Randomised controlled trial of group cognitive behavioural therapy for comorbid anxiety and depression in older adults

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**Abstract**

Anxiety and depression are commonly comorbid in older adults and are associated with worse physical and mental health outcomes and poorer response to psychological and pharmacological treatments. However, little research has examined the effectiveness of psychological programs to treat comorbid anxiety and depression in older adults. Sixty-two community dwelling adults aged over 60 years with comorbid anxiety and depression were randomly allocated to group cognitive behavioural therapy or a waitlist condition and were assessed immediately following and three months after treatment. After controlling for cognitive ability at pre-treatment, cognitive behaviour therapy resulted in significantly greater reductions, than waitlist, on symptoms of anxiety and depression based on a semi-structured diagnostic interview rated by clinicians unaware of treatment condition. Significant time by treatment interactions were also found for self-report measures of anxiety and depression and these gains were maintained at the three month follow up period. In contrast no significant differences were found between groups on measures of worry and well-being. In conclusion, group cognitive behavioural therapy is efficacious in reducing comorbid anxiety and depression in geriatric populations and gains maintain for at least three months.

**Keywords:** Anxiety, Depression, Transdiagnostic, Cognitive behavioural therapy, Older age

**Objective**

Epidemiological studies show that depression and anxiety are common disorders throughout the lifespan and that they are typically comorbid (Beekman et al., 1998; Kessler et al., 1996). Research indicates considerable overlap of these disorders in terms of risk factors (Vink, Aartsen, & Schoevers, 2008), phenomenology (Watson et al., 1995), and genetic factors, particularly for Generalized Anxiety Disorder (GAD) and Major Depressive Disorder (MDD) (Kendler, Gardner, Gatz, & Pedersen, 2007). Rates of comorbid anxiety and depression in older adults are similar to those in younger populations, with as many as 35% of primary care patients with major depression also reporting a life time history of an anxiety disorder and 23% reporting a current comorbid anxiety disorder (Lenze et al., 2000). In a community sample, 47% of older adults who met criteria for major depression also met criteria for an anxiety disorder and 23% with an anxiety disorder also met criteria for a comorbid major depressive disorder (Beekman et al., 2000).

In older adults, the presence of both anxiety and depression is associated with worse outcomes than either disorder alone including increased risk of cognitive decline and dementia (DeLuca et al., 2005), more severe depression and increased suicide rates (Cohen, Gilman, Houck, Szanto, & Reynolds, 2009; Lenze et al., 2000) and a chronic course (Almeida et al., 2012). Given the high prevalence of comorbid anxiety and depression, research indicating that comorbidity is associated with worse outcomes, and the large overlap in symptom profiles and risk factors, it is important to pay more attention to the comorbid presentation and treatment of these disorders in older adults.

Recent reviews of psychological treatments for depression in older adults indicate that cognitive behavioural therapy (CBT) is as effective as in younger adults and is superior to waitlist, care-as-usual, placebo and other control groups, with moderate to large effect sizes (mean d = 0.72) (Cuijpers, van Straten, & Smit, 2006; Mackin & Arean, 2005; Serfaty, Haworth, Blanchard, Buszewicz, & King, 2009). Reviews for psychological treatment of primary anxiety demonstrate the effectiveness of relaxation, supportive therapy, and CBT in older adults (Ayers, Sorrell, Thorp, & Wetherell, 2007; Nordhus & Pallesen, 2003). Hendriks et al. conducted a systematic review and meta-analysis of CBT for anxiety disorders in older adults and concluded that CBT was superior to waitlist and active
control conditions for anxiety and comorbid depression symptoms, but only superior to waitlist conditions for worry severity (Hendriks, Oude Voshaar, Keijser, Hoogduin, & Van Balkom, 2008). A recent meta-analysis of CBT for anxiety disorders in older adults found that CBT was only marginally more effective than active control conditions and called for approaches to increase the effectiveness of CBT for anxiety in older adults (Gould, Coulson, & Howard, 2012). They suggested that targeting comorbidity might increase therapeutic outcomes.

