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Research paper

## The uptake and effectiveness of online cognitive behaviour therapy for symptoms of anxiety and depression during COVID-19

Alison Mahoney<sup>a,b,\*</sup>, Ian Li<sup>a</sup>, Hila Haskelberg<sup>a</sup>, Michael Millard<sup>a,b</sup>, Jill M Newby<sup>c,d</sup><sup>a</sup> Clinical Research Unit for Anxiety and Depression, St Vincent's Hospital, 390 Victoria Street, Darlinghurst, Sydney, New South Wales, 2010, Australia<sup>b</sup> School of Psychiatry, Faculty of Medicine, University of New South Wales, Sydney, NSW, 2052, Australia<sup>c</sup> School of Psychology, Faculty of Science, University of New South Wales, Sydney, NSW, 2052, Australia<sup>d</sup> Black Dog Institute, Hospital Road, Randwick, NSW, Australia 2031

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## ABSTRACT

**Background:** The mental health impacts of COVID-19 have been considerable with many individuals experiencing significant anxiety and depression. Online cognitive behavioural therapy (iCBT) programs provide scalable access to psychological interventions, however the effectiveness of these programs during the pandemic has not been investigated. This study examined the uptake and effectiveness of iCBT for symptoms of anxiety and depression during the first eight months of the pandemic in Australia (March–October 2020) and compared outcomes to the 12 months prior to COVID-19.

**Methods:** 6,132 adults commenced iCBT (5,074 during the pandemic and 1,058 in the year before) and completed measures of anxiety and depression symptom severity, and psychological distress pre- and post-treatment.

**Results:** In the COVID-19 period, we observed a 504% increase in the number of monthly course registrations compared to the year prior (with a peak increase of 1,138% between April and June 2020). Baseline anxiety and depression symptom severity were similar for the COVID and pre-COVID groups. Prior to and during the pandemic, the iCBT course was associated with large effect size reductions in anxiety ( $g = 0.94$ – $1.18$ ) and depression ( $g = 0.92$ – $1.12$ ) symptom severity, as well as psychological distress ( $g = 1.08$ – $1.35$ ).

**Limitations:** lack of control group and long-term follow-up, as well as lack of detailed information about course users (e.g., health status and life context).

**Conclusion:** Results indicate the considerable increase in demand for psychological support during the COVID-19 pandemic in Australia and demonstrate the effectiveness and scalability of iCBT for symptoms of anxiety and depression.

## 1. Introduction

Prior to the COVID-19 pandemic, anxiety and depressive disorders were ranked among the top ten causes of disability across the globe (Vos et al., 2015). As the virus has spread and governments around the world have implemented measures to contain its transmission (e.g., border closures, lockdowns, social distancing), there have been widespread concerns about increasing rates of anxiety, depression and mental distress (Davide et al., 2020; Hamada and Fan, 2020; Holmes et al., 2020; Killgore et al., 2020; Mota, 2020; Newby et al., 2020; Pierce et al., 2020; Liu et al., 2020; Luo et al., 2020; Smith et al., 2020; Xiong et al., 2020). Across 66 studies published between January and March 2020, Wu et al. (2021) estimated the point prevalence of clinically significant

anxiety, depression, psychological distress and insomnia in the general population and in vulnerable sub-populations. In the general population, the estimated pooled prevalence of symptoms of depression, anxiety, distress, and insomnia was 31.4%, 31.9%, 41.1% and 37.9%, respectively, with some evidence to indicate higher rates in health care workers, patients with pre-existing chronic conditions, those in quarantine, and those who had contracted COVID-19. Although further research is needed to replicate these findings across a more diverse range of populations, the estimates reported by Wu et al. are higher than population point prevalence estimates found prior to the pandemic (e.g., 10.8% for depression and 14.7% for anxiety in Johansson et al., 2013; 8.6% for depression in Kessler et al., 2012; 18.9% for mental distress in Pierce et al., 2020). There is consequently a clear need for scalable

\* Corresponding author.

E-mail address: [alison.mahoney@svha.org.au](mailto:alison.mahoney@svha.org.au) (A. Mahoney).<https://doi.org/10.1016/j.jad.2021.05.116>

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mental health supports and interventions (Holmes et al., 2020; Poulton et al., 2020; Wu et al., 2020).

