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Psychosocial interventions following self-harm in adults: A systematic review and meta-analysis

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Summary

Background: Self-harm (intentional acts of non-fatal self-poisoning or self-injury) is common, often repeated and strongly associated with suicide. Effective aftercare of individuals who self-harm is therefore important. We have undertaken a Cochrane systematic review and meta-analysis of the effectiveness of psychosocial interventions for self-harm in adults.

Methods: We searched five electronic databases (CCDANCTR-Studies and References, CENTRAL, MEDLINE, EMBASE, and PsycINFO) for randomised controlled trials (RCTs) of psychosocial interventions for adults following a recent (within six months) episode of self-harm. Fifty-five non-overlapping RCTs were identified. Most interventions were evaluated in single trials. We report results for interventions for which at least three RCTs comparing interventions to treatment as usual have been published and hence might contribute to clinical guidance.

Findings: Cognitive behavioural-based psychotherapy (CBT; comprising cognitive-behavioural and/or problem-solving therapy) was associated with fewer participants repeating self-harm at six (OR 0.54, 95% CI 0.34 to 0.85; 12 trials; $N=1,317$) and 12 months' follow-up (OR 0.80, 95% CI 0.65 to 0.98; 10 trials; $N=2,142$). There were also significant improvements in depression, hopelessness and suicidal ideation. Patients receiving dialectical behaviour therapy (DBT; three trials) had fewer repeat self-harm episodes post-intervention (MD -18.80, 95% CI -36.70 – -0.95; 3 trials; $N=292$), however, DBT was not associated with a significant reduction in the proportion of participants engaging in self-harm. Case management and sending regular postcards (four trials each) did not reduce repetition.

Interpretation: CBT-based psychotherapy appears to be effective in patients following self-harm. DBT reduces frequency of repetition of self-harm. However, aside for CBT-based psychotherapy, there were few trials of other promising interventions, precluding firm conclusions as to their effectiveness.

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INTRODUCTION

Self-harm (non-fatal intentional acts of self-poisoning or self-injury irrespective of degree of suicidal intent)¹ has been a growing problem in most countries over the past 40 years. In the UK it is estimated that there are now more than 200,000 presentations to general hospitals each year.² Self-harm consumes considerable hospital resources in both developed³ and developing⁴ countries. Self-harm is most common in younger people.¹⁻⁴ Unlike suicide, self-harm usually occurs more commonly in females than males, although the female-to-male ratio appears to have narrowed over the past decade.⁵ The gender ratio also decreases over the life span.⁶

Self-harm is also often repeated, with 15-25% of individuals who present to hospital with self-harm re-presenting following a repeat episode within a year,⁷ although the risk of repetition is lower in adults of older age.⁸ A history of self-harm is the strongest risk factor for suicide across a range of psychiatric disorders.⁹ Repetition of self-harm further increases the risk of suicide.¹⁰

Given the size of the problem of self-harm, the frequency with which it is repeated, and the risk of subsequent suicide, it is important that effective treatment interventions are developed for this patient population. We previously published a systematic review and meta-analysis of both psychosocial and pharmacological treatment studies across the age spectrum in 1998,¹¹ which was subsequently updated in an official guideline in 2011.¹² We have recently conducted a major update of this review in conjunction with the Cochrane Collaboration.¹³⁻¹⁵ In the present report we have focused on the results of psychosocial interventions for self-harm in adults investigated in a minimum of three independent trials compared with

treatment as usual (TAU), because this permitted meta-analysis, the results of which are likely to have clinical implications.

METHOD

Search Strategy and Selection Criteria

We searched for randomised controlled trials (RCTs) of psychosocial treatments in adults following a recent (within six months) episode of self-harm indexed in five electronic databases (CCDANCTR-Studies and References, CENTRAL, MEDLINE, EMBASE, and PsycINFO) between 1 January, 1998 and 29 April, 2015. The electronic search strategy for these databases is outlined in Supplementary Document SD1. Reference lists of major reviews in this area were also screened and authors active in this field were contacted to identify ongoing or unpublished trials.

