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**Internet cognitive behaviour therapy for posttraumatic stress disorder: A randomized controlled trial and outcomes in routine care**

**Abstract**

**Background**: Despite its potential scalability, little is known about the effectiveness of internet-based cognitive behaviour therapy (iCBT) for posttraumatic stress disorder (PTSD) when it is provided with minimal guidance from a clinician.

**Aim:** The study investigated the outcomes of minimally-guided iCBT for PTSD in a randomised control trial (RCT, Study 1) and in an open trial in routine community care (Study 2).

**Method:** A RCT compared the iCBT course (n=21) to a waitlist control (WLC, n=19) in participants diagnosed with PTSD. The primary outcome measure was the PTSD Checklist-Civilian version (PCL-C) which indexed PTSD symptom severity. The iCBT group were followed-up at 3 months post-treatment. In Study 2, treatment outcomes were evaluated in 117 adults completing iCBT for PTSD in routine community care settings.

**Results**: iCBT participants in both studies experienced significant reductions in PTSD symptom severity from pre- to post-treatment treatment (within-group Hedges’ *g*s= .72- 1.02), with RCT findings showing maintenance of gains at 3-month follow-up. The WLC group in the RCT also significantly improved, but Study 1 was under-powered and the medium between-group effect favouring iCBT did not reach significance (*g*= 0.64).

**Conclusions:** This study provides preliminary support for the utility of iCBT for PTSD when provided with minimal clinician guidance. Future studies are needed to clarify the effect of differing levels of clinician support on PTSD iCBT outcomes, as well as exploring how best to integrate iCBT into large-scale, routine clinical care of PTSD.

**Keywords**

Cognitive behaviour therapy, posttraumatic stress disorder, internet intervention, RCT, effectiveness

**Introduction**

Posttraumatic stress disorder (PTSD) is common, with a12-month prevalence of 3.5-4.7% (Kessler etal., 2005; Kilpatrick et al., 2013). While trauma-focused cognitive behavioral therapy (CBT) is recommended in clinical practice guidelines (International Society for Traumatic Stress Studies, 2018; National Institute for Health and Care Excellence, 2018), barriers to treatment access (e.g., stigma, shame, logistical issues, Smith, et al., 2020) have spurred the development of internet-based treatments. The efficacy of internet-delivered CBT (iCBT) for PTSD compared to control conditions has meta-analytic support (*d*(95%CI)= 0.60(0.24-0.97): Lewis et al., 2019), and iCBT for PTSD is being increasingly integrated into routine care. Several studies of which have shown that iCBT is associated with medium-to-large pre-to-post-treatment effect size reductions in PTSD symptom severity (*d*s=0.72- 1.6) with adherence rates of ~70% (Klein et al., 2010; Ruwaard et al., 2012; Titov et al., 2017).

Most evaluations of iCBT for PTSD to date have examined therapist-assisted programs which have typically involved considerable clinical support and guidance. For example, the average therapist time provided to each participant across treatment was 194.5 minutes in Klein et al. (2010), 104 minutes in Spence et al. (2011), and 224 minutes in Ivarsson et al. (2014). The effectiveness of minimally guided iCBT programs for PTSD have not been well studied (Stefanopoulou et al., 2020). Yet such programs may be highly scalable, and if shown to be effective and safe, could improve the accessibility and coverage of iCBT thereby reducing the burden of disease attributable to PTSD. In the only study of minimally guided iCBT for PTSD, Hirai and Clum (2005) evaluated the effects of an 8-week program in 27 adults experiencing subclinical PTSD symptom severity. Compared to a waitlist control (WLC), this iCBT program was more efficacious in reducing PTSD-related avoidance symptoms, the frequency of intrusive trauma-related thoughts, and depressive symptoms (iCBT within-group *d*s=.62- 1.18). However, significant between-group differences were not observed for other PTSD symptoms including hyper-arousal and the intensity of participants’ intrusive thoughts about their index trauma. These findings are promising but require replication, especially among individuals diagnosed with PTSD. Furthermore, the therapist contact provided in the Hirai and Clum (2005) study did not involve therapeutic instruction or guidance, and only sought to prompt the completion of course assessments and modules. The effects of providing minimal therapeutic guidance during iCBT for PTSD now needs to be examined as this clinical contact may enhance risk management and better reflect the level of support recommended for the implementation of iCBT in community care settings (e.g., Newby et al., 2021).