Despite the high prevalence of comorbid anxiety and depression, and the particularly negative outcomes associated with this comorbidity, there is a striking absence of studies that have focused on the psychosocial treatment of comorbid anxiety and depression in older adults. Sallis et al. (1983) compared the effectiveness of three treatment conditions: relaxation training, pleasant event scheduling and rational disputing, and a self-disclosure discussion group on comorbid anxiety and depression in older adults. They found that depression reduced from pre to post in all conditions equally, while improvements in anxiety symptoms only occurred in the placebo condition. A major limitation of this study is that the sample size was small (n = 24) and lacked the statistical power to detect anything less than a very large difference between active treatments. To our knowledge, no other published trial has specifically investigated the efficacy of group CBT for comorbid anxiety and depression in older adults.

The majority of studies have focused on the treatment of primary depression or anxiety and not their comorbidity, and report that the presence of a comorbid disorder reduces the effectiveness of treatment for the primary disorder. For example, comorbid anxiety has been shown to delay and reduce treatment response to both pharmacological and psychological treatments for depression (Andreescu et al., 2007; Andreescu et al., 2009; Arnow et al., 2007; Cohen et al., 2009; Gum, Arean, & Bostrom, 2007; Hegel et al., 2005), and comorbid depression has been demonstrated to reduce the effectiveness of psychological treatments for primary anxiety in some studies (Schuurmans et al., 2009), but has not been found to impact on effectiveness in others (Wetherell et al., 2002).

Further, psychological treatments for primary depression have typically failed to produce significant reductions in comorbid anxiety symptomatology (Dombrovski et al., 2006; Gum et al., 2007; Serfaty et al., 2009). In contrast, psychological therapy targeting geriatric anxiety typically results in simultaneous reductions in post-treatment depression (Barrowclough et al., 2001; Gorenstein et al., 2005; Mohlman et al., 2003; Mohlman & Gorman, 2005; Stanley et al., 2003; Wetherell, Gatz, & Craske, 2003). However, limitations of these studies include that some studies have excluded individuals with clinically severe depression (Gorenstein et al., 2005; Mohlman et al., 2003; Mohlman & Gorman, 2005), many studies have only included a small number with comorbid depression, and none have reported post-treatment changes in mood disorder diagnostic severity using a clinical interview, so it is unclear whether these anxiety treatments produce diagnostically significant change in both anxiety and depressive disorders. Given that comorbidity reduces the effectiveness of treatments targeting one disorder only (the primary disorder) and is associated with worse long term outcomes, a program that addresses the core features of both disorders might be more efficacious.

The aim of the current study was to conduct a randomised controlled trial to evaluate the efficacy of group CBT program targeting comorbid anxiety and depression in older adults. The primary aim was to establish the program's basic efficacy by comparing it to a comparable waitlist condition. The primary outcome was changes in diagnostic severity for both the anxiety and depressive disorders. Secondary outcomes included changes on self-reported anxiety, depression and life interference. We included individuals who met criteria or subclinical criteria for both a mood and an anxiety disorder. We hypothesized that the CBT condition would result in significant improvements on all symptom measures from pre to post treatment and that these gains would be maintained at the 3 month follow up.

**Methods**

**Participants**

Sixty-two community dwelling participants aged 60–84 (mean age = 67.44, SD = 6.19, 22 = male, 40 = female) were recruited via advertisements in local newspapers. Participants attended the Centre for Emotional Health, Macquarie University, Sydney, Australia for assessment and treatment. All participants met DSM-IV criteria or subclinical criteria (see below for definition) for both an anxiety and a mood disorder, with either anxiety or mood being the primary (most interfering) problem. In fact, the vast majority of the sample met full DSM-IV criteria for both an anxiety disorder and a mood disorder with either problem being primary (N = 55), with the remaining 7 participants having at least subclinical levels of anxiety, depression or both. Exclusion criteria were: aged under 60 years, unable to read a newspaper, current self-harm, active suicidal intent, psychosis, or bipolar disorder. All participants were asked to refrain from engaging in additional treatment from a therapist or making changes to their medication status during the course of the trial.