With the outbreak of the COVID-19 virus, traditional face-to-face mental health services have been disrupted and remotely delivered services such as telephone and video-conferencing consultations have been widely implemented (Feijt et al., 2020; Fisk et al., 2020; Reay, Looi, and Keightley, 2020; Wang, Wei, and Zhou, 2020). Digital mental health interventions, such as internet-based cognitive behaviour therapy (iCBT) are rapidly scalable and can supplement existing mental health services (Gratzer et al., 2020; Holmes et al., 2020; Moreno et al., 2020; Torous, Myrick, Rauseo-Ricupero, & Firth, 2020; Wind, Rijkeboer, Andersson, & Riper, 2020). Findings from meta-analytic studies support the efficacy of iCBT for symptoms of anxiety and depressive disorders (Andrews et al., 2018; Carlbring, Andersson, Cuijpers, Riper & Hedman-Lagerlöf, 2018), with comparable outcomes to traditional in-person CBT (Carlbring et al., 2018; Andersson, Cuijpers, Carlbring, Riper and Hedman, 2014). Transdiagnostic iCBT courses (which treat anxiety and depressive disorders simultaneously) have also been shown to be effective in clinical trial settings and in routine care settings (e.g., Johansson et al., 2012; Newby et al., 2013; Newby, McKinnon, Kuyken, Gilbody, and Dalgleish, 2015; Newby, Twomey, Yuan Li & Andrews, 2016; Titov et al., 2011). However, the effectiveness of transdiagnostic iCBT for mixed anxiety and depression symptoms during the COVID-19 pandemic is yet to be investigated. A number of studies have demonstrated increased demand for digital mental health services during the pandemic and recent evaluations of iCBT for symptoms of obsessive-compulsive disorder (OCD) and health anxiety have indicated that iCBT courses continue to be effective under pandemic conditions (Li et al., 2020; Mahoney et al., 2020; Sharrock et al., 2021; Staples et al., 2020; Titov et al., 2020a). Given the likely increased rates of anxiety and depression caused by COVID-19, the utility of transdiagnostic iCBT for anxiety and depression symptoms during the pandemic needs to be examined.

Accordingly, this study sought to examine the uptake and outcomes of the THIS WAY UP ([thiswayup.org.au](http://thiswayup.org.au)) iCBT course for mixed symptoms of anxiety and depression (the 'Depression and Anxiety course') delivered in routine care settings (i.e., non-research settings or community-based care settings) during the first eight months of the COVID-19 pandemic period in Australia (12<sup>th</sup> March–31<sup>st</sup> October 2020). The uptake and outcomes of the course, and the demographic and clinical characteristics of course users in the year prior to this period (11<sup>th</sup> March 2019–11<sup>th</sup> March 2020) provided a comparison for the COVID-19 findings. We expected to observe an increased uptake of the iCBT course during the COVID period and predicted that the COVID group would report significantly higher anxiety and depression symptom severity than the pre-COVID sample. Consistent with previous evaluations of the THIS WAY UP Depression and Anxiety iCBT course (Newby, Mewton, and Andrews, 2017; Newby, Mewton, Williams, and Andrews, 2014; Morgan et al., 2017), we predicted that the course would be associated with large effect size reductions in anxiety and depression symptom severity, as well as psychological distress, with adherence rates comparable to pre-pandemic levels (30–40%).

## 2. Method

### 2.1. Participants

Participants were members of the Australian public who self-selected or were referred<sup>1</sup> by their individual healthcare professional (e.g., a

<sup>1</sup> Note that prior to the spread of COVID in Australia, contact with and referral from mental health professionals was predominantly associated face-to-face consultations, whereas government-funded telehealth mental health consultations became widely available during the pandemic when face-to-face consultations were disrupted.

