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Incidental treatment effects of CBT on suicidal ideation and hopelessness

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Abstract

Background: Depression and alcohol misuse are among the most prevalent diagnoses in suicide fatalities. The risk posed by these disorders is exacerbated when they co-occur. Limited research has evaluated the effectiveness of common depression and alcohol treatments for the reduction of suicide vulnerability in individuals experiencing comorbidity.

Methods: Participants with depressive symptoms and hazardous alcohol use were selected from two randomised controlled trials. They had received either a brief (1 session) intervention, or depression-focused cognitive behaviour therapy (CBT), alcohol-focused CBT, therapist-delivered integrated CBT, computer-delivered integrated CBT or Person-Centred Therapy (PCT) over a 10-week period. Suicidal ideation, hopelessness, depression severity and alcohol consumption were assessed at baseline and 12-month follow-up.

Results: 303 participants were assessed at baseline and 12 months. Both suicidal ideation and hopelessness were associated with higher severity of depressive symptoms, but not with alcohol consumption. Suicidal ideation did not improve significantly at follow-up, with no differences between treatment conditions. Improvements in hopelessness differed between treatment conditions; hopelessness improved more in the CBT conditions compared to PCT and in single-focused CBT compared to integrated CBT.

Limitations: Low retention rates may have impacted on the reliability of our findings. Combining data from two studies may have resulted in heterogeneity of samples between conditions.

Conclusions: CBT appears to be associated with reductions in hopelessness in people with co-occurring depression and alcohol misuse, even when it is not the focus of treatment. Less consistent results were observed for suicidal ideation. Establishing specific procedures or therapeutic content for clinicians to monitor these outcomes may result in better management of individuals with higher vulnerability for suicide.

Key words: Suicidal ideation; hopelessness; depression; alcohol; cognitive behaviour therapy; treatment

Introduction

Suicide is an issue of major concern among clinical populations, with approximately 90% of suicide victims experiencing a psychiatric condition at their time of death (Mann et al., 2005). Particular attention has been paid to the impact of depression and alcohol abuse on suicidality, both of which pose an independent suicide risk (You et al., 2011). These conditions frequently co-occur (Teesson et al., 2009), particularly in clinical settings (Davis et al., 2006; Lubman et al., 2007), further exacerbating the vulnerability for suicidal thoughts and behaviours (Bartels et al., 2002; Cornelius et al., 1995; Sher et al., 2005, 2008; Schneider, 2009).

In clinical populations, hopelessness and suicidal ideation have been ranked as the first and second most important suicide risk factors respectively, and are perceived to be reliable indicators of an individual's future potential for suicide (Truant et al., 1991). In clinical settings, elevated hopelessness has been reliably shown to be present in over 90% of individuals who eventually die by suicide, with these findings replicated in both inpatients and outpatients (Beck et al., 1985; 1990). Similarly, significant levels of suicidal ideation are observed in 80% of psychiatric outpatients who take their own life (Beck et al., 1999). Both symptoms are reported frequently in individuals with a diagnosis of depression, and may be more severe among individuals with comorbid alcohol misuse (Sher et al., 2005). However, the specific relationship between suicide vulnerability (i.e. markers of suicidality such as suicidal ideation and hopelessness) and comorbidity remains unclear. While suicidal ideation is related to the severity of depression (Gensichen et al., 2010), alcohol use disorders in themselves do not predict thoughts of suicide (Kelly et al., 2001). This is despite alcohol misuse being associated with significantly increased severity of depressive symptoms, and alcohol misuse and depression likely exerting a synergistic impact on suicide risk, with co-occurrence of these disorders contributing to greater risk than either occurring in isolation (Fergusson et al., 2009). For example, Effinger and Stewart (2012) have recently shown

that, among adolescents in the USA with either a depressive or substance use disorder, the presence of even sub-threshold symptoms of the other disorder significantly increases risk of suicide. Other research shows no direct correlation between hopelessness and clinical indications of either depressive symptoms or alcohol misuse (Whisman et al., 1995). The implications of this in a clinical setting are considerable: while individuals with depression and alcohol misuse are a high-risk group for suicidal behaviours, these findings suggest that targeting these primary conditions alone may be insufficient to reduce this vulnerability.

Cognitive behaviour therapy (CBT) is among the most common and effective treatments for both depression and alcohol use problems, and can be used to address these conditions either independently or in an integrated format (Kay-Lambkin et al., 2011; Baker et al., 2010; Kay-Lambkin et al., 2009). Recent evidence has also been found to support the use of computer-delivered CBT, which is equally effective in reducing depressive symptoms and substance use, while increasing the accessibility of treatment (Kay-Lambkin et al., 2011). It has been suggested that cognitive therapy, which focuses on reducing dysfunctional attitudes in depression, may be uniquely appropriate for addressing both hopelessness and suicidal ideation (Rush et al., 1982; Raj et al., 2001). While CBT generally targets a client's "primary" diagnosis, integrated treatment for comorbid depression and alcohol misuse is emerging as an important approach in the context of comorbid disorders. Evidence suggests that combining treatments may lead to a greater decrease in symptoms of both depression and alcohol use than observed through single-focused treatments for either condition alone (Baker et al., 2010). It has also been suggested that for people with comorbid conditions, integrated treatments may be necessary to reduce suicide vulnerability (Lecrubier et al., 2001). However, to our knowledge there is no research exploring integrated treatments, either therapist- or computer-delivered, that tests this suggestion, and includes suicide vulnerability as an outcome.

