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The UniWellbeing course: A randomised controlled trial of a transdiagnostic internet-delivered cognitive behavioural therapy (CBT) programme for university students with symptoms of anxiety and depression

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ABSTRACT

Anxiety and depression are prevalent among university students and many universities offer psychological services to assist students. Unfortunately, students can experience barriers that prevent access to these services and many university services experience difficulties meeting demand. The present pragmatic randomised controlled trial examined the preliminary efficacy and acceptability of a transdiagnostic and internet-delivered cognitive behavioural therapy (CBT) programme for university students seeking help with anxiety and depression. Participants were randomly allocated to either a treatment group ($n = 30$) or a waitlist-control group ($n = 23$). The treatment group received weekly contact with a therapist, via telephone or a secure messaging system, as well as automated emails that guided their progress through the programme. Significant reductions were found on standard measures of anxiety (Cohen's $d = 0.66$; 95% CI: 0.13 to 1.17) and depression (Cohen's $d = 0.81$; 95% CI: 0.27 to 1.32) among the treatment group participants, but no significant differences were found between the treatment and control groups at post-treatment. However, more pronounced reductions were found among treatment group participants with clinical level symptoms of anxiety (Cohen's $d = 1.33$; 95% CI: 0.62 to 1.99) and depression (Cohen's $d = 1.59$; 95% CI: 0.81 to 2.30), who reported significantly lower levels of symptoms than control group participants at post-treatment. These reductions were maintained at 3-month follow-up and participants rated the intervention as acceptable. The results provide preliminary support for the potential of iCBT for university students with anxiety and depression. However, larger scale implementation trials considering a broader range of outcomes are required.

Trial registration: Australian and New Zealand Clinical Trials Registry: ACTRN12612000212853.

1. Introduction

Psychological distress among university students is significantly higher than the general population (Stallman, 2010) and the prevalence of mental health difficulties among university students appears to be increasing (Storrie et al., 2010). However, research indicates that the utilisation rates for student counselling and psychological services is very low (Raunic and Xenos, 2008) with many students avoiding or delaying access (Eisenberg et al., 2007; Stallman, 2010; Storrie et al., 2010). The barriers to accessing treatment among university students are similar to the general population and include stigma, long wait-times and a preference to seek help from family, friends and the internet (Brimstone et al., 2007; Lui et al., 2014; Rickwood et al., 2007; Ryan et al., 2010). A challenge facing university counselling services is how to reduce these barriers while providing access to evidence-based treatment in a cost-effective way.

There is now considerable evidence for the efficacy of cognitive behavioural therapy (CBT) in the treatment of anxiety and depression (Butler et al., 2006; Cuijpers et al., 2008; Stewart and Chambless, 2009) and a growing recognition of the need for innovative models of service delivery that increase both access to treatment and the capacity of treatment services (Kazdin and Blasé, 2011; Kazdin, 2015). Over the last decade, there has been increasing interest in the potential of internet-delivery of CBT (iCBT) as an approach for increasing access to

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effective psychological treatments (Andersson and Titov, 2014). There is now strong meta-analytic support for the efficacy of iCBT for anxiety and depression over control conditions (Andersson and Cuijpers, 2009; Cuijpers et al., 2009). There is also emerging evidence of the comparability of clinical outcomes between face-to-face and internet-delivered CBT (Cuijpers et al., 2010) as well as the cost-effectiveness of iCBT (Hedman et al., 2012). iCBT interventions provide the same information and teach the same skills as traditional face-to-face CBT, but provide this information via structured materials accessible by computer and the internet. Internet-delivered treatments can be clinician-guided, coach-guided or entirely self-guided, with most approaches involving a fraction of the time required by traditional face-to-face psychological treatments (Andersson and Titov, 2014; Hedman et al., 2012).

Despite their potential only a limited number of randomised controlled trials have examined the use of iCBT with university students (Cukrowicz and Joiner, 2007; Day et al., 2013; Ellis et al., 2011; Kenardy et al., 2003; Lintvedt et al., 2011; Mitchell and Dunn, 2007; Orbach et al., 2007; Santucci et al., 2014; Sethi et al., 2010) and a recent meta-analysis found that, although such interventions can be beneficial, some caution is needed when interpreting the results of existing studies because of important methodological issues (Davies et al., 2014). For example, one of these studies ($n = 83$) examined a self-guided 6-week anxiety prevention programme for students with high levels of anxiety sensitivity and found reductions in anxiety-related cognitions and symptoms of depression, but not anxiety sensitivity, compared with a waitlist-control group (Kenardy et al., 2003). However, the study was limited by the use of a convenience sample of first year psychology students rather than students presenting or requesting assistance for mental health difficulties and did not include any follow-up assessment. Other studies have examined the feasibility of the established *Beating the Blues Programme* ($n = 10$; Mitchell and Dunn, 2007) and compared the efficacy of this programme provided with and without email reminders ($n = 57$; Santucci et al., 2014). Both studies reported improvements in depression scores, however, one study reported very low treatment completion rates (i.e., <20%) (Santucci et al., 2014) and neither study included parallel control groups. Thus, while the findings of existing studies are encouraging, there is still relatively limited empirical data and more research is required concerning the efficacy and acceptability of iCBT for university students.