**Measures**

**Diagnostic clinical interview**

Participants completed the Anxiety Disorders Interview Schedule for DSM-IV (ADIS: Di Nardo, Brown, & Barlow, 1994), a semi-structured interview for diagnosing anxiety and related disorders including mood disorders according to DSM-IV criteria on a 0–8 severity rating scale where ratings of 4 and above are considered of clinical severity and meet diagnostic status. This interview was administered by five different graduate students in clinical psychology formally trained on the ADIS and given regular supervision to discuss diagnostic decisions. The primary disorder was defined as the one that most interfered with the person’s life. In this study, participants with clinical severity ratings of 3 or above for their main anxiety disorder and main mood disorder were included in the study, as we were interested in also treating subclinical anxiety and depression; however, 89% of the sample met full diagnostic criteria for both an anxiety and mood disorder. The interviews were videotaped for reliability purposes and 25% were recoded after the study’s completion for the purpose of reliability coding. Inter-rater reliability (k) for agreement on the presence of a disorder in the diagnostic profile was k = 1.0 (100% agreement) for mood disorder, k = 1.0 (100% agreement) for generalized anxiety disorder and k = 0.81 (92% agreement) for social phobia.

**Cognitive assessment**

Addenbrooke Cognitive Examination-Revised (ACE-R: Mioshi, Dawson, Mitchell, Arnold, & Hodges, 2006), is a brief rating scale for dementia that assesses five cognitive domains, namely attention/orientation, memory, verbal fluency, language and visuospatial abilities. Research indicates good sensitivity and specificity for cut off scores of 88 (sensitivity = 0.94, specificity = 0.89) and 82 (sensitivity = 0.84, specificity = 1.0) (Mioshi et al., 2006).
Table 1

<table>
<thead>
<tr>
<th>Session</th>
<th>Session content</th>
<th>Homework content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, psychoeducation, myths about ageing</td>
<td>Read over session notes</td>
</tr>
<tr>
<td>2</td>
<td>Motivation to change &amp; goal setting, mood monitoring, identifying presence of thoughts in situations</td>
<td>Mood monitoring</td>
</tr>
<tr>
<td>3</td>
<td>Activity scheduling, linking thoughts and feelings</td>
<td>Activity scheduling, plus previously presented skill</td>
</tr>
<tr>
<td>4</td>
<td>Identifying unhelpful thoughts, problem solving</td>
<td>Identifying thoughts, problem solving, plus previously presented skills</td>
</tr>
<tr>
<td>5</td>
<td>Cognitive restructuring</td>
<td>Cognitive restructuring, plus previously presented skills</td>
</tr>
<tr>
<td>6</td>
<td>Common barriers to cognitive restructuring, using cognitive restructuring to deal with loneliness and low motivation</td>
<td>Previously presented skills</td>
</tr>
<tr>
<td>7</td>
<td>Review of goals, review of skills taught so far</td>
<td>Previously presented skills</td>
</tr>
<tr>
<td>8</td>
<td>Graded exposure and reducing avoidance</td>
<td>Graded exposure, plus previously presented skills</td>
</tr>
<tr>
<td>9</td>
<td>Graded exposure, assertiveness and communication</td>
<td>Assertiveness practice, plus previously presented skills</td>
</tr>
<tr>
<td>10</td>
<td>Sleep strategies</td>
<td>Sleep strategies, plus previously presented skills</td>
</tr>
<tr>
<td>11</td>
<td>Dealing with loss and bereavement</td>
<td>Previously presented skills</td>
</tr>
<tr>
<td>12</td>
<td>Review goals and skills, relapse prevention</td>
<td>Previously presented skills</td>
</tr>
</tbody>
</table>

Self-report measures

The following questionnaires were administered at pre-treatment, post-treatment and 3 month follow up.

*Geriatric Depression Scale* (GDS: Yesavage et al., 1983), a 30 item self-report measure of depression symptoms developed for older adults. It has high internal consistency, reliability, sensitivity and specificity in inpatient, outpatient and nursing home residents with zero to moderate cognitive impairment (Jongenelis et al., 2005; Yesavage et al., 1983). Internal consistency in this sample was $\alpha = .86$.

The Centre for Epidemiological Studies Depression Scale (CES-D: Radloff, 1977), a 20 item questionnaire that assesses depression symptoms over the past week. This questionnaire has been shown to be reliable and valid in elders (Beekman et al., 1997; Haringisma, Engels, Beekman, & Spinhoven, 2004). Internal consistency in this sample was $\alpha = .90$.

The Geriatric Anxiety Inventory (GAI: Pachana et al., 2007), a 20 item measure of anxiety symptoms developed for older adults. It has been shown to have adequate internal consistency, test-retest reliability and concurrent validity (Pachana et al., 2007). Internal consistency in this sample was $\alpha = .89$.

