Abstract

Objective: Generalized anxiety disorder (GAD) is a persistent mental health condition that results in significant individual and economic burden. The uptake of evidence-based treatment is low, with many individuals with GAD citing cost as one of the key barriers. Brief treatments, which are typically more cost effective than standard length treatments, have the potential to make treatment more accessible to patients with GAD. Despite evidence demonstrating the efficacy of brief treatments for a range of anxiety disorders, there are currently no such studies examining brief internet-videoconferencing delivered CBT (VCBT) interventions for patients with diagnosed GAD. The current study aims to examine the efficacy and acceptability of brief VCBT for GAD. **Method:** The authors adopted an open trial design with 36 participants (77.8% female; *Mage* = 36.81 yrs; *SD* = 12.25) to examine the efficacy of a brief 5-session VCBT intervention delivered remotely. **Results:** Large pre-treatment to post-treatment effects were seen on the primary outcome measure, the Generalized Anxiety Disorder Questionnaire-7 item (GAD-7; *d* = 1.13; 95% *CI*: 0.62-1.61) and treatment effects increased at 3-month follow-up (*d* = 1.58; 95% *CI*: 1.04-2.10). Participants rated the intervention as highly acceptable with 92% reporting that they were satisfied with the treatment. **Conclusion:** These results provide preliminary support for the viability of brief remotely delivered CBT treatment in managing GAD symptoms.

Key words: brief CBT, CBT, generalized anxiety disorder, remote treatment, videoconference.

Practitioner Points:

- Remotely delivered brief CBT via videoconference (VCBT) is a highly effective and accepted treatment for patients with generalized anxiety disorder.
- Brief VCBT may help to overcome some of the barriers that individuals with generalized anxiety disorder face when accessing treatment including geographical isolation, difficulty accessing a trained therapist, and affordability.

Brief Remote Cognitive Behavior Therapy for Generalized Anxiety Disorder: An Open Trial

1. Introduction

Generalized anxiety disorder (GAD) is characterized by excessive and uncontrollable worry that is accompanied by a number of physical and/or cognitive symptoms (APA, 2022). The disorder is typically chronic (Hoge et al., 2004) and results in substantial individual and economic burden (Konnopka & König, 2020). Globally, the combined lifetime prevalence of GAD is 4.5% (Stein et al., 2021), and the 12-month prevalence is 1.8% (Ruscio et al., 2017). The effectiveness of cognitive behavioral therapy (CBT) for the treatment of GAD is well established, with results of a previous meta-analysis demonstrating large effect sizes (g = 1.01; 95% *CI*: 0.44–1.57) (Carpenter et al., 2018). However, numerous barriers to accessing treatment for GAD have been identified, including difficulty accessing a CBT trained clinician, geographical isolation, and cost (Goetter et al., 2020; Heinig et al., 2021; Trenoska Basile et al., 2024).

Remotely delivered interventions can help to overcome barriers relating to difficulty accessing a trained clinician and geographical isolation. Remote treatments range in the level of therapist support provided during treatment. For example, low intensity remote interventions are treatments offering no or low asynchronous contact with therapist, they are largely self-paced and individuals work independently through modules of automated or set content. On the other hand, high intensity remote treatments provide synchronous (real time) contact with a therapist which is equivalent to traditional in person treatment albeit from a remote location using either phone or videoconference technology (Wootton, 2016). Both low intensity remote treatments, such as internet-delivered CBT (ICBT), and high intensity remote treatments, such as videoconferencing delivered CBT (VCBT), have been demonstrated to be effective in the treatment of GAD (Trenoska Basile et al., 2022). For instance, meta-analyses of ICBT interventions for GAD have demonstrated medium (g=0.70) to large (d=0.91) treatment effects across studies (Andrews et al., 2018; Richards et al., 2015). A recent randomized controlled trial (RCT) comparing VCBT to waitlist control

demonstrated a statistically significant reduction in GAD symptoms with large within-group effects from pre-treatment to post-treatment (*d* = 1.03) and pre-treatment to 3-month follow-up (*d* = 1.50). Large between-group effect sizes (*d* = 0.80) were also observed at post treatment (Trenoska Basile et al., 2024). While both high and low intensity remote treatment studies have contributed toward improving accessibility to evidence-based care for individuals with GAD, high intensity remote treatments do not directly address the barrier of cost. One way to reduce costs associated with high intensity treatment is to reduce the number of sessions in a course of treatment.