The present study examined the efficacy and acceptability of a new iCBT programme, the *UniWellbeing Course*, for university students experiencing symptoms of stress, anxiety, low mood and depression. The intervention is delivered with weekly support from a clinician and is designed to be appropriate for students with subclinical as well as clinical symptoms of anxiety and depression. Using a two-group randomised controlled trial (RCT) design, it was hypothesised that: (1) the treatment group would report significantly reduced symptoms of anxiety and depression at post-treatment compared with the waitlist-control group, (2) that treatment group participants with clinical level symptoms would report reductions in symptoms of anxiety and depression consistent with those observed in previous iCBT studies, and that (3) symptom reductions would be sustained at 3-month follow-up and participants would be satisfied with the treatment. The present study was setup as a pragmatic RCT and, consequently, several modifications to the length and number of lessons in the programme were made during the trial, based on participant feedback, in order to maximise the acceptability of the intervention.

2. Method

2.1. Participants

Participants were students attending Macquarie University, Sydney, Australia, who applied to participate via the website of the eCentreClinic (www.ecentreclinic.org); a specialist research clinic at the university, which provides online treatment for common mental health conditions. The *UniWellbeing Course* was promoted across the university campus via social and print media and via the University's Campus Wellbeing Service, which offers psychological support and treatment services to students. All advertisements targeted psychologically distressed students who were interested in psychological treatment; however, students did not have to attend or have an initial assessment with the University's Campus Wellbeing Service in order to participate. The participants were offered the opportunity to enter a draw to win an iPad for participating in the study and completing the post-treatment and follow-up questionnaires.

A total of 95 participants applied to participate in the study and 63 met the full inclusion and exclusion criteria. The inclusion criteria were as follows: (1) currently living in Australia; (2) 18 years of age or older; (3) self-identified as experiencing symptoms of anxiety or depression; and (4) access to a computer, the internet and use of a printer. The exclusion criteria were as follows: (1) currently participating in CBT; (2) currently experiencing a psychotic mental illness or severe symptoms of depression (defined as a total score >19 or responding >2 to Question nine (suicidal ideation) on the Patient Health Questionnaire-9 Item (PHQ-9; Kroenke et al., 2001); and (3) not on a stable dose of medication for at least 1 month, if taking medication for anxiety or depression.

Interested students were invited to complete an online application and questionnaires. Applicants were contacted via telephone to confirm that they met the study's criteria and to complete a diagnostic interview using the Mini International Neuropsychiatric Interview 5.0.0 (MINI: Sheehan et al., 1998). Fifty-five applicants met all the criteria and were randomised using a true randomisation process (www.random.org) to either the treatment ($n = 31$) or the waitlist-control group ($n = 24$). One participant in the treatment group withdrew before starting treatment and their data was not analysed. One participant in the waitlist-control group was hearing impaired and unable to complete the telephone interview, but was included in the study and the analysis. The demographic and diagnostic characteristics of the sample are shown in Table 1 and the details of the participant flow are included in Fig. 1.

2.2. Design

The design comprised a CONSORT-revised compliant RCT comparing an immediate treatment group with a delayed-treatment waitlist-control group. The outcome measures were administered at pre-treatment, weekly during the course and at post-treatment. The treatment group also completed questionnaires 3 months after finishing the course. All questionnaires were administered online, which is considered as reliable as paper-and-pencil administration (Carlbring et al., 2007; Donker et al., 2010; Hedman et al., 2010). The MINI diagnostic assessments were conducted at initial application.

Power calculations using G*Power (Faul et al., 2007) indicated that 26 participants in each group were sufficient to detect a between-groups effect size of 0.7, with alpha set at 0.05 and power set at 0.80, which was the minimum based on similar studies at the time (Dear et al., 2011a; Titov et al., 2011a). Ethical approval for the trial was provided by the Human Research Ethics Committee of Macquarie University and the trial was registered on the ANZCTR trial registry as ACTRN12612000212853.

2.3. Measures

2.3.1. Patient Health Questionnaire-9 item (PHQ-9; Kroenke et al., 2001)

The PHQ-9 is a nine-item measure of the symptoms and severity of major depressive disorder based on DSM-IV criteria. A total score of ≥10 on the PHQ-9 has been identified as a reliable indicator for a probable diagnosis of a depressive disorder (Kroenke et al., 2001). Psychometric studies indicate high levels of consistency (e.g., >.80)

Table 1
Demographic and diagnostic characteristics of the treatment and control groups.

Variable	Treatment group		Control group		Significance statistics
	n	%	n	%	
Gender					
Male	11	36.7%	8	34.8%	$\chi^2 = 0.02$, $p = .89$
Female	19	63.3%	15	65.2%	
Age					
Mean	28.6 (SD: 10.05)		26.9 (SD: 11.51)		$F = 0.49$, $p = .62$
Range	19 to 55		19 to 55		
Marital status					
Single/never married/widowed	24	80.0%	13	56.5%	$\chi^2 = 3.40$, $p = .07$
Married/de facto	6	20.0%	10	43.5%	
Student status					
Full-time	22	73.3%	17	73.9%	$\chi^2 = 0.03$, $p = .87$
Part-time	7	23.3%	6	26.1%	
Type of degree programme					
Undergraduate	25	83.3%	15	65.2%	$\chi^2 = 3.18$, $p = .07$
Postgraduate	4	13.3%	8	34.8%	
Diagnostic data (at assessment)					
MINI-diagnosis at assessment					
Generalised anxiety disorder	27	90.0%	13	56.5%	$\chi^2 = 6.83$, $p = .01$
Panic disorder	8	26.7%	4	17.4%	$\chi^2 = 0.52$, $p = .35$
Social anxiety disorder	13	43.3%	6	26.1%	$\chi^2 = 1.41$, $p = .19$
Major depressive episode	13	43.3%	5	21.7%	$\chi^2 = 2.38$, $p = .11$
Number of diagnoses					
0	2	6.7%	6	26.1%	–
1	9	30.0%	9	39.1%	–
2	8	26.7%	4	17.4%	–
≥3	11	36.7%	3	13.0%	–
Mean number diagnoses	2.03 (SD: 1.12)		1.27 (SD: 1.20)		$F = 2.33$. $p = .02$

Note. Technical issues prevented the data for student status and degree programme for one participant. One participant was unable to participate in the diagnostic interview due to a hearing impairment.
MINI; mini international neuropsychiatric interview.

and that the measure is sensitive to change (Kroenke et al., 2001, 2010; Titov et al., 2011b). Cronbach's alpha in the present study was .82.