The Penn State Worry Questionnaire (PSWQ: Meyer, Miller, Metzger, & Borkovec, 1990) is a measure of worry that has shown adequate internal consistency and conhrrent validity in elderly patients with GAD and controls (Stanley, Novy, Bourland, Beck, & Averill, 2001). Internal consistency in this sample was $\alpha = .84$.

The Short Form 12 version 1 Mental Health Subscale (SF12: Ware, Kosinski, & Keller, 1996), is a general measure of mental health status. The SF12 has been demonstrated to be reliable and valid in older populations (Jakobsson, 2007). The internal consistency in this sample was $\alpha = .83$.

Group CBT program

The Ageing Wisely group program consisted of 12 x 2 h sessions conducted by the lead author and two graduate students in clinical psychology receiving regular supervision, with 6-8 group members. Groups had one or two therapists with the second therapist being largely an observer. The program included generic CBT skills such as psycho-education, problem-solving, cognitive restructuring, sleep hygiene, assertiveness training, and graded exposure which is a core skill for treatment of anxiety, and activity scheduling which is a core skill for the treatment of depression. The program was designed for older adults with skills were presented over several sessions, including significant repetition, large font, and case examples of older adults focused on problems relevant to this life stage such as worry about dementia, physical disability, bereavement and loneliness. Due to the transdiagnostic aim of this program, all skills were presented with examples for a depressive type of problem and an anxious problem (mainly worry or social evaluation concern). Similarly, graded exposure was presented with examples for a range of anxiety problems including worry, social anxiety and specific phobia. Cognitive restructuring was a core component of the program and was introduced over the course of 4 weeks, and then practiced as homework each week, with considerable attention paid to establishing links between thoughts and feelings. A highly structured cognitive restructuring form was used that included the following sections: Situation, Thoughts, Evidence Collecting and Helpful Replacement Thought. The Evidence Collecting section included seven questions to help identify relevant evidence including: “What would a friend say?”, “What can my past tell me about my ability to cope here?”, “How likely is it that it will really happen?”, and “What alternatives are there to this situation?” See Table 1 for an outline of the session content. The program included a detailed structured participant and therapist workbook that included all material presented during the sessions, and all homework exercises. Skills were taught with a mixture of didactic teaching, group discussions and role play. There was a large emphasis on home practice with a weekly review of homework and homework forms for each new and previously presented skill included in their manual each week.

Procedure

Ethical approval was obtained through the Macquarie University Human Research Ethics Committee. After participants completed consent forms, they completed the pre-assessment questionnaires and provided demographic and medical information. Then they completed the ACE-R cognitive examination and ADIS diagnostic interview. Participants were randomly assigned, following simple randomization procedures (computerized random numbers), to 1 of 2 treatment groups of 12 weeks duration (CBT or waitlist) in blocks of 8 participants. At the end of the 12 weeks, participants again completed post-treatment assessments including diagnostic interviews (rated by clinicians unaware of condition allocation), cognitive assessments and questionnaires. Those in the waitlist condition were then offered group treatment and those who completed the group program completed the assessments again three months after the treatment ended.

Data analysis

Data analysis was conducted using SPSS (version 19, SPSS Inc., USA). All analyses were conducted as intent-to-treat and as such all participants were analysed in the group to which they were randomized. For partially completed self-report questionnaires, data for the missing items were generated using the Expectation-Maximization algorithm. This algorithm computes probabilities for each possible completion of the missing data using the current parameters to form a weighted set that is then used to provide the new parameter estimates (Do & Batzoglou, 2008). For participants who
did not start or complete treatment, missing values were imputed using the Multiple Imputation procedure (Schafer & Graham, 2002; Sinharay, Stern, & Russell, 2001). Using this procedure, pre-treatment group allocation, ADIS severity scores and questionnaire items were used to generate 20 sets of imputed data and the pooled data were used to predict missing scores.

Differences between groups on continuous measures (pre, post, follow up) were examined using hierarchical mixed models containing random intercept and random slope terms as well as fixed effects for treatment received. In order to run mixed model analyses in SPSS for the multiple imputation pooled dataset, the van Ginkel macro (van Ginkel, 2010) was used to calculate the F values, standard errors, p-values, and degrees of freedom for the group (CBT, waitlist) by time (pre, post, follow-up) interactions. Differences between groups on diagnostic status were examined using the chi-squared statistic to report recovery rates from pre to post assessment. The flow of participants through the study is presented in Fig. 1.