The NICE guidelines recommend 12-15 sessions of CBT for the treatment of GAD (NICE, 2011). However, given the direct and indirect costs associated with the provision of psychological treatments for this disorder (Konnopka & König, 2020) it is important to consider whether individuals can experience a reduction in symptoms in fewer sessions. In an observational study that included 102,206 patients across 16 services receiving treatment for a range of mental health disorders, Robinson et al. (2020) identified that 6-14 sessions of high intensity treatment results in approximately half of cases attaining reliable and clinically significant improvement on standardized outcome measures of depression and anxiety. In a similar study, Levy et al. (2020) examined the dose-response curve specifically for CBT for anxiety disorders in 201 patients who received weekly CBT at an anxiety specialty clinic. Results indicated that 64% of the sample achieved reliable change, and this response occurred in approximately five sessions on average (Levy et al., 2020). However, in this study the required dosage for GAD was not specifically examined. Brief 4-6 session CBT protocols have also been demonstrated to be effective for other anxiety disorders, such as panic disorder (Otto et al., 2012), social anxiety disorder (Herbert et al., 2002; Singh & Samantaray, 2022) and post-traumatic stress disorder (Foa et al., 1995).

Overall, while there is preliminary research to demonstrate that brief treatments can be efficacious, there is no research examining the efficacy of brief treatments specifically in GAD, and the available literature is restricted to in-person treatments. Therefore, the aim of the present study

was to build on past research and investigate the efficacy and acceptability of brief CBT for GAD when delivered via VCBT in a sample of clinically diagnosed GAD participants. Based on the limited existing literature, it was hypothesized that: 1) brief VCBT would result in significant reductions in symptoms from pre-treatment to post-treatment with large effect sizes; 2) improvements would be maintained at 3-month follow-up; 3) that brief VCBT would be acceptable to individuals with GAD; and 4) that brief VCBT would be comparable to traditional length of treatment.

2. Method

2.1. Design

The study used an open trial design comparing results from pre-treatment to post-treatment and from pre-treatment to 3-month follow-up. The sample consisted of a waitlist group from a previous RCT that examined the efficacy of VCBT for GAD (Trenoska Basile et al., 2024). The study was approved by the University of Technology Medical Research Ethics Committee (REF NO. ETH21-5843) and preregistered with the Australian and New Zealand Clinical Trials Registry (ACTRN12621000786897) on 22 June 2021. The study protocol for the RCT was also published (Trenoska Basile et al., 2024). Participants were given one week to complete each set of outcome measures. Participants were booked for treatment within a fortnight of returning their pre-treatment measures. Mid-treatment measures were sent out immediately after completion of the third session, post-treatment measures were sent out immediately after the fifth session, and follow-up measures were sent at exactly 3 months post treatment completion. Participants were given 7 days to complete the measures.