Accordingly, we sought to examine the preliminary effectiveness of a 6-lesson iCBT program for PTSD with mininmal therapeutic contact and input. Consistent with Smith et al. (2017), minimal therapeutic guidance was operationalised as therapist contact in response to participant request or symptom deterioration on standardized assessment measures, in addition to automated system emails to encourage program engagement. Study 1 was an RCT that compared iCBT to WLC among adults diagnosed with PTSD. We predicted that iCBT would produce medium-to-large effect size reductions in PTSD symptom severity at post-treatment compared to WLC and that these improvements would be maintained for 3-months. To explore the generalisability of findings and the clinical utility of iCBT for PTSD, it is valuable to examine its effectiveness beyond RCT conditions. Study 2 therefor evaluated the outcomes of iCBT for PTSD delivered in routine care by community-based clinicians via the THIS WAY UP digital mental health service. Consistent with previous studies (e.g., Luu et al., 2020; Mewton et al., 2012; Newby et al., 2013; Williams et al., 2014), we expected that the effectiveness of the course in routine care would be comparable to that of the RCT, but that adherence would be lower.

**STUDY 1: Randomised controlled trial**

**Method**

***Design***

A CONSORT-revised 2010-compliant (Schulz et al., 2010; see Supplementary Table) parallel RCT was used to compare PTSD iCBT to WLC. The study was approved by the St Vincent’s Hospital Human Research Ethics Committee (HREC/14/SVH/28) and the trial was registered on the Australian New Zealand Clinical Trials Registry (ACTRN12614001213639). Minimum samples size per group was identified as 72 (alpha=.05, power of 80%, *g*=.47, trial protocol: Allen et al., 2015), but resource restrictions constrained recruitment and the desired sample size was not achieved.

***Participants***

Participants were self-referred and recruited via advertisements posted on social media, online forums, and flyers. Recruitment across Australia commenced in September 2014, with the active trial period concluding in April 2016. Individuals applied for the study via the Virtual Clinic website (virtualclinic.org.au). Inclusion criteria were that applicants: (i) met diagnostic criteria for PTSD; (ii) had computer, internet and printer access; (iii) were Australian residents; (iv) were fluent in written and spoken English; and (v) were willing to provide the name and address of their general practitioner (GP). Applicants were excluded if they: (i) had experienced trauma within the past four weeks; (ii) were younger than 18 years; (iii) were currently receiving PTSD treatment; (iv) experiencing frequent suicidal ideation (indicated by a score of 3 on item 9 of the Patient Health Questionnaires (PHQ-9)); (v) regularly using illicit drugs or consuming >3 standard alcoholic drinks per day; (vi) had been diagnosed with a psychotic disorder or were currently taking antipsychotic medication or benzodiazepines; (vii) had started taking medication for their anxiety or depression in the last 4 weeks or intended to change their medication during the trial; (viii) were highly dissociative (indicated by an average of all item score on the Dissociative Experiences Scale score ≥40, as in Spence et al., 2011); and/or (ix) had current or pending medicolegal/Workers Compensation proceedings associated with their trauma. Applicants who were excluded received information on alternative support services.

Figure 1 shows participant flow. Of 597 applications, 415 were excluded during initial screening. The remaining 182 applicants provided consent and attempts were made to conduct a diagnostic telephone interview. Trained interviewers (AA, JS) administered the PTSD and Major Depressive Disorder (MDD) modules of the Mini International Neuropsychiatric Interview version 5 (Sheehan et al., 1998) to determine PTSD and MDD diagnosis. Following interviews, 133 applicants were excluded and 49 were randomized to iCBT (n=25) or WLC (n=24). Randomization was completed using a 1:1 ratio. Allocation was generated by an independent person using a random number generator (www.random.org) and concealed from investigators using sequentially numbered opaque envelopes manually assigned to participants. Participants were notified of group allocation via email.