General Practitioner, psychologist, or psychiatrist) to register with THIS WAY UP online clinic, an initiative of St Vincent's Hospital (Sydney, Australia) and the University of New South Wales. THIS WAY UP provides education and psychological treatment courses for adults experiencing symptoms of anxiety and depression (see [thiswayup.org.au](http://thiswayup.org.au)). Courses can be undertaken either self-guided or guided by the end-user's clinician, with users granted 90 days access to complete their course. In response to the COVID-19 pandemic, the St Vincent's Inclusive Health Foundation funded free access to all THIS WAY UP courses (previously, access cost AUD\$59 per course) between 25<sup>th</sup> March 2020 and 30<sup>th</sup> June 2020. During April 2020, the service was promoted nationally on television news programs, in print, and via social media.

Participants ( $N = 10,894$ ) included a 'pre-COVID' group ( $n = 2,321$ ) and a 'during-COVID' group ( $n = 8,573$ ) of Australian adults who registered for the Depression and Anxiety iCBT course between 11<sup>th</sup> March 2019 and 31<sup>st</sup> July 2020 (as users had 3 months to complete their iCBT course, the study period was from 11<sup>th</sup> March 2019 to 31<sup>st</sup> October 2020). Of these 10,894 adults, 6,132 (1,058 in the pre-COVID group and 5,074 in the COVID group) commenced their iCBT course and completed measures of clinical and demographic characteristics. The current sample characteristics and estimates of treatment outcomes are based on this sub-sample of 6,132 course commencers as these individuals completed study measures. iCBT course users were typically female and in their mid to late thirties (see Table 1). Course users' rurality was inferred from their postcode (which was optionally reported) and the Australian Statistical Geography Standards Australian Bureau of Statistics (2016). Of those who provided their postcode (4839/6132; 78.9%), most lived in major cities in Australia.

The 1,058 individuals in the pre-COVID group commenced their iCBT course between 11<sup>th</sup> March 2019 and 11<sup>th</sup> March 2020. The 5,074 users in the during-COVID group commenced their course between 12<sup>th</sup> March 2020 and 31<sup>st</sup> July 2020 (the 12<sup>th</sup> March being the date the World Health Organisation confirmed the COVID-19 pandemic, and noting that within the following two weeks, Australia implemented its national containment measures for the first time, i.e., border closures, supervised quarantine, strict social distancing).

This study was conducted as part of the routine quality assurance activities of THIS WAY UP. All course users provided electronic informed consent that their pooled de-identified data would be collected, analysed and published for quality assurance and research purposes by agreeing to the Terms of Use, Privacy Policy and Data Collection Notice of the service (St Vincent's Hospital Human Research Ethics Committee, 2020/ETH03027).

### 2.2. Intervention

The Depression and Anxiety iCBT course comprises six online lessons that are completed sequentially such that earlier lessons must be completed before later lessons can be accessed. Previous studies support the efficacy of the program and its effectiveness in routine care settings (e.g., Newby et al., 2013; Morgan et al., 2017). The course includes (a) psychoeducation about the nature of excessive anxiety and depression, (b) arousal reduction skills, (c) cognitive restructuring to shift unhelpful thought patterns (including those associated with cognitive distortions, rumination, worry, and metacognitive beliefs), (d) graded exposure and behavioural experiments to reduce cognitive and behavioural avoidance, and (e) relapse prevention. Lessons are presented via the illustrated narrative of two fictional characters who learn how to use CBT skills to gain mastery over their symptoms of anxiety and depression. Each lesson also comprises a lesson summary with recommended homework exercises and therapy tasks that reinforce lesson content. Users can also access extra resources on demand. There is a five-day wait-period between lessons two to six to give users time to practise the skills covered in the lessons.

In this study, most course users (84.9%) enrolled in the self-guided/self-help format of the program (Table 1). The remaining 15.1% were