2.1. Participants

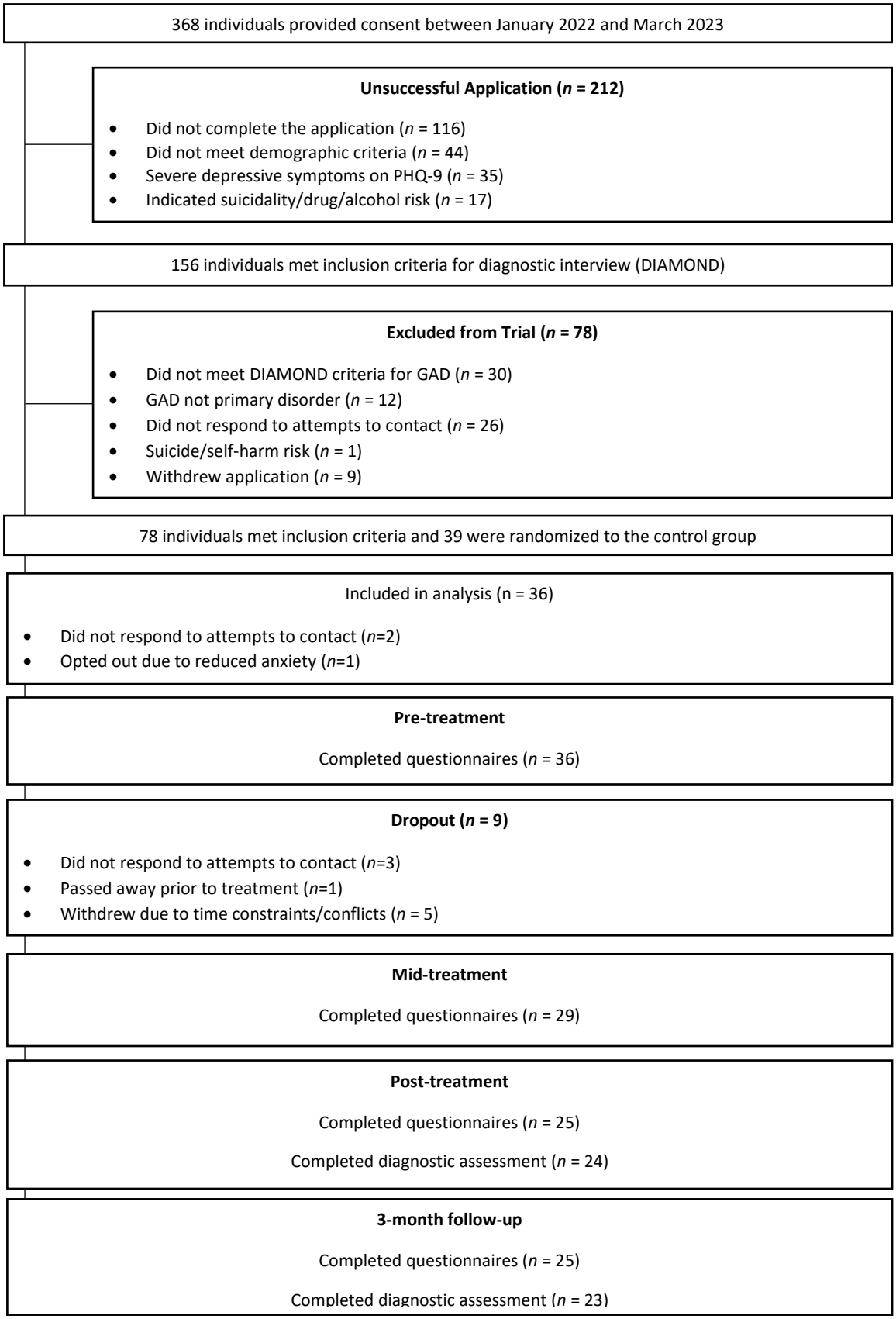
Participants included 36 individuals who completed the waitlist period of the larger RCT (Trenoska Basile et al., 2024). Participant flow is shown in Fig. 1 and demographic information of the sample is shown in Table 1. Participants had a mean age of 36.81 (*SD*=12.25) and were

predominately female (77.8%), 25% were on a stable dose of medication for their disorder and 66.7% suffered from a comorbid depressive disorder.

To be included in the trial, participants were required to (1) be an Australian resident, (2) be aged 18 or above, (3) meet criteria for GAD as the primary disorder, (4) experience symptoms of at least “moderate severity,” as assessed by the clinician during the diagnostic assessment and (5) be on a stable dose of psychotropic medication. Participants were excluded if they had symptoms that would put them at risk of harming themselves or others or would confound results of the treatment. Participants were also excluded if they did not have regular access to the internet and a camera or were engaged in regular psychotherapy (i.e., seeing a therapist weekly). A complete list of inclusion and exclusion criteria is outlined in the published protocol (Trenoska Basile et al., 2022a).

Figure 1

Participant flow chart



Note: DIAMOND: Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders, PHQ-9: Patient Health Questionnaire-9 item, VCBT: Videoconference delivered Cognitive Behavioral Therapy.

Table 1

Characteristics of the total sample (N=36).

Variable	***n***	***%***
Gender		
Female	28	77.8
Male	6	16.7
Non-binary/gender diverse	2	5.6
Age		
Mean (SD)	36.81 (12.25)	
Range	18-62	-
Marital Status		
Single	17	47.2
Married/de facto	17	47.2
Divorced/separated/other	2	5.6
Education		
Highschool	9	25.0
Trade certificate/diploma	7	19.4
Bachelor degree	11	30.6
Master/doctoral degree	9	25.0
Employment[b]		
Full time	10	27.8
Part time/casual	14	38.9
Student	11	30.6
At home parent	3	8.3
Unemployed/seeking work	4	11.1
Registered sick/disabled	2	5.6
Medication (% yes)	9	25.0
Comorbid diagnoses		
Obsessive compulsive disorder	9	25.0
Body dysmorphic disorder	3	8.3
Hoarding disorder	4	11.1
Excoriation disorder	4	11.1
Social anxiety disorder	14	38.9