While CBT may be an ideal approach to decrease suicide vulnerability among individuals with depression and alcohol misuse comorbidity, its effectiveness has rarely been tested in this context. Although some research has found CBT to be effective at targeting both suicidal ideation and hopelessness in clinical populations (Rush et al., 1982; Raj et al., 2001), conflicting results indicate cognitive therapy is no more effective than usual care in the immediate or long-term, with only marginal effects witnessed for hopelessness at 6-months (Brown et al., 2005). However, existing studies have either been inadequately powered, or only have explored interventions concerned with short-term treatment outcomes (e.g. Rush et al., 1982; Stewart et al., 2009), with longer-term effects not reported. The validation of existing findings using a larger sample and a longer-term longitudinal design may help clarify the effectiveness of CBT in addressing suicide vulnerability. Additionally, previous studies have primarily explored cognitive therapy that specifically focuses on the reduction of suicidal thoughts and behaviours. While this is valuable knowledge, it is also important to explore the effects of therapies that do not directly target suicidality. Standard practice in therapy is to treat the primary condition with which the client presents, and while suicide risk may be noted, it is not necessarily highlighted as a focus of concern (Oquendo et al., 2008). It is therefore important to evaluate the typical approach of treating the conditions of depression and alcohol abuse to determine the independent effects of this non-targeted treatment on suicide vulnerability.

The primary aims of the present analysis were: 1) to explore whether CBT, targeting depression and alcohol misuse, is associated with clinically significant reductions in indicators of suicide vulnerability (suicidal ideation and hopelessness) over a 12-month period in a large sample with sufficient power to detect expected clinical effects; 2) to investigate whether the method of treatment delivery (i.e. single-focused compared to integrated treatment, therapist-delivered versus computer-delivered treatment) is associated with differential effects on the course of suicide vulnerability; and 3) to determine whether

changes in suicide vulnerability indicators occur in accordance with change in depression and/or alcohol use, or independently from these conditions. We hypothesised that CBT will effectively reduce suicide vulnerability when compared to a control treatment of supportive counselling, and that integrated treatment will lead to a greater reduction in suicide vulnerability in a sample with comorbid conditions. Based on previous research, we predicted no differences between therapist-delivered and computer-delivered treatments (Kay-Lambkin et al., 2011), or between brief and 10-session treatments (Baker et al., 2010).

Methods

Study context

The authors have previously conducted two clinical trials (Baker et al., 2010; Kay-Lambkin et al., 2011) comparing a variety of treatment types for the outcomes of depression and substance use in people with comorbidity (known as the DAISI and SHADE projects). These studies were the first large-scale clinical trials of CBT for comorbid depression and alcohol/other drug use problems.

1) The Depression and Alcohol Integrated and Single-focused Interventions project (DAISI; recruitment phase: October 2005 to May 2007) was designed to compare single-focused (depression or alcohol) and integrated CBT for co-occurring depression and alcohol misuse. This study also incorporated a brief (1 session) intervention.
2) The Self-Help for Alcohol and other drug use and Depression project (SHADE; recruitment phase: May 2004 to February 2006) compared therapist-delivered and computer-delivered integrated CBT with a control condition of Person-Centred Therapy (PCT) for the treatment of co-occurring depression and substance use. As participants may have been using more than one substance (i.e. alcohol and/or cannabis) at harmful levels, all participants were randomised in an identical way, and

treatment was tailored to the individual to include information about cannabis only, alcohol only, or cannabis and alcohol, as was relevant to the individual. To increase comparability with DAISI participants, only those who met criteria for alcohol misuse are included in the analysis for the current paper.

While depression and substance use were the primary outcomes of these studies, a number of important domains were measured, including suicidal ideation and hopelessness, which have not been previously reported. These studies present an opportunity to explore the correlates of indicators of suicide vulnerability among this important comorbid population, and to examine the impact on suicide vulnerability, if any, of CBT-focused treatments for depression and alcohol use problems. The current paper reports findings from a combination of datasets for people who met study entry criteria for hazardous use of alcohol and at least moderate depressive symptomatology, with evidence of suicide vulnerability at the time of recruitment.

Rationale for combining data sets

Integrating data across independent studies has become increasingly common over the past decade, and has been associated with a range of methodological benefits (Stewart et al., 2012; Cooper & Patall, 2009; Stewart & Tierney, 2002). These include maximising the utility of previously collected data, the ability to increase statistical power, and reducing attrition effects. This may be particularly useful in clinical research, which tends to have smaller samples initially, as well as often experiencing higher attrition than general population studies. Ideal circumstances for pooling across data sets have been loosely identified as those in which the same measures have been collected in comparable circumstances (Bauer & Hussong, 2009; Hofer & Piccinin, 2009). Challenges posed to clinical research by this approach, such as differing participant groups or treatment types, have been addressed in previous research by imposing unified inclusion criteria across studies, or

controlling for potential sources of difference, before conducting pooled analyses (Baker et al., 2009).

From the time of their conception, the DAISI and SHADE studies were streamlined to allow for such integration, with efforts made to maximise the comparability of these data sets. These studies were identical in terms of their inclusion criteria (with the exception that SHADE allowed for the hazardous use of cannabis in the absence of alcohol misuse), recruitment techniques and sampling methods, therapy content, follow-up time intervals, and variables assessed. For the present analysis, pooling the DAISI and SHADE data sets not only increases the sample size, but also expands the capacity to address our research question, by allowing comparisons between treatment types that would not be possible if analysing the data sets independently.

Participants

Participants were recruited as part of the DAISI (Baker et al., 2010) and SHADE (Kay-Lambkin et al., 2011) clinical trials. Inclusion criteria for these studies were: elevated depressive symptoms (a score of ≥17 on the Beck Depression Inventory II [BDI-II]) (Beck et al., 1996) and concurrent use of alcohol at higher than the recommended drinking levels in Australia at the time of the studies (two standard drinks per day for females and four for males; one standard drink equates to 10g ethanol). Participants were recruited through self-referral or sources such as outpatient drug treatment clinics, general practices and non-government support agencies.