2.3.2. Generalized Anxiety Disorder-7 item scale (GAD-7; Spitzer et al., 2006)

The GAD-7 comprises 7 items measuring symptoms and severity of GAD based on the DSM-IV diagnostic criteria for GAD. The GAD-7 has high internal consistency and test–retest reliability as well as showing good convergent validity with other anxiety scales (Dear et al., 2011b; Kroenke et al., 2010; Spitzer et al., 2006;). Evidence indicates that the GAD-7 is sensitive to DSM-IV congruent GAD, social phobia and panic disorder with increasing scores indicating greater severity of symptoms (Löwe et al., 2008). A total score of ≥8 on the GAD-7 has been identified as a reliable indicator of a probable diagnosis of an anxiety disorder (Löwe et al., 2008). The GAD-7 is increasingly used in research and in large scale dissemination studies as a generic measure of change in anxiety symptoms (Richards and Suckling, 2009; Titov et al., in press). Cronbach's alpha in the current study was .88.

2.3.3. Kessler-10 item (K-10; Kessler et al., 2002)

The K-10 is a 10-item measure of general psychological distress. There is strong evidence supporting the relationship between the K-10 and psychological distress with total scores of ≥22 associated with a diagnosis of an anxiety and depressive disorder (Andrews and Slade, 2001). Cronbach's alpha in the current study was .85.

2.3.4. Sheehan Disability Scales (SDS; Sheehan, 1983)

The SDS is a 3-item measure of disability with scores ranging from 0 to 30 and well established psychometric properties (Leon et al., 1997). Cronbach's alpha in the current study was .84.

2.3.5. Mini International Neuropsychiatric Interview version 5.0.0 (MINI; Sheehan et al., 1998)

The MINI is a brief diagnostic interview developed to determine the presence of current Axis-I disorders using DSM-IV diagnostic criteria. It has excellent inter-rater reliability (k = 0.88–1.00) and adequate concurrent validity with the Composite International Diagnostic Interview (World Health Organization, 1990).

2.4. Intervention

The UniWellbeing Course is a new psychological intervention, based on previously developed internet-delivered transdiagnostic interventions for anxiety and depression (Dear et al., 2011a; Titov et al., 2011a; Titov et al., 2013, 2014). The UniWellbeing Course is based on the principles of CBT and systematically teaches information and core psychological skills that help people to understand their experiences of anxiety and depression and to start to manage their symptoms. The UniWellbeing Course comprises materials presented in a didactic form (i.e., text-based instructions and information) combined with case-enhanced learning examples (i.e., detailed case studies). Case-enhanced learning uses educational stories that identify a problem and a solution that a case study resolves for the learner, which is thought to facilitate learning and engagement while reducing apprehension (Titov et al., 2013, 2014). The primary difference between the UniWellbeing Course and previously developed courses was that the latter was modified to be appropriate for a cohort of university students. For example, the existing images were replaced with those depicting students and younger adults and case stories and examples were used which focussed on and scenarios relevant to university students were employed (e.g., stresses and pressures around exams, assignments, and navigating the transition to university life).

The UniWellbeing Course was delivered over four phases. The core lessons provided key psychological information and taught core psychological skills. Each lesson was accompanied by a Do-It-Yourself Guide summarising the relevant lesson and suggesting practice activities to help participants learn and use the skills. Each lesson was also supplemented with several detailed case stories and additional resources, which covered areas such as managing sleep, solving problems, managing irrational beliefs, controlling worry and assertive communication. Because one of the aims of the present trial was to determine the most suitable course format for participants, changes to the structure and duration of the UniWellbeing Course were made during the trial. Specifically, the first phase (n = 6) received a 3-lesson version (i.e., each lesson comprising 52 to 63 slides) of the Course, in which the lessons were systematically released, fortnightly, over 6 weeks. Then, in the second and third phases (n = 15), the course was modified into a 6-lesson course (i.e., each lesson comprising 99 to 120 slides) with 1 short lesson released systematically, over 6 weeks. Finally, in the fourth phase (n = 9), the materials were modified to form a 5-lesson course (i.e., each lesson comprising 52 to 63 slides) delivered over 5 weeks. Importantly, the therapeutic content and core psychological skills taught remained the same across the different formats; differences in the number of lessons and slides across formats reflected differences in the way in which information was presented and whether content was presented as part of a lesson or in an additional resource. For example, in the 3 lesson version of the course two or three core skills were often taught in one lesson (i.e., making the lessons longer) whereas in the 5 lesson version one or two skills were taught (i.e., making the lessons shorter) with more materials being provided as additional resources. The content of the 5-lesson version and additional resources are described in Table 2.