Of the 25 participants who were randomised to the iCBT arm of the RCT, one withdrew because they sought face-to-face services and three did not complete baseline measures or begin lesson 1. In the WLC group, 3 participants withdrew and 1 did not complete their pre-treatment questionnaires. An additional WLC participant withdrew after study commencement. As such 21 iCBT and 19 WLC participants were included in study analyses.

***Intervention***

The PTSD iCBT course was delivered over 10 weeks and involved six lessons. Content was presented via an illustrated story of a character experiencing PTSD who learns to manage their symptoms using CBT skills (see Table 1 for program content). The program was adapted from cognitive processing therapy (CPT; Resick et al., 2008) and the prolonged exposure protocol of Foa et al. (2007) and based on the social cognitive theory and emotional processing theory of PTSD. Lesson slides were followed by a homework summary and supplementary resources. Participants accessed a lesson each week with a minimum waiting period of five days between lessons to promote revision and skill implementation. While 3-4 hours was the recommended weekly commitment, participants could choose the duration they spent on each lesson. Participants were encouraged to stay on schedule via automated email reminders, with additional support provided upon request via email or phone by the study clinician (AA) which involved helping participants to understand and apply the CBT skills. The WLC group were provided free access to the iCBT course after the wait-list period. We intended to ask WLC participants whether they sought treatment for their PTSD during the waitlist period. However due to a wording error during item administration, these data could not be used.

***Assessments***

*Demographics*

Participants reported their sex, age, marital status, educational attainment and occupational status (see Table 2). Participants’ rurality (i.e., living in major city or regional/rural area) was inferred from their postcode and the Australian Statistical Geography Standards (Australian Bureau of Statistics, 2013).

*Diagnoses and traumas*

The PTSD and MDD modules of the MINI version 5 determined current diagnosis. Studies support the inter-rater reliability and concurrent validity of the MINI (Lecrubier et al. 1997; Sheehan et al., 1998). Participants completed the Life Events Checklist for DSM-IV (Gray et al., 2004) and Part 2 of the Life Events Checklist for DSM-5 (Weathers et al., 2013) to report the nature and time of their exposure to traumatic events (Table 3).

*Outcomes*

*Primary outcome*

The PTSD Checklist-Civilian version (PCL-C) is a 17-item self-report questionnaire of PTSD symptom severity (based on DSM-IV criteria) with items rated on a 5-point scale of distress (1= “Not at all” to 5= “Extremely”) and total scores ≥44 indicative of a PTSD diagnosis. The scale has sound reliability and validity (McDonald & Calhoun, 2010; Weathers et al., 1993) and the internal consistency of the PCL-C prior to treatment was α=0.86.

*Secondary outcomes measures*

The Kessler Psychological Distress Scale (K10) was used to assess the psychological distress participants had experienced in the past two weeks (Kessler et al., 2002; Merson et al., 2021; Sunderland et al., 2012) (pre-treatment α=0.87). The Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder-7 (GAD-7) indexed participants’ depression and generalized anxiety symptom severity with scores ≥10 indicative of probable GAD and MDD diagnoses, respectively (Kroenke et al., 2001; Spitzer et al., 2006). Baseline internal consistency was PHQ-9 α=0.86 and GAD-7 α=0.87.

*Outcome measurement*

All outcome measures were administered at pre-treatment, mid-treatment (week 5 of the waiting period for WLC), post-treatment (week 11 for WLC), and 3-months follow-up (treatment group only). The PCL-C and K10 were also completed prior to each iCBT lesson.

*Participant expectancies and feedback*

Prior to treatment, the iCBT group rated how logical iCBT seemed and how successful they thought it would be for reducing their PTSD symptom severity on a 9-point scale ranging from *Not at All Logical/Useful* (1), *Somewhat Logical/Useful* (5) to *Very Logical/Useful* (9). At post-treatment, participants reported how satisfied they were with iCBT and how confident they would be in recommending the program to a friend with similar difficulties (a 9-point rating scale was used ranging from *Not at All Satisfied/Confident* (1) to *Very Satisfied/Confident* (9).