From the existing DAISI and SHADE studies, participants were selected for the present analyses based on level of suicide vulnerability at baseline assessment. Participants were included if they reported either moderate hopelessness (Beck Hopelessness Scale [BHS] score of ≥ 9) (Beck et al., 1974) or moderate suicidal ideation (BDI-II item 9 score of

≥ 2); or both mild hopelessness and mild suicidal ideation (BHS score ≥ 4 *and* BDI-II item 9 score ≥1).

Treatment types

Across the DAISI and SHADE studies, all participants received one session of face-to-face integrated treatment with a therapist, and were then randomised to one of six treatment conditions: no further intervention (DAISI), depression-focused CBT (DAISI), alcohol-focused CBT (DAISI), therapist-delivered integrated CBT (DAISI & SHADE), computer-delivered integrated CBT (SHADE), or Person-Centred Therapy (PCT) (SHADE). The allocation of DAISI and SHADE participants to each treatment condition is described in Figure 1. All conditions received individual (as opposed to group) therapy. Both SHADE and DAISI included an integrated treatment condition, while single-focused treatment was an option only in DAISI. Similarly, PCT and computer-delivered CBT were offered only in SHADE. Consequently, a smaller number of participants received these treatments. The content of each treatment type was as follows:

- *Single-focused CBT:* Nine 1-hour sessions conducted face-to-face with a trained therapist with therapy strategies directed towards the primary condition of interest (depression-focused or alcohol-focused).
- *Therapist-integrated CBT:* Nine 1-hour sessions conducted face-to-face with a trained therapist incorporating treatment strategies relating to both depression and alcohol misuse, making explicit links between conditions.
- *Computer-integrated CBT:* Nine 1-hour sessions of CBT delivered by CD-ROM where the content of each session mirrored that of the therapist-integrated treatment. There was a brief check-in with a therapist at the completion of each session to monitor participants' symptoms (including suicidality).

- *PCT:* Nine 1-hour sessions of supportive counselling with the content and direction of the sessions directed by the participant; this condition was included as a control for therapist contact.

Insert Figure 1 near here

All CBT conditions also received motivational interviewing integrated into their sessions throughout their treatment period. No treatment condition involved content specifically directed towards the reduction of suicide vulnerability or the management of hopelessness, however, a protocol was developed to address suicidal thoughts or plans if these became apparent during therapy. All treatments were manualised and are described more fully elsewhere (Kay-Lambkin et al., 2005 [DAISI]; Kay-Lambkin et al., 2002 [SHADE]); they are also available upon request.

Measures

Depression and alcohol use

Depressive symptoms were assessed by the BDI-II. Due to strong associations between the BDI-II and both suicidal ideation and hopelessness, item 2 (pessimism) and item 9 (suicidal thoughts or wishes) were excluded from the current analyses, as the inclusion of these items may have resulted in artificial associations between the BDI-II and our outcomes. This approach has been taken in previous research (Beck et al., 1993). A cut-off score of ≥17 was imposed on the modified measure for inclusion in the present study. Participants completed the Opiate Treatment Index (OTI) (Darke et al., 1991) to assess their alcohol use in the month prior to assessment. These inventories were completed at baseline and 12-month follow-up. The Structured Clinical Interview for DSM-IV Disorders (SCID) (First et al., 2001) was completed at baseline to assess clinical diagnoses of Major

Depression and Alcohol Abuse/Dependence according to Diagnostic and Statistical Manual-IV (DSM-IV) (American Psychiatric Association, 1994) criteria.

Indicators of suicide vulnerability

Indicators of suicide vulnerability were provided by two measures at baseline and 12-month follow-up. Suicidal ideation was measured using item 9 of the BDI-II (suicidal thoughts or wishes), a single item that is scored on a 4-point scale from 0-3, which has been confirmed as a valid method for assessing suicidal ideation (Desseilles et al., 2012). Hopelessness was assessed using the BHS, a 20-item measure of feelings of hopelessness during the previous week.

Review of therapeutic factors

During sessions 1, 5 and 10 participants and therapists completed the Agnew-Davies Relationship Measure (Agnew et al., 1998), a self-report questionnaire measuring perceptions of the client-therapist relationship (therapeutic alliance).

In view of the differing natures of the treatment types, there may have been different opportunities to discuss suicide in each condition. To avoid a potentially misleading attribution of differences in suicide vulnerability at 12 months to treatment type, rather than, for example, to actual time spent treating suicidality, a review of taped therapy sessions was conducted. A random sample of treatment sessions was selected so that where possible an audio tape of one session from each participant was played back, with the researcher recording the number of times suicide was discussed, and the total amount of time spent discussing suicide, per session.

Statistical analysis

Data analysis was completed using PASW Statistics 18 for Windows (Release 18.0.0, SPSS Inc, Chicago, Ill, USA). All participants who completed 12-month follow-up were included, regardless of whether they had completed all 10 sessions of treatment.

Variables were generated to look at clinically significant reductions in both suicidal ideation and hopelessness. A clinically significant reduction in suicidal ideation was conceptualised as at least a one-point decrease on item 9 of the BDI-II; for example, a change from "I would kill myself if I had the chance" to "I would like to kill myself." A clinically significant improvement on the BHS was conceptualised as an improvement of at least one category, that is from “severe” (total score 15-20) to “moderate” (total score 9-14); from “moderate” to “mild” (total score 4-8); or from “mild” to “minimal” (total score 0-3). A chi-square analysis was used to explore these changes.

