initial and follow-up assessments provided participants in both groups with the opportunity to discuss problems. In cases where participants were discharged from hospital prior to completion of initial assessment and where they could not make their way to the venue for follow-up assessment, home visits were arranged by the researcher. It could be argued that this may have obfuscated differences between the treatment conditions. The possible therapeutic effects of these active intervention aspects should not be underestimated. For example, in an earlier trial by Carter and colleagues the number of repeat self-harm episodes was significantly reduced in those who received a minimal intervention (eight postcards posted to medically treated individuals who had self-poisoned over a...
12-month follow-up period). Like Carter and colleagues however, the design of the present trial does not allow us to examine the possible mechanism of action of these additional interventions. It can also be argued that the possible therapeutic effects of these procedural aspects occurred in both treatment conditions, which although making them more similar probably did not influence the likelihood of finding a differential treatment effect of the active treatment condition.

**Strengths and limitations**

Strengths of this trial include the large sample size and assessment of the primary outcome measure (repeated self-harm) from both participants’ self-report and researchers’ independent ascertainment. Although significant improvements in outcome measures at follow-up were found among patients in both groups and a number of explanations can be offered for the lack of differences in outcomes between PST and TAU, additional limitations of the trial merit attention.

**Differential drop-out rates**

The significantly greater drop out at post-assessment and follow-up of participants assigned to TAU may have masked important differences in treatment outcome at both follow-up periods. Those who failed to attend the 6-week follow-up had significantly higher levels of anxiety at baseline assessment suggesting that they may have been more unwell at follow-up. However, we carried out analyses that included adjustment for baseline values and the findings were highly consistent with those reported in the paper.

**Duration, format and waiting time**

A brief group-based interpersonal problem-solving skills training intervention delivered over six sessions may not have been sufficient to significantly reduce repetition among the group of individuals who self-harmed included in the present trial, of whom the majority had a history of self-harm episodes and scored within the severe range on level of depression. The brief interventions tested in trials with patients who have self-harmed (published after our trial commenced) typically include 10–12 treatment sessions.25,26 Furthermore, the PST intervention of 6 weeks duration may have been too brief to teach patients skills to interrupt repetition, when considered in the context of the high risk of repetition for the first 12 months following the index episode. This is further supported by negative outcomes of a brief manual-assisted CBT intervention (maximum seven sessions) for patients who had self-harmed, all of whom had a history of self-harm acts.27 In contrast, an earlier trial using a brief 12-session CBT intervention lasting approximately 5.5 months, showed positive treatment effects on self-harm repetition and related mental health outcomes favouring the CBT intervention.26

Another possible explanation for the lack of differential treatment effects is the group format of the PST programme. A recent review of cognitive–behavioural interventions to reduce suicidal behaviour found that trials where one-to-one CBT was included, and also trials combining individual and group treatment, showed a very significant effect on repetition, whereas studies using group therapy alone did not.23

A further important limitation arising from the implementation of a randomised controlled trial investigating group therapy is the potentially significant delay between recruitment and treatment initiation. In the present trial the median length of time between index episode and first PST session was 40 days. Although we found no association with repetition, this almost certainly contributed to the significant attrition prior to PST commencement. Perhaps more importantly this considerable window of time meant that pragmatic measures taken to minimise attrition for all patients (PST and TAU groups) including weekly telephone calls and encouragement from a significant other are likely to have had important treatment effects in both groups and may also explain the lack of differential treatment effects. The clinical profile of participants in the present trial indicates a group that requires more intensive input (incorporating one-to-one and group therapy sessions and long-term treatment approaches), to address patterns of frequent self-harm repetition associated with comorbid psychological and psychiatric problems.25,26 Many of the patients who completed the PST intervention indicated the need for more than six treatment sessions, which further supports this explanation. Put more simply the experimental treatment programme in the present trial (PST), may have provided patients with too little too late.

**Eligibility**

The most common reason for ineligibility for the trial was alcohol dependence followed by age that was outside the trial age range. Together these comprised half of those excluded from the trial. Given the high risk of repetition among those misusing alcohol25 and the high rates of self-harm among girls aged 15–19 years in particular,2 this trial failed to evaluate the efficacy of problem-solving skills training in reducing repetition in these subgroups.