***Analyses***

Group differences in demographic and pre-treatment data were estimated with independent *t-* and χ2 tests. Intention-to-treat linear mixed models with random intercepts for subjects examined the effect of treatment on the PCL-C, K10, PHQ-9 and GAD-7 total scores. Missing data were accommodated using maximum likelihood estimation. Measurement occasion was treated as a binary variable and models were estimated separately for each outcome. First, models were estimated using a restricted maximum likelihood estimator and a variance components covariance structure for the random effects. Second, the relative fit of the residual covariance structure of the random effects was evaluated using the Bayesian information criterion (Raferty, 1995). Specifying a first order autoregressive structure for the residuals of the PCL-C and the K10, and identity covariance structure for the residuals of the GAD-7 and PHQ-9 provided the closest model fit. Significant treatment effects were followed with pairwise comparisons of their estimated marginal means. Within-group Hedges’ *g* effect sizes were calculated between pre- and post-treatment assessments and between the iCBT group’s post- and 3-month follow-up assessments and corrected for the correlation between repeated measurements. Between-group effect sizes were estimated by calculating the difference between the average of the iCBT and WLC groups divided by the pooled standard deviation of the two groups at their post-treatment assessments.

In the iCBT group, clinically significant change was evaluated in two ways among participants who completed treatment. First, rates of remission were estimated using PCL-C scores≥ 44 to indicate probable diagnosis (Blanchard et al., 1996). Second, a reliable change index (RCI) of 13.20 on PCL-C scores was calculated based on the standard deviation of the estimated marginal means at baseline (i.e., 13.75) and a *r*=0.88.

**Results**

*Participant characteristics*

Most participants were female, aged in their early 40s (*M(SD)*=41.60(13.81)) and resided in major cities (Table 2). Limited sample size precluded examination of statistically significant group differences (other than age, which did not differ by group, *M(SD)iCBT=*41.90(14.45) *vs. M(SD)WLC=*41.26(13.45), *t*(38)=0.15, *p*=0.89). However, the distributions of demographic variables suggested that the two groups had a comparable sex and rurality distribution, and a similar proportion of married/de facto relationships and those engaged in paid work. On average, groups reported clinically significant baseline PTSD, MDD, and GAD symptom severity (see Table 4), with no significant group differences observed for pre-treatment PTSD (*t*(38)= 0.52, *p*=0.60), depressive (*t*(38)= 0.24, *p*=0.81) and GAD symptom severity (*t*(38)= 0.20, *p*=0.85) or psychological distress (*t*(38)= 0.49, *p*=0.63).

Most participants reported experiencing primary exposure(s), the most common type being sexual trauma or assault, followed by the unexpected loss of others (see Table 3). Regarding index trauma, 29% of the sample reported a childhood traumatic event and 22% of the sample reported this as childhood physical or sexual assault. Groups did not differ with respect to the number of years since their index trauma (*M(SD)iCBT=*12.84(11.47) *vs. M(SD)WLC=*15.34(14.05), *t*(38)= 0.62, *p*=0.54)), nor did they differ in the average number of traumas experienced (*M(SD)iCBT=*5.67(2.92) *vs. M(SD)WLC=*6.52(2.82), *t*(38)=0.95, *p*=0.35), witnessed(*M(SD)iCBT=*1.47(1.72) *vs. M(SD)WLC=*1.00(1.00), *t*(38)=1.06, *p*=0.30), or learned of (*M(SD)iCBT=*2.19(2.64) *vs. M(SD)WLC=*1.32(1.89), *t*(38)= 1.19, *p*=0.24).

*Adherence*

Of those who started iCBT, 66.7% (14/21) completed all 6 lessons (56% [14/25] of those who were randomised to iCBT completed the course). An additional two participants completed ≥4 lessons (and were therefore exposed to the majority of treatment content, including exposure), two participants completed 3 lessons and another two participants completed 2 lessons. One participant did not complete any lessons.