**Table 1**  
Course user demographic and clinical characteristics before and during the COVID-19 pandemic.

	Pre-COVIDn = 1058		During-COVIDn = 5074		Total Samplen = 6132		Pre- vs. during-COVID comparisons Significance Test
	Mean	SD	Mean	SD	Mean	SD	
Age	39.30	13.85	37.31	13.53	37.66	13.61	$t(6130) = 4.33, p < .001$
PHQ-9	13.89	5.83	14.11	6.18	14.07	6.12	$t(6130) = -1.06, p = .29$
GAD-7	12.03	5.01	11.79	5.20	11.83	5.17	$t(6130) = 1.37, p = .17$
K-10	30.39	6.79	30.52	7.52	30.50	7.40	$t(6130) = -.52, p = .60$
	n	%	n	%	n	%	Significance Test
Sex							$\chi^2(2) = 31.85, p < .001$
Female	654	61.8	3557	70.1	4211	68.7	
Male	363	34.3	1311	25.8	1674	27.3	
Prefer not to say	41	3.9	206	4.1	247	4.0	
Location							$\chi^2(1) = 0.27, p = .61$
Major City	623	69.1	2688	68.3	3311	68.4	
Regional/remote	278	30.9	1250	31.7	1528	31.6	
Clinician assistance							$\chi^2(1) = 72.88, p < .001$
Clinician-guided	250	23.6	675	13.3	925	15.1	
Self-guided	808	76.4	4399	86.7	5207	84.9	
<b>Pre-treatment probable diagnosis</b>							
MDD							$\chi^2(1) = 0.06, p = .82$
Yes	791	74.8	3776	74.4	4567	74.5	
No	267	25.2	1298	25.6	1565	25.5	
GAD							$\chi^2(1) = 1.37, p = .24$
Yes	694	65.6	3232	63.7	3926	64.0	
No	364	34.4	1842	36.3	2206	36.0	

Note. GAD-7= Generalized Anxiety Disorder-7; PHQ-9= Patient Health Questionnaire-9; K-10= Kessler Psychological Distress Scale; GAD= Generalised Anxiety Disorder; MDD= Major Depressive Disorder.

supervised by their individual community clinicians. Supervising clinicians were mostly psychologists (38.7%), general practitioners (34.8%), and medical specialists (12.4%). Supervising clinicians retained clinical responsibility for their patients during the iCBT program. Course users and their supervising clinicians were advised that users were unlikely to benefit from the course if they 1) were being treated with benzodiazepines or atypical anti-psychotics; 2) had an alcohol or substance use disorder; 3) had schizophrenia or bipolar affective disorder; or 4) were actively suicidal. However, adhering to this advice was at the discretion of the course user and clinician.

Supervising clinicians were encouraged to contact their patients/clients after the first two lessons had been completed in order to provide support and promote adherence. All course users are sent lesson reminder emails and some users received optional SMS reminders (if they opted in at course registration). To track participant progress, the Kessler Psychological Distress Scale (K-10) was administered prior to each lesson (with lesson 1 scores designated as pre-treatment, lesson 6 as post-treatment), and the Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder 7-item scale (GAD-7) were administered prior to lessons 1 (pre-treatment), 4, and 6 (post-treatment). Course users were emailed referrals to crisis services if they scored highly on self-reported measures of distress (Kessler-10 ≥ 30; Kessler et al., 2002) and/or suicidal ideation (PHQ-9 Q9 ≥ 1; Kroenke, Spitzer & Williams, 2001). Supervising clinicians were also alerted by email if their patient’s/client’s distress became severe (K-10 ≥ 30) and/or if suicidal ideation was reported (PHQ-9 Q9 > 1).

### 2.3. Assessments

#### 2.3.1. The Patient Health Questionnaire-9

(PHQ-9) is a nine-item self-report screening tool for probable Major Depressive Disorder (MDD) in the preceding two weeks (Kroenke et al., 2001). Participants rate their symptoms as “not at all”, “on several days”, “on more than half the days” or “on nearly every day” with total scores ≥ 10 indicating probable MDD (Kroenke et al., 2001). Evidence of test-retest reliability ( $r = 0.84$  over 48 h), and validity (including convergent, divergent, and criterion validity, and treatment sensitivity) has been provided (Beard, Hsu, Rifkin, Busch & Björgvinsson, 2016;

Kroenke, et al., 2001). Pre-iCBT PHQ-9 internal consistency was  $\alpha = 0.87$ .