2.5. Therapist contact

One therapist, a provisionally registered psychologist (AM) undertaking doctoral studies in psychology provided all clinical contact with

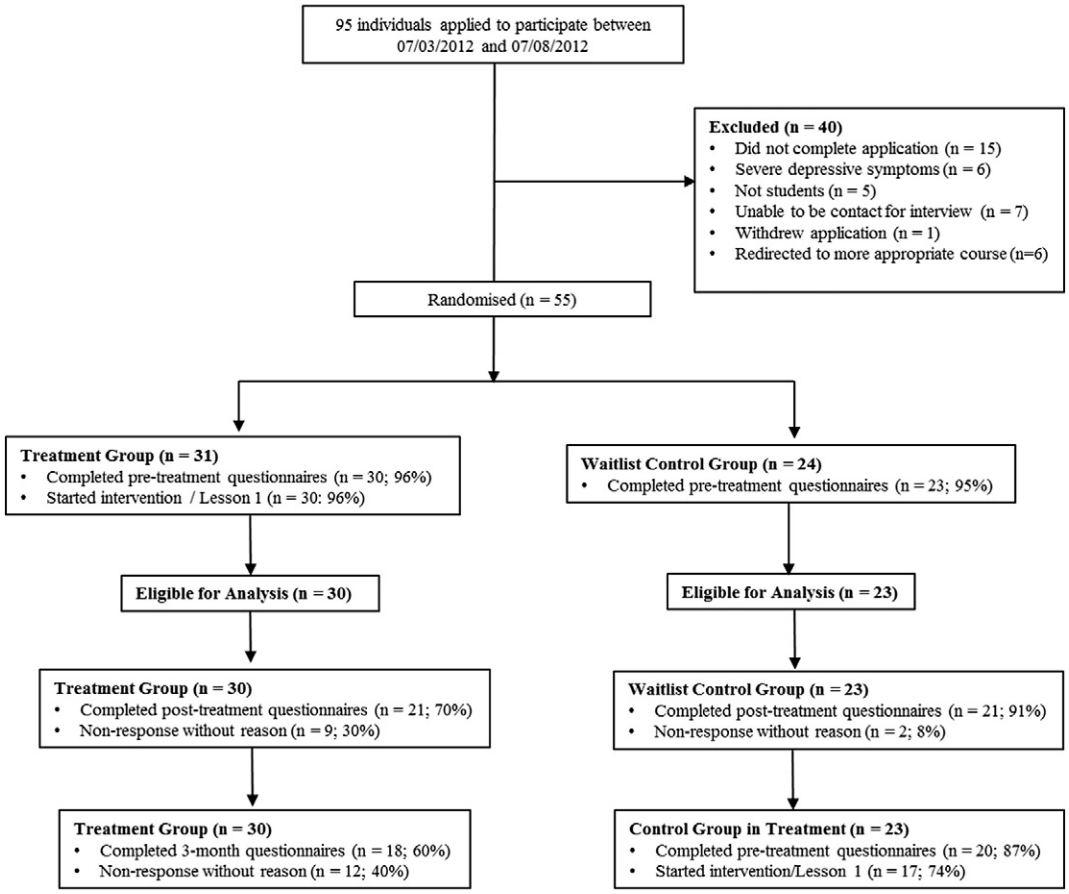

Fig. 1. Participant flow chart.

the participants and conducted all the MINI diagnostic assessments. Authors BFD and NT provided weekly, 1 hour supervision sessions at a scheduled time in which all cases were reviewed. Supervision was provided at other times as required. The therapist attempted to contact participants each week during the course and tried to limit contact to 5 to 10 minutes, although more time could be used where clinically indicated. The participants could elect to have their weekly contact via telephone or the secure email-type system. The aim of the contact was to reinforce progress, describe and summarise key skills, encourage practice and lesson completion, and normalise challenges. The participants were invited to engage in discussions of the materials and to provide feedback about the material to the clinician. All contacts with the participants were recorded as was the total therapist time spent per participant. Automated emails were also sent to participants at specific times during treatment to notify them of new resources that had become available or to encourage them to complete the tasks.

Table 2
UniWellbeing course lesson content.

Lesson	Core lesson content	Additional resources
1	Education about the prevalence, symptoms and treatment of anxiety. Introduction of a CBT model and explanation of the functional relationship between physical, cognitive and behavioural symptoms. Instructions for identifying one's own symptoms and how the symptoms interact.	– What to do in a mental health emergency
2	Introduction to the basic principles of cognitive therapy and importance of managing thoughts to managing anxiety. Instructions for monitoring and challenging automatic thoughts.	– Sleep management – Structured problem solving
3	Introduction to the physical symptoms of anxiety (i.e. hyper-arousal) and depression (i.e., hypo-arousal) and their relationship to emotional wellbeing. Instructions about controlling physical symptoms using strategies such as controlled breathing and scheduling pleasant activities.	– Worry time – Challenging irrational beliefs – Managing panic attacks
4	Introduction to the behavioural symptoms of anxiety (i.e., safety behaviours and avoidance behaviours). Instructions about behavioural activation and graded exposure.	– A list of 100 pleasant things to do – Overcoming procrastination
5	Information about the occurrence of lapses and managing long-term wellbeing. Information about the signs of relapse and instructions for creating a relapse prevention plan.	– Assertive communication skills

2.6. Statistical analysis

All analyses were conducted using SPSS version 22. Group differences in demographic and diagnostic data were analysed with one-way analyses of variance (ANOVAs) and chi-square tests (Table 1). A generalised estimation model (GEE) modelling technique was employed to examine changes in PHQ-9 GAD-7, K-10 and SDS scores. GEE emphasises the modelling of an average group (i.e., population) effect over time, where the within subjects variance can be accounted for in the model estimates, but with a primary emphasis on the average group-related change over time (Hubbard et al., 2010). An exchangeable working correlation structure was selected, coupled with a robust error estimation for the purposes of model parsimony, for all GEE analyses. All GEE models also specified a gamma distribution with a log link response scale to address positive skewness in the dependent variable distributions. Consistent with the principles of intention-to-treat analyses GEE analyses were first run to impute missing data points