Linear regressions predicted suicidal ideation and hopelessness respectively at 12 months. These models controlled for the baseline value of each outcome, demographics (age, gender, marital status, employment status and urban/rural location), and number of sessions attended. To compare treatment types, five orthogonal contrasts were generated: (a) PCT versus CBT; (b) single-focused versus integrated treatments; (c) computer-delivered versus therapist-delivered integrated treatment; (d) depression-focused versus alcohol-focused therapy; and (e) brief versus 10-session treatment. This regression was also repeated for depressive symptoms and alcohol use. Since participants were initially selected for higher suicide vulnerability, we acknowledged the possibility of regression to the mean; therefore regressions were repeated including all participants with complete data, not just those for whom suicide vulnerability was elevated.

Due to the relatively low retention rate at 12-month follow-up, two sets of analyses were undertaken. The initial, primary analysis was conducted after using multiple imputation to account for missing values. A fully conditional speculation model was used, with 10 iterations, to replace missing data for each of our four outcomes at 12 months. Each of the

four outcomes was imputed using baseline demographics, and baseline values of each outcome. To maximise the accuracy of the imputation, values of each outcome from previous DAISI and SHADE follow-up time points (3 and 6 months) were also used as predictors. Following this, a secondary "efficiency" analysis was conducted, including only participants with complete data, to explore any potential effects of data imputation.

Correlations between change in suicidal ideation, hopelessness, depression and alcohol use were conducted.

To partially control for the number of statistical tests in this analysis, a Bonferroni correction was used for all multivariate analyses. A family-wise error rate was chosen, controlling for the four outcomes variables; therefore a significance level of .0125 was set.

Ethical considerations

Ethics approval for the two original clinical trials was obtained from the human research ethics committees (HREC) of Hunter New England Health, the University of Newcastle, Queensland University of Technology, Northern Sydney, Central Coast Health and Mid West Area Health Service. For the current analysis, approval was obtained from the primary HREC at the University of Newcastle to integrate the DAISI and SHADE data sets and explore suicide vulnerability as an outcome. All participants provided written informed consent to take part in treatment and to complete 12-month follow-up.

Results

The overall results for the original DAISI and SHADE studies have been reported in full elsewhere (Baker et al., 2010; Kay-Lambkin et al., 2011).

Baseline characteristics

At baseline, 195 (68.7%) DAISI and 108 (39.4%) SHADE participants met our criteria (303 total). Data were collected from 181 (139 DAISI, 42 SHADE) of these participants at 12-month follow-up, resulting in a retention rate of 59.7%. However, after using multiple imputation, full data was available for all participants. There were no differences between baseline (or follow-up) scores for suicidal ideation, hopelessness, depression or alcohol use between participants whose follow-up data was imputed, compared with those with complete data. The mean age of the sample was 43.4 years; 163 (53.8%) were male, 95 (31.4%) were married and 142 (46.9%) were employed at baseline.

At baseline, 184 participants (60.7%) met 12-month DSM-IV criteria for Major Depressive Disorder, with 97 (32.0%) meeting sub-threshold criteria. Alcohol dependence was diagnosed in 255 people (84.2%), while 19 (6.3%) met criteria for alcohol abuse. The mean suicidal ideation score was 1.00 (±0.76), while the mean hopelessness score was 12.27 (±4.50). There was no difference in these scores across treatment conditions. Both higher suicidal ideation (r = .36, p < .001) and higher hopelessness (r = .26, p < .001) were correlated with higher depressive symptoms at baseline.

Insert Table 1 near here

12-month follow-up

Table 1 shows the means and standard deviations for the four outcome measures at baseline and 12 months; the regression analysis is shown in Table 2.

Depressive symptoms

Depressive symptoms at 12 months were significantly lower than baseline, F(1,302) = 156.32, p < .001. When client characteristics were controlled for, there were no differences observed between treatment conditions (Table 2).

Alcohol use

Alcohol use decreased significantly by 12 months, $F(1,302) = 44.46$, $p < .001$. The regression to predict alcohol use at 12 months was significant (Table 2). When client characteristics were controlled for there were no differences observed between treatment conditions.

Insert Figure 2 near here

Suicide vulnerability

At baseline, 236 participants reported some level of suicidal ideation. By 12 months, 147 of these people (62.3%) had decreased by at least one point on the BDI-II item 9. Follow-up suicidal ideation is depicted in Figure 2a, with reference to categories reported at baseline. Between baseline and follow-up, there was no significant decrease in the severity of suicidal ideation overall ($p = .299$). As shown in Figure 3a, on a univariate level, the severity of suicidal ideation was least likely to decrease in the PCT and computer-delivered CBT conditions. However, after controlling for baseline scores and client characteristics, no differences in suicidal ideation were observed between conditions (Table 2).

Insert Figure 3 and Table 2 near here

Eighty-two of the 200 participants reporting baseline hopelessness (49.0%) decreased their score on the BHS by at least one category, as shown in Figure 2b. At 12 months, the severity of hopelessness had decreased significantly across the sample, $F(1,302) = 33.76$, $p < .001$. However, as shown in Figure 3b, this decrease did not occur consistently across conditions, with minimal change observed in the PCT and computer-integrated CBT conditions. This was reflected in the regression model shown in Table 2. This

model found that two orthogonal contrasts significantly predicted hopelessness at follow-up. The PCT condition displayed less improvement than participants who received CBT, while the integrated CBT conditions improved less than the single-focused conditions. A trend was also observed for computer-delivered treatment leading to smaller improvements than therapist-delivered treatment, however this effect did not meet our Bonferroni criterion for significance.