#### 2.3.2. The Generalized Anxiety Disorder-7

(GAD-7) is a self-report screener for Generalised Anxiety Disorder (GAD, Spitzer, Kroenke, Williams, and Löwe, 2006). Participants reported how often they had experienced symptoms in the past two weeks as either “not at all”, “on several days”, “on more than half the days” or “on nearly every day” with total scores ≥ 10 indicative of probable GAD (Spitzer et al., 2006). Studies have provided evidence to support the temporal stability ( $r = 0.83$  over one week) and validity of the GAD-7 (e.g., convergent/divergent validity, criterion validity with respect to diagnosis via structured interview; treatment sensitivity) (Löwe et al., 2008; Newby et al., 2013; Spitzer et al., 2006). Pre-treatment GAD-7 internal consistency was  $\alpha = 0.88$ .

#### 2.3.3. The Kessler Psychological Distress Scale

(K-10) is a 10-item measure of psychological distress experienced by users in the preceding two weeks (Kessler et al., 2002). Users reported how frequently they had experienced each item as either “none”, “a little”, “some”, “most” or “all” of the time. Total scores ≥ 20 are suggestive of probable mental disorder(s) (Andrews and Slade, 2001). Evidence supporting test re-test ( $r = 0.80$  over 1-2 weeks), convergent and discriminant validity, and treatment sensitivity has been reported (Furukawa, Kessler, Slade, and Andrews, 2003; Merson, Newby, Shires, Millard and Mahoney, 2021; Slade, Grove and Burgess, 2011; Sunderland, Wong, Hilvert-Bruce, and Andrews, 2012). The psychometric properties of the instrument are stable across the adult lifespan (Sunderland, Hobbs, Anderson, and Andrews, 2012). In this study, the pre-iCBT K-10 internal consistency was  $\alpha = 0.90$ .

### 2.4. Analyses

Analyses were performed in SPSS v 26.0. To begin, counts of course registration, commencement and adherence estimated course uptake. Next, independent samples  $t$ -tests and  $\chi^2$  tests were computed to examine group differences in the demographic and clinical characteristics of the pre-COVID and during-COVID course users.

Intention-to-treat linear mixed models were then used to investigate reductions in the outcome measures (PHQ-9, GAD-7, K-10) from pre- to post-iCBT, using the MIXED procedure with a random intercept for subject. 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 (Raftery, 1995), where we found that an autoregressive covariance structure provided the closest model fit for the residuals for all outcome measures. The fixed effects of clinician assistance (clinician-guided vs self-guided) and its interaction with time were then added to each model. The fixed effect corresponding to the clinician assistance (supervised vs. unsupervised) by time interaction enabled us to examine whether there was a difference in improvements on the PHQ-9, GAD-7 and K-10 variables in the self-help vs. clinician-guided participants. Hedges' g effect sizes were calculated between pre- and post-treatment assessments based on the pooled standard deviation and corrected for the correlation between repeated measurements. Effect sizes were classified as small ( $g = 0.2-0.5$ ), medium ( $g = 0.5-0.8$ ) or large ( $g > 0.8$ ).

Consistent with previous evaluations of the Depression and Anxiety iCBT course (Newby et al., 2014; 2017), a reliable change index (RCI) was computed for the sample of course users who completed their iCBT course. A change of  $\geq 6.79$  points on the PHQ-9 (using test-retest  $r = 0.84$ , Kroenke et al., 2001) and  $\geq 5.91$  points on the GAD-7 (using test-retest  $r = 0.83$ , Spitzer et al., 2006) between pre-and post-treatment assessments was considered to be a reliable change with 95% confidence (Jacobson and Truax (1991)). Additionally, in the completer sample, we calculated the proportion of participants who achieved symptom normalisation (i.e., scores below established thresholds for probable diagnosis) on the PHQ-9 and GAD-7 at post-iCBT.

### 3. Results

#### 3.1. Uptake of the depression and anxiety iCBT course before and during the COVID-19 pandemic in Australia

Fig. 1 provides the counts of monthly course registrations and commencements from March 2019 to October 2020. The mean number of monthly course registrations was 189 in the 12 months before COVID (March 2019-February 2020) and 1,142 during COVID (indicating a 504% increase associated with COVID-19 in Australia). Similarly, the mean number of monthly course commencements was 86.25 in the 12 months before COVID and 642.89 during COVID (representing a 645% increase). Peak uptake in the COVID-19 period was observed in the