Trials were eligible for inclusion provided they met the following criteria: (a) used random allocation to assign participants to the intervention and control groups; (b) participants were 18 years or older at the point of randomisation; (c) all participants had engaged in self-harm no more than six months prior to randomisation; (d) the trial evaluated the effectiveness of a psychosocial intervention relative to TAU, enhanced usual care, or other forms of lower intensity or alternative therapies. Non-English language trials were eligible for inclusion and were translated by native speakers.

Self-harm was defined as including any non-fatal act of self-poisoning or self-injury irrespective of degree of suicidal intent or other type of motivation.¹

Trials were independently screened for inclusion by KW and one of TTS, EA, DG, PH, ET, or KvH. Disagreements were resolved following discussion with KH. Where insufficient information was recorded in the study report to determine eligibility, study authors were contacted to provide additional clarification.

Grouping of trials in terms of specific types of interventions was done by consensus within the review group, based partly on standard categorisation of therapeutic approaches together with discussion and consensus within the review group and with other experts in the field, and also correspondence with some authors to clarify the nature of the interventions. We combined cognitive behaviour therapy with problem solving therapy as ‘cognitive behavioural-based psychotherapy’ because the latter is an integral part of cognitive behaviour therapy and both involve cognitive-behavioural treatment principles.

In this report we have focused on trials in which a specific psychosocial intervention has been compared with TAU (or in one case enhanced usual care) and has been evaluated in at least three trials. We list all other interventions for which we identified trials in Supplementary Document SD2. For our full Cochrane review see the Cochrane Library.¹³

Data Extraction

Quantitative information was extracted independently by KW and one of TTS, EA, DG, PH, ET, or KvH. Any disagreements were resolved following discussion with KH and study authors were contacted to provide additional information where data were missing or unclear.

We assessed risk of bias for each included trial using the approach favoured by the Cochrane Collaboration.¹⁶ Each study was rated as “high”, “unclear” or “low” risk of bias with respect

to the following: adequacy of the random sequence generation procedure, adequacy of allocation concealment, presence of participant and clinical personnel blinding, presence of outcome assessor blinding, presence of incomplete outcome data, presence of selective outcome reporting, and presence of any other bias.

Outcome Measures

The primary outcome was repetition of self-harm at the conclusion of treatment ('post-intervention') and at six, 12, and 24 months' follow-up. Secondary outcomes included frequency of repeated episodes of self-harm, suicide, suicidal ideation, depression, hopelessness, and problem solving.

Statistical Analyses

Proportions of participants repeating self-harm and deaths by suicide were assessed using the summary odds ratio (OR) and accompanying 95% confidence interval (CI). Data on frequency of self-harm, suicidal ideation, depression, hopelessness, and problem solving scores were pooled using the mean difference (MD), where outcomes were assessed using the same psychometric scale for all studies included in the meta-analysis, or the standard mean difference (SMD) and its accompanying 95% CI where outcomes were assessed using different psychometric scales. Analyses were undertaken in RevMan for Windows, version 5.3, using the Mantel-Haenszel random effects model for dichotomous data and the inverted variance random effects model for continuous data.

We conducted analyses using the intention-to-treat method where data were available to allow this. This was usually possible when examining the outcomes of repetition of self-harm

and suicide. Where outcomes relied on patient interview, this was generally not possible and we have instead used all available case data.

Between-study heterogeneity was assessed using the I^2 statistic, which indicates the percentage of variance between-study attributable to genuine differences between studies rather than the play of chance.¹⁷ Investigation of potential causes of heterogeneity are typically only undertaken when $I^2 \geq 75\%$.¹⁷

Role of the funding source

The source of funds used for this study (personal funding from the National Institute of Health Research to KH) had no role in study design, data collection, data analysis, data interpretation, or writing of the report. KH and KW had full access to all the data in this study and all authors had final responsibility for the decision to submit for publication.