Efficiency analysis

There was a significant difference in 12-month retention rates across treatment conditions, with the lowest retention in the computer-integrated CBT and PCT conditions (brief intervention 63.6%, depression-focused CBT 73.3%, alcohol-focused CBT 66.0%, therapist-integrated CBT 61.5%, computer-integrated CBT 44.4%, PCT 37.5%), $\chi^2_{(5)} = 15.86$, $p = .007$. Participants who did not complete follow-up reported significantly higher alcohol use at baseline (11.72±9.88) compared to those who were retained (8.99±5.94), $F(1,302) = 8.97$, $p = .003$.

When analyses were repeated using only participants with complete, non-imputed data, several differences in results were observed. Firstly, the overall change in severity of suicidal ideation was significant (1.01±0.76 vs. 0.44±0.58, $F(1,179) = 71.75$, $p < .001$). Secondly, reductions in hopelessness were significantly greater in therapist- versus computer-delivered CBT ($\beta = 0.24$, $t = 3.13$, $p = .002$). Lastly, reductions in alcohol use were significantly greater in the alcohol-focused versus depression-focused condition ($\beta = -0.27$, $t = -3.41$, $p = .001$).

Inclusive analysis

After completing the analysis of all participants who completed 12-month follow-up (n = 378), rather than just those with elevated suicide vulnerability at baseline, we observed the same pattern of significance in our results for suicidal ideation, depression and alcohol use (i.e. there were no significant differential treatment effects). The same pattern of results was also observed for hopelessness, with one additional finding. Computer-delivered CBT led to significantly smaller reductions in hopelessness at 12 months than therapist-delivered CBT (β = 0.18, t = 2.83, p = .006).

Change in clinical symptoms

Change in suicidal ideation did not correlate significantly with change in hopelessness (r = 0.16, p = .095); trends with change in depression (r = 0.45, p = 0.23) and alcohol use (r = -0.16, p = .021) did not meet our Bonferroni criterion for significance. Hopelessness changed significantly in accordance with depression (r = .32, p = .002), but not with alcohol use (r = -0.09, p = .249).

Therapeutic factors

Overall 91 therapy tapes were reviewed for mentions of suicidality. This included 24 depression-focused, 25 alcohol-focused, 27 therapist-integrated, nine computer-integrated, and six PCT sessions. In total, suicidality was discussed in 27 sessions (30%); there were no differences between conditions in either the number of times per session suicide was raised (1.4±0.80, range 1–4), or in the amount of time spent discussing suicidality per session (2m34s±3m42s, range 0m4s–12m49s).

There was no difference in the number of sessions attended between 10-session treatment conditions, and neither participants nor therapists reported significant differences in therapeutic alliance between treatment conditions.

Discussion

The present analysis provides mixed evidence as to the effectiveness of CBT with MI in reducing suicide vulnerability in clinical populations. It is important to note that the aim of DAISI and SHADE was not to reduce suicide vulnerability, and the observed results pertain only to non-specific treatment for suicidality. After ten sessions of CBT and MI, statistically significant reductions were observed in the severity of hopelessness; this is consistent with previous research conducted in smaller samples (Rush et al., 1982), although CBT in the current study did not focus specifically on suicide vulnerability. The clinical significance of this finding is less clear; only half of participants with baseline hopelessness reduced their symptoms by at least one point by 12 months, indicating room to improve on this outcome.

The findings for suicidal ideation are also open to mixed interpretation. Although about two-thirds of participants with baseline suicidal ideation reduced their symptoms by at least one point by follow-up, there was no overall significant decrease in the severity of suicidal ideation across the sample. Considering that the treatment provided in DAISI and SHADE was not aiming to reduce suicide vulnerability, these results are perhaps not unexpected, however they do have important implications. CBT targeting primary diagnoses is a common treatment approach for depression and alcohol misuse, and suicide vulnerability may often not be targeted directly. Our results put into question the appropriateness of this, with the remission rates observed indicating room to improve on the outcomes for both hopelessness and suicidal ideation, and it is possible that treatments either focusing on suicide vulnerability specifically, or incorporating suicidality modules into the treatment agenda, would lead to greater reductions. Further research to explore this potential would be valuable.

PCT was associated with a significantly smaller reduction in hopelessness than CBT treatments, suggesting that the structure and format of CBT with MI may be better suited to

treat vulnerability for suicidal thinking, as indicated in previous research (Rush et al., 1982; Raj et al., 2001). A similar finding was observed for integrated CBT, which had less effect on hopelessness than either single-focused treatment.

There are several potential explanations for our findings, which suggest a lower capacity for PCT and integrated CBT to reduce hopelessness (in their current formats). The content of PCT was determined by participants, hence issues were not discussed during therapy unless the participant chose to do so. While exceptions were made in the presence of suicidal ideation, this allowance was not in place for hopelessness. The current analysis also found that single-focused treatments were more effective than integrated therapy for reductions in hopelessness; although it needs to be acknowledged that all treatment conditions began with a single common session addressing both depression and alcohol misuse. While we are not aware of previous research exploring integrated treatments for hopelessness in a comorbid population, this finding was contrary to our hypothesis that a treatment addressing both problems may be needed in that context (Lecrubier et al., 2001). It may be that simpler, single-focused interventions have a better impact on hopelessness as they convey a less complex message. With treatment focusing on only one disorder, the content of each session and the ultimate goal of therapy are clearer, and may increase client confidence that they can change their behaviour, incidentally reducing hopelessness.