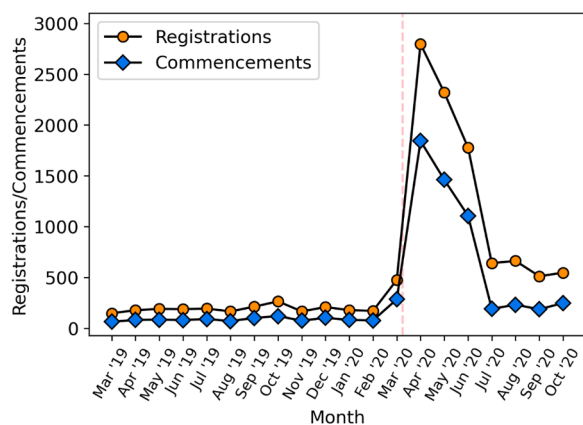


Fig. 1. Course registrations and commencements by month for the THIS WAY UP Depression and Anxiety iCBT course. The dashed line indicates the date when COVID-19 was declared a pandemic by the World Health Organisation (12/03/2020).

earliest months (April, May and June 2020) where there was a 1,138% increase in course registrations and a 1,679% increase in course commencements compared to April to June 2019.

#### 3.2. User characteristics of the depression and anxiety iCBT course before and during the COVID-19 pandemic

The demographic and clinical characteristics of the pre- and during-COVID samples are given in Table 1. Compared to the pre-COVID group, the group who started during COVID were younger on average and had a higher proportion of female users and users enrolling in the self-help (vs. clinician-guided) iCBT course. Differences in symptom severity and rates of probable GAD and MDD were not significant across the pre-COVID and during-COVID groups.

#### 3.3. Adherence to the depression and anxiety iCBT course before and during the COVID-19 period

On average, pre-COVID users completed more lessons than during-COVID users (pre-COVID  $M(SD) = 3.50(2.18)$  vs. during-COVID  $M(SD) = 2.76(2.01)$ ,  $t(6130) = 10.72$ ,  $p < 0.001$ ), and were more likely to complete all 6 lessons of the iCBT course (34.6% vs 21.5%,  $\chi^2(1) = 82.26$ ,  $p < 0.001$ ). Table 2 provides lesson completion rates for the clinician-guided vs. self-guided participants in each group. Clinician-guided users were more likely than self-guided users to complete their iCBT course during the pandemic ( $\chi^2(1) = 39.62$ ,  $p < 0.001$ ), but not before COVID-19 ( $\chi^2(1) = 3.07$ ,  $p = 0.08$ ).

#### 3.4. Outcomes of the depression and anxiety iCBT course before and during the COVID-19 pandemic

Table 3 shows the estimated marginal means and linear mixed model results for each outcome measure between pre- and post-treatment. Course users before and during COVID-19 reported significant, large effect size reductions from pre- to post-iCBT in GAD symptom severity ( $g = 0.94-1.18$ ), MDD symptom severity ( $g = 0.92-1.12$ ), and psychological distress ( $g = 1.08-1.35$ ). In both the pre-COVID and during-COVID groups, the time by clinician assistance (self-guided vs clinician-guided) interaction was not significant for any outcome measure (pre-COVID sample  $ps = 0.30-0.96$ ; during-COVID  $ps = 0.32-0.63$ ) indicating that clinician-guided and self-guided users did not differ in their degree of improvement across iCBT on any outcome measure.

#### 3.5. Reliable change before and during the COVID pandemic in the iCBT completer samples

In the pre-COVID group, 44.3% (162/366) of users who completed

Table 2

Lesson completion rates for clinician-guided and self-guided course users before and during the COVID-19 pandemic.

Lesson completion	Clinician-guided		Self-guided	
	n	%	n	%
<b>Pre-COVID</b>				
Lesson 1	234	93.6	749	92.7
Lesson 2	205	82.0	577	71.4
Lesson 3	170	68.0	452	55.9
Lesson 4	140	56.0	375	46.4
Lesson 5	117	46.8	321	39.7
Lesson 6	98	39.2	268	33.2
<b>During COVID</b>				
Lesson 1	659	97.6	4315	98.1
Lesson 2	482	71.4	2494	56.7
Lesson 3	366	54.2	1723	39.2
Lesson 4	289	42.8	1302	29.6
Lesson 5	240	35.6	1063	24.2
Lesson 6	208	30.8	885	20.1

**Table 3**

Reductions in symptom severity and psychological distress from pre- to post-iCBT before and during COVID-19.