for participants with missing data using initial scores as a covariate. Time and Group were specified as predictor variables, with time as a within-subject variable, and the response or dependent variable as the outcome variable. Consistent with previous clinical trials (e.g., Dear et al., 2015; Titov et al., 2015) and large dissemination studies of transdiagnostic treatments (Richards and Suckling, 2009; Gyani et al., 2013; Titov et al., in press), the primary GEE analyses were then run separately for the overall sample and for the clinical subsamples, which comprised those participants scoring ≥8 on the GAD-7 at pre-treatment or ≥10 on the PHQ-9 at pre-treatment. Importantly, compared with the overall analyses, the clinical subsample analyses provide outcome data focussed on those individuals who would be identified as having clinical-level difficulties in the outcome areas. These analyses acknowledge the heterogeneity of presentations in transdiagnostic treatments and recognise that not all individuals have clinical level difficulties in each outcome domain. Effect sizes (Cohen's *d*) and 95% confidence intervals were also calculated for both within-group and between-group effects based on the estimated means and pooled SDs, which were calculated from the estimated SEs.

The following criteria of clinical significance were used. First, *reliable improvement* was calculated using standard procedures for determining reliable change (Jacobson and Truax, 1991), which take into account the reliability and measurement error associated with the questionnaire being employed. Specifically, a person was deemed to have made a reliable improvement if they scored above the total cut-off at pre-treatment (i.e., ≥8 on the GAD-7 or ≥10 on the PHQ-9) and their symptoms improved by a reliable amount; that is, more than 3.53 or 5.20 on the GAD-7 and the PHQ-9, respectively (Gyani et al., 2013). Second, *reliable recovery* was determined to have occurred if a participant scored above the clinical cut-off at pre-treatment, made a *reliable improvement*, and scored below the clinical cut-off at the post-treatment or follow-up time point of interest. Finally, a person was deemed to have a *reliable deterioration* if their symptoms deteriorated or worsened by a reliable amount; that is, more than 3.53 or 5.20 on the GAD-7 and the PHQ-9, respectively (Gyani et al., 2013).

3. Results

3.1. Preliminary tests

No differences were found between the treatment and control groups on the demographic variables shown in Table 1. However, the treatment group met the diagnostic criteria for a greater number of diagnoses at assessment compared to the control group. No differences were found between the treatment and control groups at pre-treatment on PHQ-9, GAD-7, K-10 or SDS scores (*ps* > .05).

3.2. Symptom outcomes for overall sample

The means, standard deviations and effect sizes for the outcome measures are shown in Table 3. The means and 95% confidence intervals for the outcome measures are shown in Fig. 2. The GEE analyses revealed significant effects for Time (PHQ-9: *Wald's* $\chi^2 = 76.69$, $p < .001$; GAD-7: *Wald's* $\chi^2 = 39.89$, $p < .001$; K-10: *Wald's* $\chi^2 = 81.30$, $p < .001$; SDS: *Wald's* $\chi^2 = 49.62$, $p < .001$) and a significant Time by Group interaction on the PHQ-9 (*Wald's* $\chi^2 = 9.04$, $p < .01$), GAD-7 (*Wald's* $\chi^2 = 14.09$, $p < .001$), and SDS (*Wald's* $\chi^2 = 5.64$, $p = .018$), but not the K-10 (*Wald's* $\chi^2 = 2.53$, $p = .112$). Pairwise comparisons showed no significant differences between groups post-treatment for the PHQ-9 ($p = .172$) or SDS ($p = .328$). However, there was a difference at post-treatment on the GAD-7 ($p = .042$) with the treatment group reporting lower scores. Pairwise comparisons also revealed that the treatment group reported significant improvements in scores from pre-treatment to post-treatment ($p \leq .001$) on the PHQ-9, GAD-7 and SDS, where the control group did not report any improvements from pre-treatment to post-treatment (*p* range = .168 to .758). The comparisons also revealed significant further improvements from post-treatment to 3-month follow-up for the treatment group on the PHQ-9, GAD-7 and SDS (*ps* ≤ .001).

3.3. Symptom outcomes for clinical subsamples

The means, standard deviations and effect sizes for the clinical subsamples are shown in Table 3 and the means and 95% confidence intervals for the outcome measures are shown in Fig. 2. GEE analyses revealed significant effects on the PHQ-9 for Time (*Wald's* $\chi^2 = 70.39$, $p < .001$) and a significant Time by Group interaction (*Wald's* $\chi^2 = 8.01$, $p = .005$). Pairwise comparisons revealed a significant between group difference at post-treatment ($p = .030$) with the treatment group reporting fewer symptoms. These comparisons also revealed the treatment group's symptoms reduced from pre-treatment to post-treatment ($p < .001$) and from post-treatment to 3-month follow-up ($p < .001$), but there were no reductions in the control group's symptoms from pre-treatment to post-treatment ($p = .353$).

The GEE analyses also revealed significant main effects on the GAD-7 for Time (*Wald's* $\chi^2 = 38.70$, $p < .001$) and Time by Group interaction (*Wald's* $\chi^2 = 34.45$, $p < .001$). Pairwise comparisons revealed a significant difference between groups at post-treatment ($p < .001$) with the treatment group reporting fewer symptoms. Treatment group scores also improved from pre-treatment to post-treatment ($p < .001$) and from post-treatment to-3 month follow-up ($p = .010$), while the control group's symptoms worsened from pre-treatment to post-treatment ($p = .02$).