Both the efficiency analysis and the inclusive analysis indicated smaller improvements for computer-delivered, compared with therapist-delivered, integrated CBT. This effect was not observed in the main regression, which may have been due to power issues considering that computer-integrated CBT had the smallest allocation of participants. Regardless, the inconsistency of findings between these two analyses should be interpreted with caution. Therapist delivery and engagement within CBT may be a key component of hopelessness treatment. Indeed, the significance of the therapists' role in treating hopelessness during CBT for suicidal ideation has been highlighted (Collins & Cutcliffe,

2003). However, there were no differences in therapeutic alliance across therapist- and computer-delivered conditions. These findings may also reflect the format of present analyses, which did not allow equal opportunity to address hopelessness in each treatment condition. The computer-delivered condition had little input from the therapist beyond the brief check-in at the completion of each session, with no measure of hopelessness included in the check-in, nor direction to apply CBT strategies to thoughts related to hopelessness. Including a protocol for dealing with hopelessness in all treatments, as was done for suicidal ideation, may enhance the capacity to monitor and act on these symptoms equally across conditions.

While several important effects were observed for hopelessness, the findings for suicidal ideation are less clear. Despite the lack of a statistically significant decrease in the severity of suicidal ideation, there was evidence for clinically meaningful changes in this outcome. These findings align with previous evidence that, despite a strong association, depression and suicidal ideation are independent conditions (Handley et al., 2012), supporting the need for "suicide specific" components when targeting suicidal ideation within depression. It is possible that, as suicidal ideation is often considered a long-term condition, statistically significant changes may have been observed had a longer follow-up time been employed. A statistically significant effect was observed in the efficiency analysis, suggesting that the effects may have been diluted by imputing such a large proportion of the outcome data.

In the present analysis, there were no significant differences in treatment outcomes for either hopelessness or suicidal ideation between brief and 10-session interventions. This mirrors the original DAISI findings for depressive symptoms (Baker et al., 2010). A systematic review of CBT for suicide vulnerability reported that no previous studies have focused on the effects of single-session treatments (Tarrier et al., 2008), thus we are unable to compare our findings to previous explorations of this outcome. While this finding does

suggest equivalence between brief and longer-term therapies, this must be viewed in light of the present analysis' modest reductions in suicide vulnerability. As suicidality is often a long-term, recurring condition in clinical samples (Williams et al., 2006), regular monitoring and contact with services is likely to be advisable.

The absence of correlation between change in suicidal ideation and hopelessness supports previous findings (Beck et al., 1985) and suggests that these factors may need to be addressed separately to alleviate suicide vulnerability. The presence of hopelessness has been linked with the development of suicidal ideation and attempts (Kuo et al., 2004), and residual hopelessness is associated with attempted and completed suicide even after depressive symptoms have subsided (Szanto et al., 2002). Treatments focusing specifically on increasing hope and sense of purpose have been successful in other client conditions, such as in patients with cancer (McClement & Chochinov, 2008; Lethborg et al., 2008; Breitbart et al., 2010); adapting these approaches towards co-occurring depression and alcohol misuse may reduce hopelessness and suicide vulnerability in this condition.

Change in hopelessness correlated positively with change in depressive symptoms, indicating that the treatment of depression is likely to be important, although not sufficient, in the management of suicide vulnerability (consistent with existing recommendations; Rihmer, 2001). Importantly, however, it has been proposed that hopelessness may have multiple components; a state component that varies alongside depression severity, and a trait component that occurs independently (Young et al., 1996). Hopelessness has been identified as a key component of demoralisation, which may occur independently of depression yet still present significant vulnerability for suicide (Clarke & Kissane, 2002). This implies that treating depression alone is unlikely to alleviate suicide vulnerability, and the additional components of treatment that effectively targeted hopelessness may not have been present in PCT or the integrated treatments.

Neither changes in suicidal ideation or hopelessness correlated with change in alcohol use. Considering the mean alcohol scores were above recommended drinking levels both at baseline and follow-up, this may indicate a threshold effect, where suicide vulnerability is higher in individuals drinking above a certain level, rather than a linear effect. While we cannot conclude that reductions in alcohol use are important for the resolution of suicide vulnerability, our results concur with previous research in that they do not suggest that this relationship is directly causative for this outcome (Caces & Harford, 1998).

Limitations to the study include the use of a single-item measure of suicidal ideation, enabling us to explore only changes in the severity of thoughts of suicide, rather than the frequency of thoughts, or actual suicidal behaviours. The limited variation in this single-item measure may in part account for the lack of significant decrease in the overall severity of suicidal ideation in the present analysis. As all CBT conditions also contained a motivational interviewing component, we cannot ascertain whether our findings are due to CBT itself, or to the combination of these strategies. The aggregation of two independent data sets for the present analysis is a source of both strengths and limitations. Although we imposed inclusion criteria on the present analysis to make participant groups as similar as possible, as well as controlling for additional potential differences between studies, it is possible that the DAISI and SHADE studies were subject to other sources of heterogeneity that were not anticipated and hence not controlled for. Conversely, combining the data sets allowed for a sufficient sample size to conduct the multivariate analyses, which would have been far more restricted if conducted in either data set independently. It also allowed analyses to be conducted over a range of different treatment conditions, greatly increasing the range of comparisons we were able to make. While the results presented may be regarded as only preliminary evidence, directions for future research were indicated.