Measure	Pre-treatment EMM (SD)	Post-treatment EMM (SD)	Df	F	r	Hedges' g (95% CI)
<b>Pre-COVID</b>						
PHQ-9	13.89 (5.76)	7.80 (5.08)	1093.44	377.71***	.41	1.12 (0.97, 1.27)
GAD-7	12.03 (4.94)	6.45 (4.53)	942.68	361.56***	.41	1.18 (1.02, 1.33)
K-10	30.39 (7.19)	21.36 (6.22)	1912.09	230.94***	.47	1.35 (1.19, 1.50)
<b>During-COVID</b>						
PHQ-9	14.11 (6.13)	8.98 (5.07)	2763.73	821.37***	.61	0.92 (0.83, 1.00)
GAD-7	11.79 (5.20)	7.28 (4.36)	2916.41	836.52***	.56	0.94 (0.86, 1.03)
K-10	30.52 (7.84)	22.98 (6.08)	6527.41	563.77***	.61	1.08 (0.99, 1.17)

Notes. PHQ-9=Patient Health Questionnaire-9; GAD-7= Generalized Anxiety Disorder-7; K-10= Kessler Psychological Distress Scale; r = Pearson correlation between Lesson 1 and Lesson 6 scores for calculation of within-group effect sizes; EMM = estimated marginal mean, \*\*\*  $p < .001$

their iCBT course experienced reliable improvement in GAD-7 scores and 39.3% (144/366) of users experienced reliable improvement in the PHQ-9 scores from pre- to post-iCBT, whereas 2.5% (9/366) and 2.7% (10/366) reported reliable deterioration in GAD-7 and PHQ-9 scores, respectively. In the during-COVID group, 36.1% (395/1093) and 34.4% (376/1093) of users who completed their iCBT course experienced reliable improvement in GAD-7 and PHQ-9 scores, respectively (with 1.3% [14/1093] reporting reliable deterioration in GAD-7 score, and the same proportion in PHQ-9 scores).

### 3.6. Normalisation of symptom severity before and during the COVID pandemic in the iCBT completer samples

In the pre-COVID group, 75.9% of users who completed treatment no longer reported symptom severity consistent with probable GAD at post-iCBT and 64.5% no longer reported symptom severity consistent with probable for MDD. For the during-COVID group, 69.1% and 58.9% of users no longer reported symptom severity consistent with probable GAD and MDD, respectively, at post-iCBT.

## 4. Discussion

The COVID-19 pandemic has had profound impacts on health and wellbeing across the globe (Carter, Anderson and Mossialos., 2020; International Monetary Fund, 2020; Mayor, 2020; Sachs et al., 2020; UN Committee for the Coordination of Statistical Activities, 2020). Daily life for many individuals has been tremendously disrupted, and there has been widespread calls for scalable mental health services and interventions to support the wellbeing of communities (e.g., Gratzler et al., 2020; Holmes et al., 2020). This study examined the uptake and effectiveness of an online CBT course for symptoms for anxiety and depression during the COVID-19 pandemic in the Australian community and compared outcomes to the year prior to the pandemic.

As hypothesised, the uptake of the iCBT course increased considerably during the pandemic in Australia (> 500% increase in monthly registrations and commencements compared to the pre-COVID period). The peak uptake of the iCBT course occurred in April to June 2020 where we observed a 1,138% increase in course registrations and a 1,679% increase in course commencements (compared to April–June 2019). This increased uptake is consistent with previous studies that have demonstrated heightened demand for digital mental health services in Australia during the pandemic (e.g., Mahoney et al., 2020, Staples et al., 2020; Titov et al., 2020b). Multiple factors may have contributed to this increased uptake, including the heightened distress and anxiety in the community as a result of the pandemic, the enhanced promotion and awareness of mental health in the community, media publicity, disruptions to face-to-face mental health services, and the additional time individuals may have had to undertake iCBT programs due to reduced employment and lockdowns. The uptake of the self-guided (vs. clinician-guided) iCBT course was most pronounced during the pandemic period (when 84% of users undertook the self-guided course). The self-help course can be accessed immediately