RESULTS

We identified 23,830 citations. An additional 10 trials ongoing at the time of the systematic search were identified through correspondence with researchers in the field. Following de-duplication, this figure was reduced to 16,799. A total of 16,538 were excluded following screening, whilst a further 237 were excluded after reviewing the full text. Seven trials were excluded as they evaluated the effectiveness of a pharmacological intervention (see ¹⁴), whilst a further 11 trials were excluded as they evaluated an intervention for children and adolescents (see ¹⁵).

A further 26 trials were excluded from this report as fewer than three independent trials investigated the effectiveness of the same intervention. For information on the effectiveness

of the remaining interventions not covered in this report the reader is instead referred to our review in the Cochrane Library.¹³ A total of 29 trials were therefore included in the present review (Figure 1; Supplementary Document SD3), comprising 18 trials of cognitive behavioural-based psychotherapy (CBT),¹⁸⁻³⁵ three trials of dialectical behaviour therapy (DBT),³⁶⁻³⁸ and four trials each of case management³⁹⁻⁴² and postcards.⁴³⁻⁴⁶

(Insert Figure 1 about here)

The included trials comprised a total of 8,480 adult participants. The weighted mean age of participants at randomisation was 25.5 years (standard deviation 15.7 years, range 22.3 years to 42.3 years). Almost three-quarters of participants were female (70.7% in the 25 trials that recorded information on gender). Just over one half of participants had a history of multiple episodes of self-harm (58.4% in the 18 trials that recorded information on history of self-harm).

Cognitive Behavioural-based Psychotherapy versus Treatment as Usual

CBT-based psychotherapy, comprising both cognitive behavioural therapy and/or problem-solving therapy, was compared to TAU in 18 independent trials.¹⁸⁻³⁵

Data on the proportion of patients repeating self-harm by the end of treatment was only available for one trial,²⁷ in which there was no apparent effect (23/171 vs. 27/142, OR 0.66, 95% CI 0.36 to 1.21, $N=313$). However, CBT-based therapy was associated with fewer participants repeating self-harm at the six month (OR 0.54, 95% CI 0.34 to 0.85, $N=1,317$; Figure 2) and 12 month follow-up assessments (OR 0.80, 95% CI 0.65 to 0.98, $N=2,232$;

Figure 2). There was no evidence of a significant reduction in frequency of self-harm by the 12 month follow-up period, however (MD -0.21, 95% CI -0.68 to 0.26; $N=594$; Figure 2).

By the conclusion of the follow-up period, there were nine suicide deaths in patients allocated to CBT-based psychotherapy and 15 in those allocated to TAU. There was no evidence of a significant reduction in suicides by this point (OR 0.66, 95% CI 0.29 to 1.51; $N=2,354$; Figure 2).

(Insert Figure 2 about here)

CBT-based psychotherapy was associated with significant reductions in scores for both depression and hopelessness at the six and 12 month assessments, and for suicidal ideation and problem-solving at six months (Figure 3).

(Insert Figure 3 about here)

Dialectical Behaviour Therapy versus Treatment as Usual

The efficacy of DBT as compared to TAU in participants diagnosed with personality disorder (predominately borderline personality disorder) was investigated in three trials.³⁶⁻³⁸ There was no evidence of a significant treatment effect for DBT on the proportions of participants repeating self-harm at post-intervention (OR 0.59, 95% CI 0.16 to 2.15; $N=267$; Figure 4) nor at 12 months in two of these trials (OR 0.36, 95% CI 0.05 to 2.47; $N=172$; Figure 4).

However, there was a significant treatment effect on frequency of self-harm in favour of DBT at post-intervention (MD -18.82, 95% CI -26.68 to -0.95; $N=292$; Figure 5).

(Insert Figure 4 about here)

(Insert Figure 5 about here)

There was no evidence of a significant treatment effect for DBT on suicide at post-intervention, although only one such event was observed (OR 3.00, 95% CI 0.12 to 76.49; $N=317$; Figure 4). There was no evidence of a significant treatment effect for DBT on depression, hopelessness, or suicidal ideation scores, although these analyses only included one or two of the trials (Figure 5). None of the included studies measured changes in problem-solving scores.