3.4. Clinical significance

The proportions of participants reporting *reliable improvement*, *reliable recovery* and *reliable deterioration* are shown in Table 4. Chi-square analyses indicated greater proportions of *reliable improvement* and *reliable recovery* on the GAD-7 in the treatment group compared to the waitlist-control group ($p < .05$). No significant differences were found in the levels of *reliable improvement* and *reliable recovery* in the treatment and control groups; however, the levels of both appeared to increase in the treatment group at the 3-month follow-up time point. For example, at 3-month follow-up, approximately 45% of the treatment group reported *reliable improvement* and *reliable recovery* on the GAD-7 and the PHQ-9.

3.5. Clinical contact

The mean clinical contact time per participant in the treatment group was 19.21 minutes (SD = 15.16), which included reading and sending secure email messages and telephoning participants. During the course the clinician sent a total of 75 messages (M = 2.6 per participant) and made 69 telephone contacts (M = 2.4 per participant). An additional 60 minutes was required per participant to complete the MINI diagnostic assessments and for general administrative purposes.

3.6. Treatment completion and treatment satisfaction

Forty-three percent of the treatment group participants completed the entire course within 6 weeks. At post-treatment, participants were invited to provide evaluative feedback about the intervention, which involved answering several open-ended questions and rating the course on a 5 point scale ranging from very satisfied to very dissatisfied. Sixteen participants in the treatment group provided feedback about the course. Technical issues prevented 3 participants from providing feedback. No reason was given by the remaining two participants. Of the participants who did provide feedback about the course ($n = 16$), 87.5% (14/16) indicated that they were very satisfied or mostly satisfied with the course and only 12.5% (2/16) were neutral or dissatisfied with the course. Moreover, of the respondents, 93.8% (15/16) indicated it was worth

Table 3
Means, standard deviations and effect sizes (Cohen's d) for the observed and estimated marginal means for each group.

	n	Observed means			Estimated means			Effect sizes (based on estimated means)		
		Pre	Post	3-Month follow-up	Pre	Post	3-Month follow-up	Pre- to post-within group effect size	Post-between group effect size	Pre- to 3-month follow-up within group effect size
Overall sample										
PHQ-9										
Treatment Group	30	11.16 (5.32)	6.33 (4.59)	4.16 (3.74)	11.17 (5.24)	7.27 (4.36)	4.57 (3.15)	0.81 [0.27–1.32]	0.40 [−0.16–0.94]	1.53 [0.93–2.08]
Control Group	23	10.04 (5.35)	8.70 (6.53)	–	10.04 (5.24)	9.37 (6.30)	–	0.12 [−0.46–0.69]		–
GAD-7										
Treatment Group	30	9.60 (5.51)	6.09 (4.01)	4.44 (3.32)	9.60 (5.43)	6.57 (3.60)	4.71 (2.73)	0.66 [0.13–1.17]	0.60 [0.04–1.15]	1.14 [0.58–1.67]
Control Group	23	8.39 (3.89)	8.35 (5.60)	–	8.39 (3.81)	9.48 (6.10)	–	−0.21 [−0.79–0.37]		–
K-10										
Treatment Group	30	24.93 (6.49)	21.14 (6.32)	17.00 (5.49)	24.93 (6.49)	21.77 (6.52)	17.47 (5.31)	0.49 [−0.03–0.99]	−0.03 [−0.57–0.52]	1.26 [0.69–1.79]
Control Group	23	22.52 (6.53)	20.74 (7.21)	–	22.52 (6.39)	21.60 (7.08)	–	0.13 [−0.45–0.71]		–
SDS										
Treatment Group	30	19.48 (9.32)	13.24 (7.47)	8.00 (6.47)	19.48 (9.32)	14.54 (7.37)	8.68 (5.53)	0.59 [0.06–1.10]	0.28 [−0.27–0.83]	1.41 [0.83–1.96]
Control Group	23	16.57 (11.10)	14.68 (10.47)	–	16.57 (10.86)	17.12 (10.90)	–	−0.05 [−0.63–0.53]		–
Clinical subsample										
PHQ-9 ≥ 10										
Treatment group	20	14.10 (3.62)	8.33 (4.86)	5.60 (4.22)	14.10 (3.53)	8.98 (4.14)	5.64 (3.13)	1.33 [0.62–1.99]	0.91	2.34 [1.66–3.31]
Control group	11	14.63 (3.35)	13.37 (7.42)	–	14.64 (3.20)	13.50 (6.19)	–	0.23 [−0.62–1.06]	[−0.12–1.66]	–
GAD-7 ≥ 8										
Treatment group	18	13.33 (3.71)	6.75 (4.37)	5.10 (4.17)	13.33 (3.61)	7.51 (3.71)	5.49 (3.10)	1.59 [0.81–2.30]	1.54	2.33 [1.44–3.12]
Control group	12	11.33 (2.60)	12.66 (4.18)	–	11.33 (2.49)	13.75 (4.53)	–	−0.66 [−1.46–0.18]	[0.68–2.32]	–

Note. Standard deviations are shown in round parentheses and 95% confidence intervals are shown in square parentheses. GAD-7: Generalised Anxiety Disorder 7-item; PHQ-9: Patient Health Questionnaire 9-item; K-10: Kessler 10-item; and SDS: Sheehan Disability Scales.

their time to participate in the course and 93.8% (15/16) indicated that they would recommend the course to others. Finally, 93% (15/16) reported that they were more confident to manage symptoms of stress, anxiety, low mood and depression as a result of the course.