*Treatment effects*

As seen in Table 4, there was no significant group by time interaction for PTSD symptom severity (*F*(2, 89.16)=1.17, *p*=0.32). In comparison to the WLC group, iCBT participants experienced moderate effect size reductions in PTSD symptom severity (between-groups *g*=0.64, 95% CI= -.10- 1.38), however, this did not reach statistical significance. Participants receiving iCBT experienced, on average, large effect size reductions in PTSD symptom severity from pre- to post-treatment (within-group *g*=1.02, 95% CI= .29-1.75) whereas those in the WLC group reported moderate reductions (within-group *g*=0.67, 95% CI=-.01-1.34). There was no significant change in PCL-C scores for the iCBT group between post-treatment and 3-month follow-up.

There were no significant group by time interactions for the secondary outcome measures of depression, anxiety and psychological distress: PHQ-9 (*F*(2, 72.25)=1.06, *p*=0.35), GAD-7 (*F*(2, 73.49)=0.47, *p*=0.63), and K-10 (*F*(2, 92.19)=3.63, *p*=0.03), with small between-group effect sizes in all cases (*gs*= -0.03-0.29). For the secondary outcomes, pre- to post-treatment within-group effect sizes were medium to large for the iCBT group and small to medium for WLC. There was no significant change in secondary outcome measures between post-treatment and follow-up for the iCBT group.

*Remission and reliable change among completers*

Among participants who completed post-treatment measures, 61.5% of the iCBT (n=8/13) and 17.7% of the WLC group (n=3/17) no longer reported a PCL-C score indicative of a probable PTSD diagnosis. Moreover, 38% of those in the iCBT group (n=5/13) and 29% of the WLC group (n=5/17) experienced reliable improvements in their PTSD symptom severity with 95% confidence (Jacobson & Truax, 1991). No participant with post-treatment data available experienced a reliable deterioration in their PTSD symptom severity.

*Participant expectancies and feedback*

Participant expectancies and feedback following treatment were positively skewed, with the median participant consistently reporting that iCBT seemed somewhat logical, would reduce their symptom severity somewhat, as well as being somewhat satisfied with treatment and confident in recommending the treatment to a friend with similar difficulties.

*Personnel contact with participants*

During the 10-week course, study personnel spent an average of 38.00 minutes (*SD*=67.29) per participant on email and telephone calls. There was an average of 9.76 (*SD*=6.72) email exchanges (i.e., emails sent or received) and 4.05 (*SD*=4.88) telephone calls per participant. Three participants required a higher level of support (>30 min).Two participants required support the manage self-harm and suicidal ideation and urges that had been triggered by acute psychosocial stressors, while another participant needed guidance on how to reduce dissociation and emotional avoidance while rewriting her trauma narrative. .

**Discussion**

Study 1 examined the efficacy of the PTSD iCBT program delivered with minimal therapeutic guidance compared to WLC for adults with PTSD. We found that iCBT produced moderate effect size reductions in PTSD symptom severity and small effect size reductions in depression and anxiety symptom severity compared to WLC. Treatment gains were maintained at 3-month post-treatment for the iCBT group. We did not find significant pre- to post-treatment between-group differences with respect to PTSD, depressive, and anxiety symptom severity or psychological distress. Both the iCBT and WLC groups experienced significant reductions in PTSD symptom severity across the treatment phase (within-group *g*= 1.02 for iCBT; *g*= .67 for WLC) with estimated rates of remission and reliable change higher among the iCBT group.