**Results**

The mean number of sessions attended of the twelve week program was 9.31 (SD = 3.11). Our sample size allowed us to detect a medium effect size (Cohen’s $d > 0.4$) with adequate power (90%).

**Baseline measures**

The groups did not differ significantly in terms of any demographic features (e.g. age, income, education), pre-assessment ACE-R or pre-assessment questionnaires, except that the severity of the primary problem was significantly higher for the CBT condition than the waitlist condition at pre-assessment. See Table 2 for more details. Means on self-report questionnaires fell over (GAI, GDS, CES-D) or close to (PSWQ) cut-offs recommended for clinical severity, corroborating the ADIS severity ratings that the samples were clinically impaired but not extreme. Although there was no statistical difference between the means of the total ACE-R scores

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**Fig. 1.** Consort diagram of participants through the study.
A Bonferroni adjustment was made to account for multiple comparisons, alpha = .01 (.05/5).

Diagnostic severity across time and condition

Using mixed model analyses on the pooled data, the interaction between time (pre, post) and group (CBT, waitlist) for the clinician rated severity of the primary problem was significant, $F(1, 47.95) = 17.36, p < .001$, demonstrating a significant improvement with treatment compared to waitlist. Estimated marginal means, standard errors and within group effect sizes for all mixed model analyses are presented in Table 3.

To compare the efficacy of the CBT program in reducing anxiety and depression separately, we coded the primary problem as either anxiety or mood. Mixed model analysis failed to demonstrate a significant interaction between time (pre, post), group (CBT, waitlist), and primary problem type (anxiety, mood), $F(1, 45.38) = .632, p = .431$. This indicated that the CBT group program did not statistically differ in its efficacy in reducing primary anxiety and primary mood problems.

Questionnaire measures across time and condition

Mixed model analyses indicated significant time by group interactions on the GDS, $F(1, 50.88) = 8.86, p = .004$, CES-D, $F(1, 53.23) = 7.90, p = .007$, and the GAI, $F(1, 55.65) = 7.40, p = .009$. In all cases self-reported anxiety and depression symptoms reduced significantly more in the CBT condition than waitlist. In contrast, the group by time interaction was not significant for the PSWQ, $F(1, 54.95) = .57, p = .452$, or the SF12 Mental scale, $F(1, 51.39) = .000, p = .988$.

Evaluation of treatment maintenance

Mixed model analyses were used to determine whether the benefits from treatment were retained at the follow up period for the CBT condition controlling for ACER scores at pre-assessment (there was no follow up data for the waitlist condition as participants received CBT immediately after the post assessment). For the clinician-rated severity of the primary problem there was a significant main effect of time, $F(2, 49.53) = 35.23, p < .001$, where severity of the primary problem was significantly reduced from pre to post treatment, $t(42.12) = 8.00, p < .001$, but not from post to follow-up, $t(33.60) = 1.23, p = .22$. See Table 4. To check whether the efficacy of the CBT program differed for anxiety symptoms compared to depressive symptoms over time, we examined the interaction between time (pre, post, follow-up) and primary problem type (anxiety, mood) and found a non-significant interaction, $F(2, 48.12) = .293, p = .75$, indicating that reductions in symptoms over time were not statistically different for symptoms of depression or anxiety.

For the majority of self-report measures, the mixed model analysis indicated a significant change over time that was maintained at follow-up: GDS, $F(2, 49.31) = 21.04, p < .001$, pre to post treatment reduction, $t(46.39) = 5.49, p < .001$, post to follow up, $t(44.71) = -2.09, p = .77$, CES-D, $F(2, 49.48) = 34.52, p < .001$, pre to post treatment reduction, $t(47.38) = 7.28, p < .001$, post to follow up, $t(45.96) = .10, p = .93$, GAI, $F(2, 49.79) = 9.46, p < .001$, pre to post treatment reduction, $t(46.69) = 3.25, p = .001$, pre to post treatment reduction, $t(47.38) = 7.28, p < .001$,