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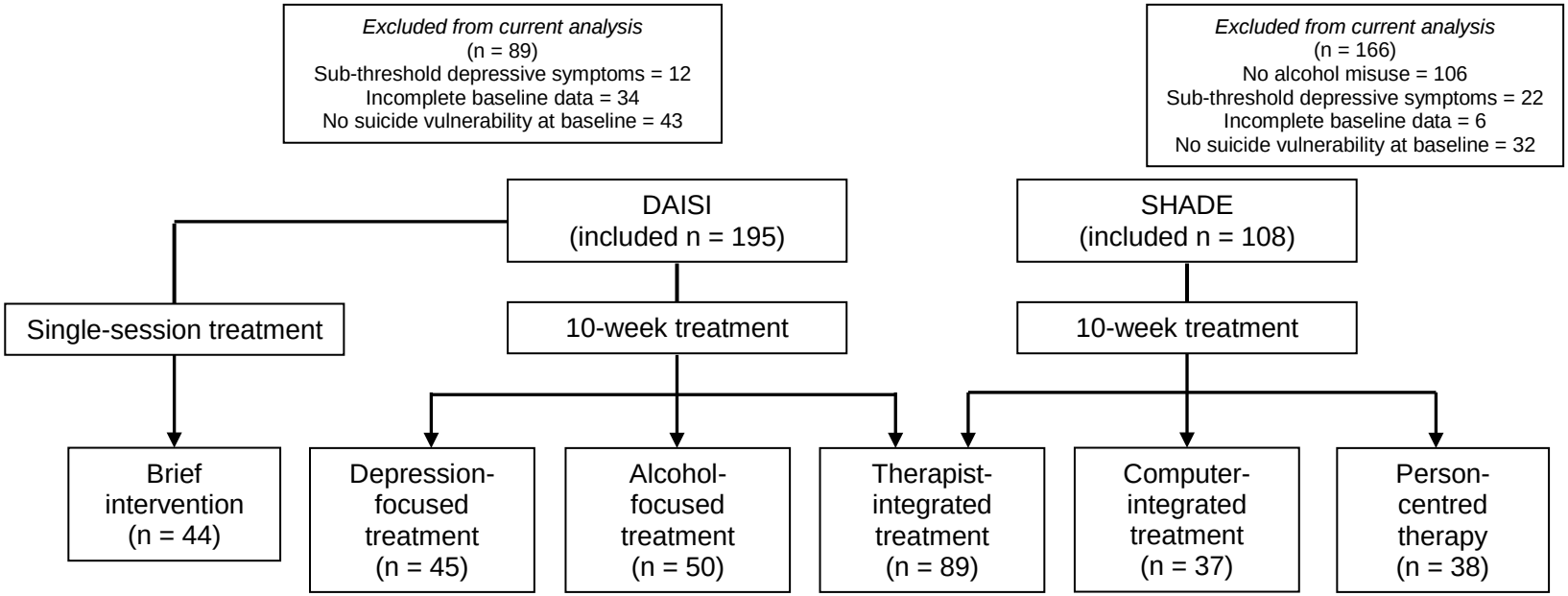

Figure 1. Subset of DAISI and SHADE participants included in the current analysis

Table 1. Mean (standard deviation) of the four outcome measures at baseline and 12-months

		Brief intervention	Depression-focused	Alcohol-focused	Therapist integrated	Computer integrated	PCT	Overall
Depression	Baseline	30.09 (7.26)	31.89 (8.88)	31.04 (8.19)	31.06 (7.43)	31.73 (7.43)	31.79 (8.27)	31.21 (7.83)
	12-months	22.18 (13.54)	16.48 (12.55)	17.68 (13.21)	20.29 (13.56)	20.45 (13.92)	25.61 (12.02)	20.26 (13.49)
Alcohol use	Baseline	8.56 (6.36)	9.83 (7.61)	9.78 (6.98)	9.62 (6.83)	14.96 (12.83)	9.01 (5.20)	10.10 (7.88)
	12-months	6.03 (5.76)	8.01 (6.57)	5.57 (5.59)	6.00 (6.80)	6.02 (9.67)	6.28 (6.90)	6.23 (6.90)
Suicidal ideation	Baseline	0.98 (0.66)	1.09 (0.79)	0.96 (0.73)	0.99 (0.79)	0.95 (0.71)	1.05 (0.84)	1.00 (0.76)
	12-months	0.90 (0.96)	0.86 (0.91)	0.86 (1.05)	0.82 (0.95)	1.04 (1.02)	1.32 (1.03)	0.94 (1.00)
Hopelessness	Baseline	12.52 (4.61)	12.93 (4.42)	12.68 (4.73)	11.97 (4.48)	11.89 (4.58)	11.74 (4.27)	12.27 (4.50)
	12-months	9.00 (6.72)	6.64 (6.00)	5.43 (6.26)	10.00 (6.73)	13.56 (6.19)	13.95 (5.32)	9.53 (6.96)