A recent meta-analytic evaluation of the effects of iCBT for PTSD found that, on average, these programs produce medium effect size reductions in PTSD symptoms compared to control conditions (*d*(95%CI)= 0.60(0.24-0.97), Lewis et al. 2019). The magnitude of our between-group difference in PTSD symptom severity following treatment is consistent with this report. Nonetheless, this result did not reach statistical significance. It is important to understand this finding in the context of our limited sample size. Although there was substantial interest from applicants in this RCT, our inclusion criteria meant that 41 participants began the trial. This resulted in only 66% power to detect a statistically significant result for the order of the demonstrated magnitude of treatment effects (e.g., 80 participants would need to be randomised to detect the 0.64 treatment effect to a statistically significant degree). Interestingly, the other RCT of minimally-supported iCBT for PTSD (Hirai & Clum, 2005) did not find consistent pre- to post-treatment between-group differences in PTSD symptom severity (e.g., significant differences for avoidance symptoms but not hyperarousal). Our findings may reflect the limited impact of the current PTSD program among those experiencing severe PTSD symptom severity or could also indicate that minimal therapeutic guidance may be insufficient to enable robust symptom improvement (note that the current contact time per participant of 38 minutes was considerably less than other studies, for example, the 148 minutes per/participant provided by Lewis et al., 2016). Additionally, WLC participants in this study may have accessed other treatment(s) thereby narrowing between-group differences, as has been considered in previous RCTs that have found considerable improvements for WLC participants during the treatment period (e.g., *d*=.55 in Spence et al., 2011).

The majority of participants who began their iCBT (67%) completed the program, with reasonable program acceptability. Current adherence rates are lower than other trauma-focused iCBT studies that included more intensive therapeutic guidance (e.g., 69-73% adherence in Spence et al., 2014; 87% in Knaevelsrud et al., 2017), and higher than trauma-focused iCBT programs consisting of more than six lessons (e.g., 16%- 39%, Ivarsson et al., 2014; Lewis et al., 2017; Littleton et al., 2016). However, our adherence was much lower than clinician-guided iCBT studies for other clinical disorders (e.g., 89% completion rate for six lesson iCBT for MDD and GAD; Newby et al., 2013) and face-to-face psychotherapy for PTSD (e.g., 80%; Bradley et al., 2005). Further research is needed to explore methods of improving adherence in iCBT for PTSD. For example, in this study some participants reported difficulty relating to the single character story who had experienced only one type of trauma, while others desired face-to-face components or a ‘blended’ intervention. While most iCBT participants required minimal therapist assistance throughout treatment, it should be noted that three participants required considerably more support to manage suicidality/self-harm and complete exposure exercises. In their PTSD iCBT RCT, Spence et al. (2011) also found that a small portion of participants required considerable clinician support. When utilizing PTSD iCBT in routine care settings, iCBT providers need to consider how best to ensure timely clinical support for this group of service users.

A considerable proportion of applicants in this RCT were ineligible due to comorbid conditions, subsyndromal symptoms, and substance use. It is unclear how a broader population of individuals with PTSD symptoms would engage with the iCBT course and whether current findings would generalize to community patients undertaking treatment outside an RCT setting. Given our limited power to detect between-group differences in this RCT and our findings that the iCBT participants experienced significant improvements in PTSD symptom severity that were maintained over time, it was decided that the iCBT course could be made available to community clinicians for use with their patients under their supervision. Study 2 subsequently examined the effectiveness of the PTSD iCBT course as used by clinicians in routine community care settings.

**STUDY 2: Evaluation in routine community care**

**Method and procedure**

Over 3 years (27th July 2016 to 29th June 2019), the PTSD course was disseminated to Australian adults via the digital mental health service, THIS WAY UP (thiswayup.org.au) which is a not-for-profit provider of free and low-cost iCBT. Community clinicians (e.g., psychologists, general practitioners) who registered at THIS WAY UP prescribed the course and retained clinical responsibility for their patients during the course. Prior to enrolment, course users provided electronic informed consent that their pooled de-identified data would be collected, analyzed and published (St Vincent’s Hospital Human Research Ethics Committee approval, 2020/ETH03027).

The iCBT program was the same as Study 1 except patients were given 90 days to complete their course (like all other THIS WAY UP courses). Consistent with the minimal therapeutic guidance provided in Study 1, patients received regular automated emails to increase engagement. Clinicians were encouraged to contact their patients after the first two iCBT lessons and as needed throughout the course. However, clinicians could contact their patients and provide concurrent treatment(s) at their discretion. Community clinicians were not asked to report their level of contact with their patients or to report concurrent treatment provision (if any). To support risk management, clinicians and course users were also notified via email when patients missed a nominated lesson date or scored highly on self-reported measures of distress (K10>30), depressive symptoms (PHQ-9> 23), or suicidal ideation (PHQ-9 Q9> 1).