Note. Based on original dataset, M – Mean, SD – Standard Deviation, ACE-R – Addenbrooke Cognitive Examination Revised, ADIS – Anxiety Disorder Interview Schedule, GDS – Geriatric Depression Scale, CES-D – Centre for Epidemiological Studies Depression Scale, GAI – Geriatric Anxiety Inventory, PSWQ – Penn State Worry Questionnaire, SF12 – Short Form 12, GAD – Generalized anxiety disorder; SOC – Social Phobia; SPEC – Specific phobia; PTSD – Post traumatic stress disorder; OCD – Obsessive Compulsive Disorder, MDD – Major Depressive Disorder; DYS – Dysthymia; ADNOS – Anxiety Disorder Not Otherwise Specified; MDNOS – Mood Disorder Not Otherwise Specified, *F(1,61) = 5.32, p = .03 (all other differences between groups were non-significant, ANOVAs p > .05).
The reliability of the measure, SD1 is the standard deviation of the baseline observation and r is the correlation coefficient. Change Index according to Evans, Margison, and Barkham (1998) is calculated as $\text{RI} = 2\sqrt{SD1} - 2r$. The sample size for CBT group was significant ($t(47.90) = 3.35, p < .005$, post to follow up, $t(47.18) = -.72, p = .47$, and PSWQ, $F(2, 49.76) = 5.93, p = .005$), pre to post treatment, $t(47.56) = 3.21, p < .005$, post to follow up, $t(47.36) = .55, p = .59$. The improvement over time for the SF12 Mental scale was not significant, $F(2, 53.14) = 4.16, p = .02$.²

### Recovery rates

We calculated recovery rates in two different ways. First, when clinical status was defined as a clinician-rated severity score of 3 or greater on the ADIS (capturing subclinical problems), the treatment condition resulted in significantly higher recovery rates for the primary problem (42% recovery rate) compared to the waitlist condition (7.4% recovery rate) at post-treatment, $\chi^2(1, N = 46) = 7.89, p < .01$. Second, when we based recovery rates on the presence of a full clinical anxiety or mood disorder (reflected by a severity score of 4 or greater on the ADIS), the analysis revealed that the treatment condition resulted in a significantly higher recovery rate on the primary disorder at post-treatment, $\chi^2(1, N = 46) = 9.48, p < .005$, for the treatment condition (53% recovery rate) compared to the waitlist condition (11% recovery rate), and this recovery was maintained, and increased (67% recovery rate) at three month follow up.

### Reliable change

We analysed the extent to which change on the main outcome was statistically reliable and clinically relevant by calculating the Reliable Change Index according to Evans, Margison, and Barkham (1998) which is based on the original formula by Jacobson and Truax (1991). The reliable change was calculated with the following formula where SD1 is the standard deviation of the baseline observation and r is the reliability of the measure.

The standard deviation and reliability score were taken from the current sample. Accordingly, 74% of the participants in the CBT group showed a reliable improvement from baseline to post-treatment, increasing to 86% at 3-month follow-up. Reliable change for the waitlist condition from baseline to post-treatment was 23%. There was no reliable worsening of severity in the two groups. Chi-square tests were calculated showing that the difference between groups from pre to post-treatment was significant ($t(1, N = 45) = 11.39, p < .005$. Reliable change was also detected for the CBT group at post-treatment compared to the waitlist group on the following scales: GAI = 47%, (compared to 15% waitlist), (1, N = 62) = 5.47, p < .05; GDS = 44% (compared to 0.03% waitlist), (1, N = 62) = 15.91, p < .001; CESD = 41% (compared to 0.06% in waitlist), (1, N = 62) = 11.28, p < .005.

## Discussion

This study reported on the efficacy of a group CBT program for older adults with comorbid anxiety and depression that assessed changes in diagnostic severity of anxiety and mood symptoms at post-treatment.