**Clinical implications**

Our findings indicate that for individuals who self-harm, the majority of whom have a history of self-harm, a brief group problem-solving skills training programme is no more effective than TAU when delivered a median of 40 days following the index episode. In clinical practice this time delay to therapy group initiation would likely be halved as the constraint of randomisation of eligible patients in a parallel trial would be absent. Future trials might reduce potential delays to treatment initiation by broadening the inclusion criteria further, for example time from index episode to initial assessment could be extended up to 1 week. Patients with a history of psychosis but not currently psychotic could also be included. Additional measures to minimise the wait to commence therapy could include offering an initial one-to-one primer session with an overview of the PST programme material or by running the six-session PST programme as a semi-closed rather than a fully closed group on a repeat basis, with each patient repeating the treatment programme over 11 weeks, which could significantly shorten the waiting time. Further work is required to establish whether a modified, more intensive group problem-solving skills training programme delivered sooner following the index episode would be effective.
Overview of instruments used to assess psychological, behavioural and social characteristics assessed at baseline, 6-week post-assessment and 6-month follow-up

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Baseline</th>
<th>6 weeks</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide Intent Scale (SIQ)</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Beck Scale for Suicidal Ideation (BSS)</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Beck Depression Inventory (BDI)</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Beck Anxiety Inventory (BAI)</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Barratt Impulsivity Scale (BIS)</td>
<td>✓</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Generalised Self-efficacy Scale (GSS)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Means-Ends Problem-Solving Procedure (MEPS)</td>
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<tr>
<td>Optional Thinking Test (OTT)</td>
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<td>-</td>
</tr>
<tr>
<td>Self-Rating Problem-Solving Scale (SRPS)</td>
<td></td>
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<tr>
<td>Current Problems List (CPL)</td>
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<tr>
<td>Beck Hopelessness Scale (BHS)</td>
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<tr>
<td>Social Life Scale</td>
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</tr>
</tbody>
</table>

a. Denotes instruments that were administered at baseline within 3 days of the index episode.

References

I am proud to be a psychiatrist. Despite often feeling stigmatised by medical colleagues, I have always derived a great sense of personal reward and satisfaction from my chosen line of work. As psychiatrists, we try to understand how it must feel for our patients, and we strive to treat them with compassion, empathy and humanity. But what happens when you suddenly find yourself on the other side of the fence?

Last year, after a traumatic event, I started experiencing persecutory delusions and was convinced that my life was in grave danger. A descent into full-blown paranoid psychosis ensued, culminating in a hospital admission and treatment with antipsychotic medication.

I was a patient on a ward on which I used to work – my worst nightmare realised. Not only was I embarrassed to be there, the staff with whom I used to work appeared equally embarrassed for me. The pity was written all over their faces. And my own prejudice towards mentally ill patients surfaced. Despite needing acute assessment and treatment, I felt I was for some reason better than or at least different to them. I wanted to distance myself from them – to reassure myself that I was not one of them. But, alas, I was. I was just as unwell, and just as human. I was just as vulnerable and susceptible to mental illness, just as breakable. I was no longer the ‘doctor’, I was their equal.

After my illness, I felt a sense of deep-seated shame and guilt and came to view myself as ‘weak-minded’. This ‘self-stigmatisation’, where the stigmatised person relates to negative attitudes expressed by others towards themselves and their illness, is debilitating – if you share in the negativity surrounding you and view such attitudes as ‘understandable’, where is the motivation to fight them? Other people’s – including my psychiatrist’s – wishes to conceal this episode have only served to compound and perpetuate my own sense of shame and embarrassment. Of course, they are concerned about my career. My psychiatrist attempted to minimise the psychotic quality and severity of my illness – does he, too, anticipate discrimination against a fellow doctor with a history of mental illness?

I am relieved to say that currently I am enjoying a period of sustained mental stability, which I can only hope continues ad infinitum.

So why did I share my experience of psychotic illness? I surmised that all my anti-stigma support for my patients would not mean a thing unless I was willing to practise as I preach. I would like to think this decision will come to be viewed as one of personal dedication to the cause of de-stigmatising mental illness, and that the whole experience will help me become a better psychiatrist.
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