THIS WAY UP does not routinely collect detailed demographic or clinical information from users, however, symptom measures are administered to support outcome and safety monitoring. Course users in Study 2 completed the K10 prior to each lesson, and the PTSD Checklist for DSM-5 (PCL-5) and PHQ-9 prior to lessons one, four and six. The PCL-5 is the most up-to-date version of the PCL-C (used in Study 1) and is a psychometrically sound, 20-item measure that assesses DSM-5 PTSD diagnostic symptoms (Bovin et al., 2015; Weathers et al., 2013; Wortmann et al., 2016). Total scores≥ 31 indicate probable PTSD diagnosis (and correspond to a cut score of 44 on the PCL-C as used in Study 1, Blevins et al., 2015). The internal consistency of the PCL-5 prior to treatment was α= .93.

**Results**

***Participants***

Of the 117 individuals who enrolled in the course, most were male (61.5%), in their mid-forties (*M(SD)*= 44.89(13.78), range= 20-79 years), and resided in major cities (55.1%). The sample was characterised by high rates of probable disorder; 74.4% reported symptom severity consistent with a diagnosis of PTSD, 23.1% reported symptoms consistent with probable MDD, and 82.9% reported clinically significant distress. Community clinicians were psychologists (37.6%), medical specialists (32.5%), general practitioners (26.5%), and social workers or other allied health (3.4%).

***Course outcomes and adherence***

The average number of completed lessons was 4.52 (*SD=*1.99); with 56.4% (66/117) of course users completing all six lessons and 72.7% (85/117) completing ≥4 lessons. Intention-to-treat linear mixed model analyses estimated changes in outcomes measures from pre- to post-iCBT as in Study 1 (with the exception that an identity covariance structure was specified for the residuals of the K-10 in Study 2). On average, participants experienced significant (*p*< .001) reductions on all outcome measures (Table 5), with medium effect size reductions in PTSD (*g*= 0.72) and MDD (*g*= 0.71) symptom severity, and large effect size reductions in psychological distress (*g*= 0.93).

Among course users whose baseline PCL-5 scores indicated probable PTSD (≥31) and who completed their post-treatment questionnaires, 45.8% (n=22/48) scored below threshold at post-treatment. Among this same group, 39.6% (n=19/48) experienced a reliable pre- to post-treatment improvement in PTSD symptom severity with 95% confidence (Jacobson & Truax, 1991). Among all those who completed post-treatment questionnaires, 34.8% (n=23/66), experienced reliable improvement and 1 individual experienced reliable deterioration in PTSD symptom severity.

**Discussion**

Study 2 evaluated the outcomes of the iCBT course in community care settings. Most course users completed the majority of lessons (56.4% completed all lessons; 72.7% completing ≥4 lessons). As predicted, significant reductions in symptoms of PTSD, depression, and psychological distress were observed from pre- to post-iCBT, with over a third of treatment completers achieving remission and/or reliable improvement in PTSD symptom severity.

Although the medium effect size reduction in PTSD symptom severity (*g*= .72) was identical to that reported by Klein et al. (2011) for their 12-week self-guided PTSD iCBT course, it was lower than the effects reported in previous evaluations of therapist-guided iCBT delivered in routine care (e.g., *d*=1.3-1.6 in Ruwaard et al., 2012). The medium and large effect size reductions in secondary outcomes in Study 2 also appear somewhat lower than previously reported findings, as does current course adherence (e.g., 69.3% adherence in Titov et al., 2017; 76% in Ruwaard et al., 2012). As in Study 1, these differences could reflect differences in the amount of therapeutic contact provided to course users (e.g., on average, Ruwaard et al. provided 9.5 hours of therapist input in their 5-week course and Titov et al. provided 194 minutes over 8 weeks). Although clinician support has often been associated with better adherence to iCBT for many disorders (e.g., Titov et al., 2008), Study 2 did not assess therapist contact time given the ‘real world’ nature of the study. This precludes definitive conclusions regarding the impact of differing levels of guidance on symptom change. It is possible that therapist contact varied considerably across participants. At the discretion of the community clinician, some participants may have received extensive support while others very little. Further studies are needed to clarify the effect of differing levels and types of therapist support on PTSD iCBT outcomes, as well as exploring what level of support is feasible and realistically achievable in community care settings. Additional limitations of Study 2 include the reliance on self-report measures as well as the lack of structured diagnostic interviews, a comparator condition, and measurement of concurrent treatment. It is possible the symptom improvements observed in Study 2 were due to treatments outside of the iCBT protocol (e.g., concurrent psychological or pharmacological therapies), learning effects from past treatments, or spontaneous recovery. Nevertheless, the rates of program engagement and the improvements observed in symptom severity and psychological distress across treatment are promising.