### Table 3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CBT Mean</th>
<th>Standard error</th>
<th>Effect size* ES 95% CI</th>
<th>Waitlist Mean</th>
<th>Standard error</th>
<th>Effect size* ES 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity Primary Problem</td>
<td>6.33</td>
<td>.25</td>
<td>1.46</td>
<td>0.74</td>
<td>2.18</td>
<td>5.81</td>
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<tr>
<td>Post-treatment</td>
<td>3.46</td>
<td>.29</td>
<td>2.13</td>
<td>0.71</td>
<td>3.55</td>
<td>5.61</td>
</tr>
<tr>
<td>Severity Primary Mood Problem</td>
<td>6.53</td>
<td>.44</td>
<td>0.52</td>
<td>0.39</td>
<td>1.31</td>
<td>4.93</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>3.00</td>
<td>.29</td>
<td>1.20</td>
<td>0.36</td>
<td>2.04</td>
<td>6.05</td>
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<tr>
<td>Severity Primary Anxiety Problem</td>
<td>6.25</td>
<td>.29</td>
<td>2.13</td>
<td>0.71</td>
<td>3.55</td>
<td>5.61</td>
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<tr>
<td>Post-treatment</td>
<td>3.71</td>
<td>.34</td>
<td>1.20</td>
<td>0.36</td>
<td>2.04</td>
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<td>Geriatric Depression Scale</td>
<td>18.14</td>
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<td>0.30</td>
<td>1.65</td>
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<tr>
<td>Pre-treatment</td>
<td>9.21</td>
<td>1.44</td>
<td>1.41</td>
<td>0.72</td>
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<td>Centre for Epidemiological Studies-Depression</td>
<td>26.37</td>
<td>1.94</td>
<td>26.25</td>
<td>1.35</td>
<td>1.65</td>
<td>21.15</td>
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<td>Geriatric Anxiety Inventory</td>
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<td>1.10</td>
<td>0.95</td>
<td>0.28</td>
<td>1.62</td>
<td>9.48</td>
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<td>Pre-treatment</td>
<td>5.84</td>
<td>1.20</td>
<td>1.20</td>
<td>0.50</td>
<td>1.03</td>
<td>8.33</td>
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<tr>
<td>Penn State Worry Questionnaire</td>
<td>53.62</td>
<td>2.52</td>
<td>53.25</td>
<td>2.52</td>
<td>0.87</td>
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<td>Post-treatment</td>
<td>46.54</td>
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<td>Short Form-12 (Mental)</td>
<td>37.09</td>
<td>2.01</td>
<td>37.09</td>
<td>2.01</td>
<td>0.86</td>
<td>43.45</td>
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<tr>
<td>Pre-treatment</td>
<td>47.79</td>
<td>2.26</td>
<td>47.79</td>
<td>2.26</td>
<td>0.86</td>
<td>43.45</td>
</tr>
</tbody>
</table>

Note: Calculations are based on the original dataset. *Effect size expressed as Cohen’s d, on the basis of pre–post treatment change within conditions using pooled baseline standard deviations, Cohen’s d = M1 – M2/SD pooled. ES 95% CI – Effect size with 95% confidence intervals. Confidence intervals for effect sizes were computed using procedures delineated by Odgaard and Fowler (2010).

² A Bonferroni adjustment was made to account for multiple comparisons, alpha = .01 (.05/5).

### Table 4

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimated marginal means with standard error in brackets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinician Rated Severity Primary Disorders</td>
<td>6.35 (.26)</td>
</tr>
<tr>
<td>Clinician Rated Mean Severity All Anxiety Disorders</td>
<td>6.22 (.30)</td>
</tr>
<tr>
<td>Clinician Rated Mean Severity All Mood Disorders</td>
<td>6.62 (.40)</td>
</tr>
<tr>
<td>Geriatric Depression Scale</td>
<td>18.15 (1.40)</td>
</tr>
<tr>
<td>Centre for Epidemiological Studies-Depression</td>
<td>26.48 (1.52)</td>
</tr>
<tr>
<td>Geriatric Anxiety Inventory</td>
<td>11.53 (1.18)</td>
</tr>
<tr>
<td>Penn State Worry Questionnaire</td>
<td>53.53 (2.23)</td>
</tr>
<tr>
<td>Short Form – 12 (Mental Scale)</td>
<td>37.13 (2.09)</td>
</tr>
</tbody>
</table>

Note: Based on original dataset.
pre-treatment, post-treatment, and follow up periods. Compared to waitlist, older adults receiving treatment demonstrated significant improvements according to clinician reported severity of primary anxiety and mood problems. Importantly, the degree of improvement in primary anxiety and primary mood problems was similar indicating that the program successfully targeted both disorders. In addition, we found significant improvements in self-reported ratings of anxiety and depression following CBT but not waitlist. All of these changes were maintained three months following the end of treatment. These improvements resulted in recovery rates of the primary clinical problem of 52% in the treatment group compared to 11% of the waitlist group that were maintained three months later. Further, significant reliable change was shown by 74% of CBT participants compared to 23% of waitlist participants on clinician rated severity of their main problem and by 40–50% of CBT participants compared with <1–15% of participants on waitlist on self-report measures.