and directly by users without contact with a clinician, and thus has particular utility during times of lockdown and severe social distancing when individuals may be hesitant or unable to consult a clinician. It is also important to note that individuals accessing the iCBT course in this study reported experiencing high levels of psychological distress and had high rates of probable MDD (>70%) and GAD (>60%). Our results highlight the considerable need and demand for online therapy programs, especially self-directed ones during the pandemic, and demonstrate the scalability and accessibility of digital mental health services.

Consistent with predictions and previous evaluations of the transdiagnostic Depression and Anxiety iCBT course (Newby et al., 2013; 2014; 2017; Morgan et al., 2017), course users in both the pre- and during-COVID groups reported experiencing significant, large effect size improvements in anxiety ( $g = 0.94$ – $1.18$ ) and depression ( $g = 0.92$ – $1.12$ ) symptom severity, and psychological distress ( $g = 1.08$ – $1.35$ ). Also consistent with prior course evaluations in routine care settings, at the end of the course, approximately 30–40% of course completers reported clinically significant improvements in anxiety and/or depression symptoms severity, and between 60–70% had scores below threshold for probable GAD and/or MDD. Current rates of course adherence were a little lower than those found in previous evaluations of the clinician-guided form of the course in routine care settings, which may be due to the large proportion of self-guided users in this sample and the waiving of course fees for the majority of the during-COVID study period as part of St Vincent's Hospital's response to the unfolding COVID-19 crisis. Clinician-guidance has often been associated with better adherence to iCBT and payment may also be associated with course completion (Hilvert-Bruce, Rossouw, Wong, Sunderland, and Andrews, 2012). Indeed, clinician-guided users in the COVID group were more likely to complete their course compared to self-guided users, and overall rates of course adherence in this study are superior to those found for the free, 4-lesson, self-guided form of the course (~14%, Morgan et al., 2017). However, further research should continue to focus on improving adherence in iCBT as greater iCBT adherence has been associated with better treatment outcomes in several studies (e.g., Hilvert-Bruce et al., 2012; Mahoney, Haskelberg, Mason, Millard, and Newby, 2021; Sunderland et al., 2012). Nevertheless, our findings show that internet-based CBT remains effective in improving symptoms of anxiety and depression under pandemic conditions.

### 4.1. Limitations

This study examined the utilisation of iCBT for mixed anxiety and depression symptoms in community and routine care settings, as such there was no control group and current outcomes may be the result of other factors such as natural adjustment to personal circumstances during COVID-19, concurrent treatment, or spontaneous remission. Furthermore, attrition and missing data may have led to biased estimates of treatment effect. We relied on self-report data and did not conduct structured diagnostic interviews or collect detailed data about users' health status (e.g., COVID status), life context (e.g., in residential care, quarantine, recent unemployment), or reasons for undertaking the

iCBT course. Consequently, we do not know how many users were experiencing recent onset mental health disorders and how many had exacerbations of pre-existing conditions, and it is also unclear how many users were experiencing an adjustment disorder and how many were experiencing a 'normal reaction to an abnormal situation'. The longer-term outcomes for course users who accessed the iCBT course during the pandemic also need to be evaluated. Lastly, it is clear that the impact of the pandemic in Australia has been different from other regions around the world; our findings may not generalise to other populations.

#### 4.2. Conclusions

While the volume of users accessing internet-based CBT for anxiety and depression dramatically increased during the COVID-19 pandemic in Australia, the levels of psychological distress and symptom severity among users was similar to before the pandemic. Like pre-COVID evaluations, the iCBT course was associated with large effect size improvements in levels of anxiety, depression and distress. Our findings underscore the demand for online mental health services (especially self-directed courses) during the pandemic, and demonstrate the utility and scalability of these effective interventions. **Contributors**

AM and IL analysed the data and wrote the first draft of the manuscript. JN, HH, and MM contributed to the design of the study and supported data collection and collation. All authors contributed to and have approved the final manuscript.

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#### Conflict of Interest

None.

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