Case management versus Treatment as Usual or Enhanced Usual Care

The effectiveness of case management was compared to TAU^{39, 40, 42} or enhanced usual care⁴¹ in four independent trials. There was no evidence of a significant treatment effect for case management by the post-treatment assessment (OR 0.78, 95% CI 0.47 to 1.30; $N=1,608$; Figure 6).

(Insert Figure 6 about here)

There was no indication of a significant treatment effect for case management on suicide at post-intervention (OR 0.95, 95% CI 0.57 to 1.57; $N=1,757$; Figure 6). No data on the other secondary outcomes were reported for these trials.

Postcards versus Treatment as Usual

The effectiveness of sending regular postcards to patients over a 12 month period in addition to TAU was compared to TAU alone in four trials.⁴³⁻⁴⁶ Sending postcards did not have a significant effect on the proportion of participants repeating self-harm by the post-intervention (OR 0.87, 95% CI 0.62 to 1.23; $N=3,214$; Figure 7) or 12 month follow-up assessments in two of these studies (OR 0.76, 95% CI 0.57 to 1.02; $N=2,885$; Figure 7),^{44,45} although the latter result was borderline.

Visual inspection of Figure 7 would suggest that the result for one trial at post-intervention may be an outlier.⁴⁶ Omitting this relatively small pilot trial reduced heterogeneity from 51% to 0% and indicated a significant treatment effect for postcards (OR 0.78, 95% CI 0.62 to 0.97; 3 trials; $N=3,212$). Additionally, it is noticeable that, in the very large trial from the Islamic Republic of Iran,⁴⁵ there was a significant reduction in the proportion of participants who were sent postcards repeating self-harm at both time points (Figure 7). No evidence of benefit was found in terms of frequency of repetition at post-intervention in three trials (MD -0.07, 95% CI -0.32 to 0.18; $N=1,097$; Figure 8), at 12 months follow-up in two trials (MD -0.19, 95% CI -0.58 to 0.20; $N=984$; Figure 8), or at 24 months follow-up in one trial (MD -0.03, 95% CI -0.16 to 0.10; $N=472$; Figure 8), although interestingly a five year follow-up of one of these trials suggested an impact at this stage.⁷

(Insert Figure 7 about here)

(Insert Figure 8 about here)

Information on the effectiveness of this intervention by gender and repeater status is provided in our related review in the Cochrane Library.¹³ Where there was any evidence of a difference in treatment effect by gender or repeater status, interventions tended to be more beneficial for females and for individuals who had a history of multiple episodes of self-harm.

There was no evidence of a significant effect for postcards on suicides in all four trials at post-intervention (OR 1.86, 95% CI 0.61 to 5.72; $N=3,464$; Figure 7), or in one trial at the 12 month follow-up assessment (OR 0.41, 95% CI 0.08 to 2.15; $N=772$; Figure 7). No data on changes in depression, hopelessness, or problem-solving were reported for any of the included trials. Dichotomous data on the number of participants self-reporting an episode of suicidal ideation were available for one trial,⁴⁵ with a significant treatment effect favouring the postcard condition by the post-intervention assessment [302/1043 vs. 446/1070; OR 0.57, 95% CI 0.48 to 0.68; $N=2,113$], an effect that was maintained at the 12 month follow-up assessment [465/997 vs. 588/1004; OR 0.62, 95% CI 0.52 to 0.74; $N=2,001$].⁴⁸

Publication bias

Presence of publication bias could be formally evaluated for CBT-based psychotherapy (inclusion of 10 trials minimum) with respect to repetition of self-harm at six months and 12 months (see Supplementary Document SD4). The relative absence of smaller studies showing no beneficial effect for CBT-based psychotherapy (to the right lower side of the funnel plots) suggested publication bias. It is therefore possible that there are unpublished trials in which the experimental treatment was ineffective, although other potential causes of funnel plot asymmetry include differences in methodological quality between trials, true heterogeneity, and artefactual sampling variation