Despite these improvements, we failed to find a significant group by time interaction on the PSWQ and the SF12 Mental scale. The relatively minimal change on the PSWQ relative to strong changes seen on other measures is interesting and in contrast to most other studies on GAD in older adults. One possible conclusion is that although the treatment package focused heavily on cognitive restructuring skills it did not satisfactorily target symptoms of worry. Given that a large portion of our sample were diagnosed with GAD, post-hoc analyses were conducted to compare changes in clinician-rated severity between those with primary GAD and those with other primary anxiety or mood disorders. The results showed a non-significant group by time interaction, $F(2, 47.09) = 0.10, p = .908$, and a non-significant time effect, $F(2,26.32) = 0.65, p = .533$. Because these non-significant comparisons may be affected by a lack of power, we also examined whether there was a significant main effect of time on GAD severity for those treated with CBT, and found a significant effect $F(2,13.81) = 9.14, p < .005$. These results suggest that this program was effective for individuals with GAD, but for some reason the PSWQ did not detect these improvements when examined for all individuals in the trial. The fact that the PSWQ has been shown to have only moderate test-retest reliability (Hopko et al., 2003; Stanley et al., 2001) and a different factor structure in older samples compared to younger samples (Knight, McMahon, Skeaf, & Green, 2008) might also contribute to these findings.

The failure to find significant change on the SF12 Mental scale with treatment might reflect the broad nature of this scale and a life interference measure more targeted at impairment associated with anxiety and depression in older adults might have identified stronger differences. Although there was sufficient power in this study to detect medium effects, changes on the PSWQ and SF12 may reflect smaller effects that weren’t detected in this sample. Further research is needed with larger sample sizes.

It is important to note that the CBT program showed similar effects in reducing symptoms of both anxiety and depression. Thus, in line with our aims, it appears that the program was able to adequately target both disorders in this population. Given high rates of comorbidity, the vast overlap in symptoms, and previous findings that comorbidity is generally associated with worse treatment outcomes in single disorder treatment studies, research should continue to focus on treating these disorders together. This result is in line with recent work that has demonstrated that CBT can be used in older adults with subclinical levels of anxiety and depression in a preventative role, with results lasting at least two years (van’t Veer-Tazelaar et al., 2011; van’t Veer-Tazelaar et al., 2009). The direction is also consistent with recent moves among programs for younger adults that aim to target broader emotional distress rather than individual disorders (Farchione et al., 2012).

Limitations of the study include that treatment was compared to a waitlist control and not an active intervention that controlled for other nonspecific therapy factors. Socializing with others and being heard by an empathetic therapist are important nonspecific therapeutic factors that are present in a group therapy format and may have accounted for some of the treatment effects. Therefore future research needs to compare group CBT with a placebo group condition that specifically controls for potential nonspecific therapy factors or with other group based psychological treatments in order to determine whether the specific components associated with the CBT program are specifically responsible for the efficacy of the intervention. Further, the power achieved in this study was probably too low to detect small differences in treatment efficacy for worry severity and life interference, or to detect differences in the effectiveness of the program for anxiety versus mood symptoms. The study also had a relatively short follow up period of 3 months. Previous research has shown maintenance of treatment gains for specific disorders among older adults up to 12 months (Stanley et al., 2003) so it is unlikely that the effects reported here would dissipate with time, but demonstration of this maintenance within a comorbid population would be valuable. Finally, this study lacked formal treatment adherence and therapist competence measures. Instead, these issues were monitored by weekly supervision sessions with study authors, but should be included in future studies.

Overall this study meets a need to develop an efficacious transdiagnostic psychological treatment program to tackle the problem of comorbid anxiety and depression in older adults. Tackling both disorders at once is likely to be cost-effective and produce superior outcomes to treatments that focus on the primary disorder only. Given the negative consequences of anxiety and depression in older adults, interventions such as this may help to reduce the risk of these negative outcomes and produce lasting benefits for older individuals.

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