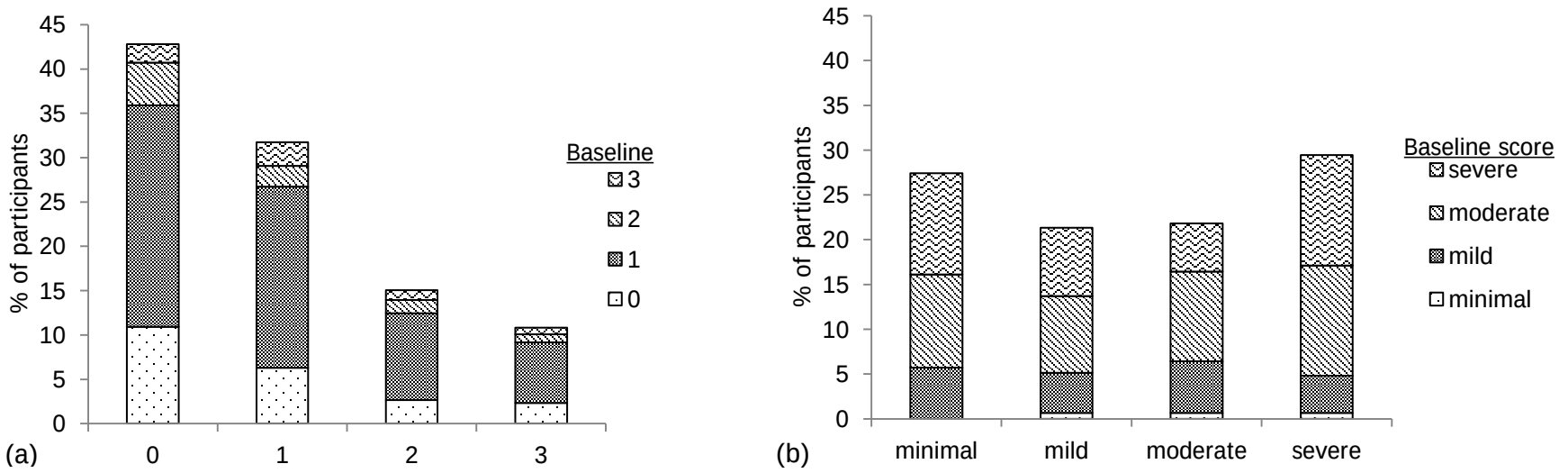

Figure 2. Score categories for (a) suicidal ideation, and (b) hopelessness at 12-month follow-up. For suicidal ideation, 0 = I do not have thoughts of killing myself; 1 = I have thoughts of killing myself, but would not carry them out; 2 = I would like to kill myself; 3 = I would kill myself if I had the chance.

Table 2. Linear regressions predicting 12-month suicidal ideation risk and 12-month hopelessness, after controlling for baseline scores, number of sessions attended and client demographics

Orthogonal contrasts	Depression[Ω]			Alcohol use[ɳ]			Suicidal ideation[†]			Hopelessness[◇]		
	β*	*t*	*p*	β*	*t*	*p*	β*	*t*	*p*	β*	*t*	*p*
Brief (vs. 10 session) CBT	0.11	1.38	.174	-0.10	-1.19	.239	0.02	0.21	.835	0.04	0.50	.617
PCT (vs. CBT)	0.15	1.97	.053	-0.02	-0.29	.777	0.14	1.89	.062	0.24	3.60	.001
Integrated (vs. single-focused) treatment	0.10	0.99	.332	-0.06	-0.74	.465	0.16	0.18	.861	0.34	4.71	<.001
Computer-delivered (vs. therapist-delivered) CBT	0.01	0.21	.831	0.01	0.07	.947	0.06	0.79	.429	0.16	2.06	.046
Alcohol (vs. depression) treatment	0.03	0.29	.777	-0.10	-1.72	.086	0.00	0.05	.962	-0.05	-0.64	.525

* Standardised regression coefficient

[Ω] $F(12,302) = 2.27$, $p = .050$, $R^2 = .09$

[ɳ] $F(12,302) = 3.48$, $p = .011$, $R^2 = .13$

[†] $F(12,302) = 1.32$, $p = .266$, $R^2 = .05$

[◇] $F(12,302) = 6.35$, $p < .001$, $R^2 = .21$

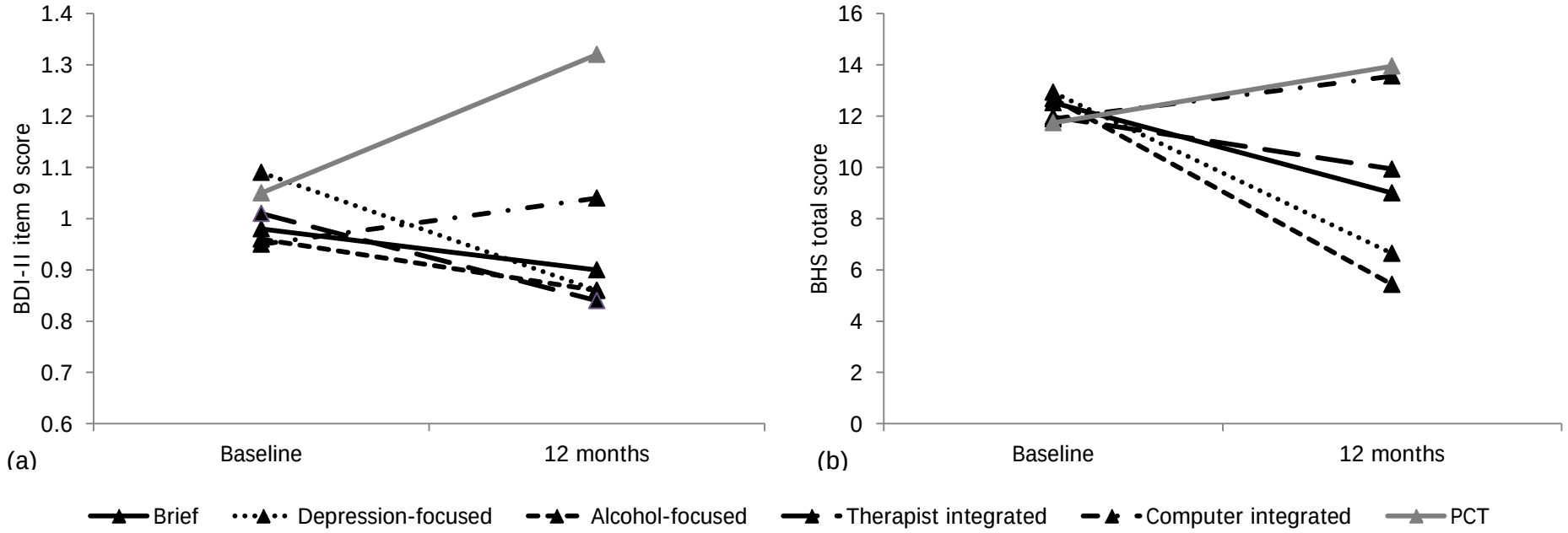

Figure 3. Change from baseline to 12 months in a) suicidal ideation (BDI-II item 9) and; b) hopelessness (BHS total score)