DISCUSSION

Since our previous review in 1998, there has been a considerable increase in the number of trials of psychosocial treatments for adults who self-harm and also in the types of interventions that have been evaluated. This reflects concerns internationally about this issue, in part reflected in the increased attention given to the prevention of self-harm and suicide,⁴⁹ and also involvement of more countries in this research area, especially in Asia. However, relatively few intervention approaches have been evaluated in multiple studies,¹³ and therefore are not amenable to meta-analysis. Here we have focused on interventions for adults who have self-harmed for which there have been at least three comparable studies, thus allowing meta-analysis and hence reasonably substantiated conclusions.

Summary of main results

There were 18 trials in which CBT-based psychotherapy, comprising cognitive behavioural therapy and/or problem solving therapy, was compared with TAU. Meta-analysis of these trials showed that fewer participants in the CBT-based psychotherapy condition repeated self-harm at both six and 12 months after trial entry. However, no significant treatment effect was found for the frequency of self-harm. There was evidence of beneficial effects for depression and hopelessness at six and 12 months following therapy and for suicidal ideation and problem solving at six months. On the basis of data from 15 trials, there was no evidence of a significant effect of psychological therapy on suicides, although relatively few such events were recorded. The finding with regard to repetition of self-harm is consistent with those of a previous review⁵⁰ and a recent study in the US military (although not all participants engaged

in self-harm in this study).¹ Findings from a recent large-scale non-randomised epidemiological study in Denmark also supported the effectiveness of psychological interventions,⁵² although the actual nature of the treatment provided was not specified.

In three trials DBT was compared with TAU in patients with predominately borderline personality disorder but with no apparent overall effect on the proportion of patients repeating self-harm at 12 and 24 months following trial entry. There was, however, a significant treatment effect for DBT on frequency of repetition of self-harm. Most of the participants in these trials were female (see Table SD3).

There was no evidence that case management resulted in better outcomes than TAU. Similarly, no evidence was found for greater effectiveness of postcards sent on a regular basis over a 12 month period in addition to TAU compared with TAU alone. However, the results of a small pilot trial indicated that it may have been an outlier. Removal of this trial from the analysis resulted in a significant treatment effect for postcards in terms of the proportions of participants repeating self-harm by the end of the intervention period. The single largest trial of this intervention appeared to show a noticeably beneficial effect of postcards.^{5, 48} This is particularly interesting as more limited psychiatric resources would probably have been available in the control condition (TAU) in the Islamic Republic of Iran, where this study was conducted, as compared to Australia, New Zealand, and the UK, all of which have better resourced services. This raises the possibility that such an intervention may be more useful in such settings, although further trials in countries with poorly resourced psychiatric services are desirable to determine generalisability of the findings from the Iranian study. Additionally, the postcards used in this trial were very different from those in the other trials in that they included religious and philosophical messages in addition to general support.

Strengths and limitations

As far as we are aware we identified all trials meeting our inclusion criteria that have been completed and published up to the end of our search period. We have considerably expanded the range of outcome variables compared with the original version of our review.¹¹ This often required correspondence with authors to obtain unpublished data. Different measures were used in the assessment of some outcome variables which may have impacted on the results.

Participants and clinical personnel were not blind to treatment allocation in any trial as we believe it is generally not possible to blind participants or clinicians to psychosocial therapy. For 10 trials, moreover, outcome assessors were also not blind to treatment allocation. Performance and/or detection bias therefore cannot be ruled out. Further biases specific to the trials included in this review are outlined in Supplementary Table SD3.

There was evidence of possible publication bias for CBT-based psychotherapy (there were insufficient trials to test this in relation to the other approaches).