4. Discussion

The aim of the present study was to examine the feasibility, acceptability and efficacy of iCBT for university students experiencing symptoms of stress, anxiety, low mood and depression. It was hypothesised that the treatment group would report significantly reduced symptoms of anxiety and depression at post-treatment and that participants with clinical level symptoms would report reductions in symptoms of anxiety and depression consistent with those observed in previous iCBT studies. It was also hypothesised that symptom reductions would be sustained at 3 months and that participants would rate the treatment as acceptable. These hypotheses were partially supported. The treatment group's symptoms reduced at a greater rate than the control group, but there were no significant differences between the groups at post-treatment with the exception of anxiety, which was significantly lower for the treatment than the control group. However, when focussing on participants with clinical-level symptoms, these reductions were more marked and evidence of significant differences in symptoms of anxiety and depression were found. The reductions in symptoms were maintained at 3-month follow-up in both the overall sample and in those participants with clinical level symptoms. There was also some evidence of further improvement in symptoms from post-treatment to 3-month follow-up. The treatment was rated as acceptable and required relatively little clinician time on average per participant.

The findings of the present study are encouraging and are largely consistent with the results reported in the broader literature concerning iCBT for anxiety and depression (Andersson and Cuijpers, 2009; Cuijpers et al., 2010). The results are also generally consistent with the previous studies examining the use of internet-delivered psychological treatments for university students (Day et al., 2013; Kenardy et al., 2003; Mitchell, and Dunn, 2007; Santucci et al., 2014). For example, one study ($n = 66$) of a 6-week iCBT programme, supported by trained university students, found moderate effect size (Cohen's $d > 0.50$) reductions in anxiety and depression among treatment group participants compared with control group participants (Day et al., 2013), which were maintained at 6-month follow-up. The present study found similar reductions among the overall treatment group (Cohen's $d > 0.50$) and, as hypothesised, evidence of larger reductions (Cohen's $d > 0.80$) among participants with clinical-level symptoms of anxiety and depression. Importantly, although the treatment group participants exhibited significantly greater reductions in symptoms over time, evidence of between group differences in symptoms at post-treatment were only found for the clinical subsamples. This likely reflects the small sample sizes employed in the present study as well as the relatively low symptom levels reported by many participants.

The present study is encouraging in terms of the preliminary support it provides for the feasibility and acceptability of iCBT provided to students. For example, more than 85% of the participants that provided feedback indicated that they were satisfied or very satisfied with the course. It is worthwhile to note that these levels of satisfaction were obtained with relatively little clinician contact per participant ($M = 19.21$ min; $SD = 15.16$), which highlights the potential cost-effectiveness of iCBT treatments and the potential of iCBT to university student counselling services. It is also important to note that the overall completion rate of approximately 45% in the present study was low compared with other similar clinician-guided iCBT programmes for adults with anxiety and depression generally (e.g., Dear et al., 2011a). However, the completion rates are consistent with those observed in previous studies of university students (61%: Day et al., 2013) and other studies of iCBT provided to younger adults (61%; Johnston et al., 2014). Adherence helps to ensure that the participants obtain a sufficient 'therapeutic dose' and the present study was pragmatic in that aim to explore the most suitable