**General Discussion**

Overall, this study found preliminary support for the effectiveness of iCBT for PTSD when delivered with minimal therapeutic guidance in both research and community care settings. The Study 1 RCT did not find significant differences between the iCBT course and waitlist control as both groups experienced symptom improvements during the treatment phase, and power to detect group differences was limited. In Study 2, individuals who completed the course in routine care settings also experienced significant improvements from pre- to post-treatment. The medium pre- to post-iCBT effect size reduction in PTSD symptom severity observed in routine care settings (*g*= .72) was lower than the large (within-group) effect sizes observed in the RCT (*g*= 1.02). However, consistent with the RCT, we observed medium and large effect size reductions in depressive symptom severity and psychological distress in Study 2. Course adherence was also similar in Study 1 and 2 with most course users completing most lessons. Despite the similarity of the findings from Study 1 and Study 2, the characteristics of the samples differed in several respects. Most patients in Study 2 were male (61.5%) whereas most were female in Study 1 (89.5%). More course users of THIS WAY UP resided in rural communities compared to Study 1 (44.9% vs. 32.5%), and Study 1 participants were self-referred while Study 2 participants were recommended the course by clinicians. Taken together, the findings of Study 1 and 2 suggest that the iCBT program has some utility for a variety of adults experiencing elevated symptoms of PTSD.

This study conducted an initial exploration of the effectiveness of a minimally guided iCBT course for PTSD and complemented the extant literature which has examined more intensely guided iCBT programs. Firm conclusions cannot be made because different levels of support were not directly compared, however overall, current treatment outcomes appear weaker than those of iCBT courses with more extensive clinician guidance. Future studies need to quantify and explain these differences, but it is conceivable that greater therapeutic support enhances outcomes by facilitating engagement with the more challenging parts of treatment (e.g., exposure to the trauma memory), tailoring the intervention to individual needs (e.g., overcoming skill-implementation barriers or modifying skills to maximize uptake), or by optimizing risk management. It is likely that the relationship between therapeutic guidance and treatment outcomes is complex and multifaceted. For instance, in their RCT regarding rape-related PTSD, Littleton et al. (2016) found that their self-help psychoeducational condition was more effective for participants with lower levels of baseline PTSD symptom severity while their therapist-facilitated iCBT was more effective for women with higher baseline severity. Additional research should investigate how best to customize iCBT to different samples, as well as directly compare in-person CBT to iCBT and examine the benefits of stepped-care approaches to PTSD treatment provision. It is also unclear how acceptable and beneficial PTSD iCBT is for diverse ethnicities within and across populations (noting that ethnicity was not assessed in the current study). Future research also needs to address the lack of evidence regarding long term outcomes of PTSD iCBT (e.g., 12-24 months, Lewis et al., 2019).

**Conclusions**

Online interventions such as iCBT are highly scalable and can help enhance the availability and accessibility of treatment for the multitude of people experiencing symptoms of PTSD. This study found preliminary evidence that iCBT with minimal therapeutic guidance provides some benefits to a portion of adults experiencing symptoms of PTSD. The iCBT course was associated with significant improvements in PTSD symptom severity, but these improvements were comparable to those of the waitlist control condition who also exhibited improvements during the treatment period. Further work is required to determine optimal levels of therapeutic guidance and to inform how iCBT should be best employed in large-scale, routine clinical care for PTSD.

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