Comparison with other reviews

There have been several reviews of the efficacy of psychosocial interventions for adults who self-harm. None of those in which systematic review methodology has been used to identify interventions have included meta-analyses of treatment efficacy across multiple interventions,⁵³⁻⁵⁶ aside from an official guideline which included data supplied by the present authors during a previous update of this review.¹² One meta-analysis specifically focused on cognitive-behavioural interventions concluded that there was evidence for the effectiveness of brief psychological therapy.⁵⁰ Another focused on contact-based

interventions found no evidence of effectiveness in terms of repetition of self-harm but pooled together several different types of contact-based intervention, including: letters, green cards, and postcards and also included trials in which not all participants had engaged in self-harm.⁷

Implications for practice

There is sufficient evidence to conclude that CBT-based psychotherapy is effective in adult patients following self-harm. This approach is usually brief (maximum of 10 therapy sessions with an average of three to five sessions). While this intervention is not suitable for all patients who engage in self-harm, it should be available in services for this patient population.² DBT can reduce the frequency of self-harm in patients with borderline personality disorder who engage in repeated acts of self-harm. The usual format for DBT is quite lengthy (one year) and includes both individual and group-based approaches.⁶ While sending regular postcards to patients in the year following an episode of self-harm may not reduce the proportion of patients repeating self-harm, the findings from the trial in Iran suggest postcard interventions may hold promise in reducing the frequency of self-harm repetition in settings where there are limited psychiatric services. Possible mechanisms for this, such as reduced distress and feeling contained or supported, might be investigated in future trials.

Implications for research

Given the apparent positive benefits of CBT-based psychotherapy, studies should be conducted to identify which types of patients are most likely to benefit from this approach. Researchers evaluating psychosocial treatments should investigate whether the intervention results in changes in the psychological or social mechanisms which are the targets of treatment (e.g., improved problem solving, regulating emotions, changes in interpersonal skills) and the extent to which such changes relate to positive outcomes.⁵⁸ Such knowledge will help clarify the mediators of treatment efficacy and allow therapy to be modified so that it might be more effective for self-harm patients in specific services and settings.

In view of the development of online therapy for a range of psychological problems,⁵⁹ and the apparent effectiveness of CBT-based psychotherapy in reducing repetition of self-harm, development of online programmes or tools providing this intervention should be a priority, especially given the findings of a recent trial of online self-help for people with suicidal thoughts.⁶⁰

Contributions of authors

KH had the idea for the review. All authors extracted data and assessed risk of bias for included trials. Both KW and TTS conducted the statistical analyses. KH and KW wrote the initial version of the report. All authors contributed to the interpretation of results and revision of the report and also approved the final version of the review.

Declaration of interest

KH authored two of the trials included in the report and EA and DG authored one trial each. We declare no other competing interests.

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Figure captions:

Figure 1. PRISMA search flow diagram of included and excluded studies.

Figure 2. Cognitive behavioural-based psychotherapy vs. TAU. Random effects odds ratio (OR) and accompanying 95% confidence intervals for effectiveness on repetition of self-harm at six and 12 months' follow-up and on suicide at final follow-up.

Figure 3. Cognitive behavioural-based psychotherapy vs. TAU. Random effects mean difference (MD) and accompanying 95% confidence intervals for effectiveness on frequency of self-harm, depression, hopelessness, suicidal ideation, and problem-solving scores at post-intervention and six and 12 months' follow-up.

Figure 4. DBT vs. TAU. Random effects odds ratio (OR) and accompanying 95% confidence intervals for the effectiveness on repetition of self-harm at post-intervention and at 12 months' follow-up and on suicide at post-intervention.

Figure 5. DBT vs. TAU. Random effects mean difference (MD) and accompanying 95% confidence intervals for effectiveness on frequency of self-harm and scores for depression, hopelessness and suicidal ideation.

Figure 6. Case management vs. TAU. Random effects odds ratio (OR) and accompanying 95% confidence intervals for effectiveness on repetition of self-harm and suicide at post-intervention.

Figure 7. Postcards vs. TAU. Random effects odds ratio (OR) and accompanying 95% confidence intervals for effectiveness on repetition of self-harm at post-intervention and at 12 months' follow-up.

Figure 8. Postcards vs. TAU. Random effects mean difference (MD) and accompanying 95% confidence intervals for effectiveness on frequency of self-harm at post-intervention, 12 and 24 months' follow-up.