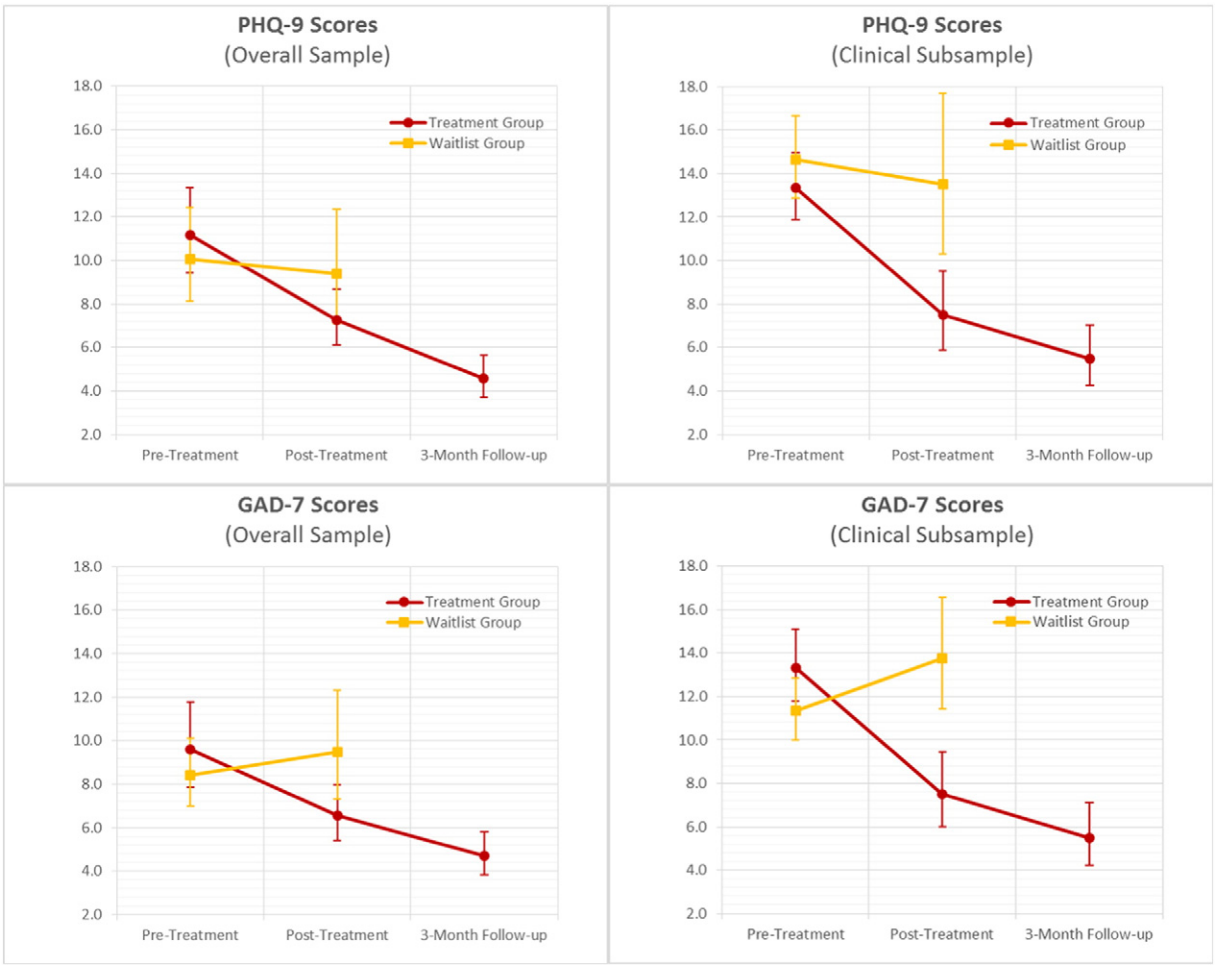

Fig. 2. Means and 95% confidence intervals for the groups across the treatment time points.

course format for university students. Importantly, while the core content was similar, modifications to the length and number of lessons were made during the trial based on the participants' feedback. Unfortunately, while the present study is unable to provide any clear information about treatment satisfaction and the optimum treatment formats for university students, we believe that this is an important area for future research.

The present study was a small feasibility study and several important limitations need to be considered when interpreting its findings. First, although the findings are encouraging, the present study involved a relatively small number of participants and consequently was underpowered to detect small-to-moderate clinical effects. Thus, further controlled trials with much larger samples are needed in the future. Second, although there was evidence of further improvement in the treatment group from post-treatment to 3-month follow-up, the use of a short follow-up period and a waitlist-control group limits the conclusions that can be made about long-term differences in clinical outcomes. Third, the present study employed only clinical measures of anxiety and depression and, while seeking assistance with their emotional

Table 4
Proportions reporting reliable improvement and reliable recovery.

Clinical sample	Post-treatment								3-Month follow-up			
	Reliable deterioration	χ^2	No change	χ^2	Reliable improvement	χ^2	Reliable recovery	χ^2	Reliable deterioration	No change	Reliable improvement	Reliable recovery
PHQ-9 (PHQ-9 ≥ 10)												
Treatment ($n = 20$)	0/20 (0%)	–	8/20 (40%)	$\chi^2 = 5.0$ $p = .03$	7/20 (35%)	$\chi^2 = 5.0$ $p = .03$	5/20 (25%)	$\chi^2 = 0.2$ $p = .66$	0/20 (0%)	2/20 (10%)	0/20 (10%)	18/20 (90%)
Control ($n = 11$)	0/11 (0%)	9/11 (82%)			0/11 (0%)		2/11 (18%)		–	–	–	–
GAD-7 (GAD-7 ≥ 8)												
Treatment ($n = 18$)	0/18 (0%)	$\chi^2 = 6.9$ $p = .01$	4/18 (22%)	$\chi^2 = 4.0$ $p = .04$	6/18 (33%)	$\chi^2 = 2.5$ $p = .11$	8/18 (44%)	$\chi^2 = 7.3$ $p = .01$	0/18 (0%)	2/18 (11%)	2/18 (11%)	14/18 (78%)
Control ($n = 12$)	4/12 (33%)		7/12 (58%)		1/12 (8%)		0/12 (0%)		–	–	–	–

Note. A person was deemed to have made a reliable improvement if they scored above the total cut-off at pre-treatment and their symptoms improved by a reliable amount. A person was deemed to have reliably recovered if they scored above the clinical cut-off at pre-treatment, made a reliable improvement, and scored below the clinical cut-off at the post-treatment or follow-up time point of interest. A person was deemed to have made a reliable deterioration if their symptoms deteriorated by a reliable amount. GAD-7; Generalised Anxiety Disorder 7-item. PHQ-9; Patient Health Questionnaire 9-item.

wellbeing, many participants presented with subclinical level symptoms of anxiety and depression. Unfortunately, there is little clear guidance about the most appropriate measures or outcomes in this area. Similarly, the allocation of participants with MINI diagnoses was significantly different between groups and this is likely to have affected the findings. Future studies may consider using stratified randomization based on diagnosis to avoid this issue. Moreover, given that reductions in levels of anxiety and depression are unlikely to be the most relevant outcomes for all students, as observed in the present study, the inclusion of general measures of coping and university performance would be a worthwhile addition to future research. Fourth, based on participant feedback, several changes were made to the treatment programme during the current RCT in order to maximise acceptability, which may have affected outcomes. Unfortunately, the small sample sizes participating in each version of the treatment programme mean that is not possible to compare each version of the programme; however, further research on the optimal structure of iCBT programmes for this population would be valuable given the lower completion rates observed. Finally, the present study employed a sample who were seeking and willing to participate in an internet-delivered treatment programme, rather than a more general student sample or students presenting directly to a university counselling service. Consequently, some caution is needed in generalising the results of the present study. However, a large trial is currently underway exploring the implementation and uptake, acceptability and efficacy of iCBT provided as a part of routine university counselling services.

In summary, no between-group differences were found in symptoms of anxiety and depression at post-treatment for the entire sample. However, when focusing on students with clinical level symptoms, evidences of significant differences in symptoms of anxiety and depression were obtained between the treatment and control groups at post-treatment. The iCBT intervention required relatively little clinician time per participant and was rated as acceptable by participants. Thus, the present study provides preliminary support for the potential utility of iCBT as an innovative approach for increasing access to and providing psychological treatment for university students experiencing anxiety and depression. Larger scale implementation trials with a broader range of outcome measures are an important area for future research.

Disclosures

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