Panic disorder	6	16.7
Agoraphobia	5	13.9
Separation anxiety disorder	3	8.3
Specific phobia	6	16.7
Major depressive disorder	18	50.0
Persistent depressive disorder	8	22.2
Premenstrual dysphoric disorder	5	13.9
Post traumatic stress disorder	1	2.8
Adjustment disorder	2	5.6
Binge eating disorder	1	2.8
Somatic symptom disorder	2	5.6
Illness anxiety disorder	2	5.6
Substance use disorder	4	11.1
Attention deficit/hyperactivity disorder	6	16.7
DIAMOND GAD severity*		
Mean (SD)	4.66 (0.68)	

*Note. *N = 35 (severity data for 1 participant was not recorded)*

2.2. Measures

2.2.1 Diagnostic assessment

2.2.1.1. Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders (Tolin et al., 2018). The DIAMOND is a structured clinical interview that systematically assesses the DSM-5 diagnostic criteria for anxiety disorders, mood disorders, obsessive-compulsive and related disorders, trauma- and stressor-related disorders, schizophrenia spectrum disorders, eating disorders, somatic symptom and related disorders, substance use disorders, and selected neurodevelopmental disorders. The DIAMOND demonstrates very good interrater reliability (kappa = .71) and test-retest validity (kappa = .68) for the GAD diagnosis (Tolin et al., 2018). Prior to treatment, assessing clinicians completed formal DIAMOND training and the inter-rater reliability for each clinician ranged from very good to excellent (0.73 – 1.00). A blind assessment approach was used when possible, where the assessing clinician differed from the treating clinician. The diagnostic interviews were administered by trained interviewers who were either provisionally registered or fully registered psychologists under the supervision of an experienced clinical psychologist.

2.2.2 Primary outcome measure

2.2.2.1. Generalized Anxiety Disorder Questionnaire-7 item (GAD-7) (Spitzer et al., 2006). The GAD-7 is a 7-item measure of symptoms of GAD. Each of the seven items are rated on a 4-point scale from 0 (not at all) to 3 (nearly every day) and a total score is calculated by summing each of the seven items. The scale has demonstrated good psychometric properties in previous samples (Hinz et al., 2017; Johnson et al., 2019; Spitzer et al., 2006). A score of 10 or above indicates clinically significant symptoms of GAD (Spitzer et al., 2006). The GAD-7 was used as the primary outcome measure. The Cronbach's alpha for the present sample was 0.864.

2.2.3. Secondary outcome measures

2.2.3.1. Generalized Anxiety Disorder Dimensional Scale (GAD-D) (Lebeau et al., 2012). The GAD-D is a 10-item measure of generalized anxiety symptoms. Participants rate the frequency with which they have experienced GAD symptoms over the past month on a 5-point Likert scale ranging from 0 (never) to 4 (all of the time), resulting in a total score ranging between 0 and 40. Previous studies have established acceptable psychometric properties (Groves et al., 2023; Lebeau et al., 2012). Higher scores indicate greater severity of GAD symptoms. The Cronbach's alpha for the present study was 0.858.

2.2.3.2. Penn State Worry Questionnaire-3 item (PSWQ-3) (Berle et al., 2011). The PSWQ-3 is a 3-item, self-report questionnaire designed to assess the core features of worry in GAD including uncontrollability, excessiveness, and multiple worry domains. Participants rate items on a 5-point scale and responses are summed, with higher scores indicating greater worry. The PSWQ-3 has demonstrated good psychometric properties in previous samples (Berle et al., 2011). A higher score indicates greater worry. The Cronbach's alpha for the present study was 0.863.

2.2.3.3. Patient Health Questionnaire-9 item (PHQ-9) (Kroenke et al., 2001). The PHQ-9 is a 9-item measure of depressive symptoms. Each item is assessed on a 4-point Likert scale from 0 (not at all) to 3 (nearly every day) and symptoms are assessed over the previous 2 weeks. Scores are summed and total scores ≥ 10 are used to indicate clinically significant depressive symptoms (Manea et al., 2012) with 88% sensitivity and 88% specificity (Kroenke et al., 2001). The PHQ-9 has been demonstrated to have excellent psychometric properties in previous samples (Kroenke et al., 2001; Zuithoff et al., 2010). The Cronbach's alpha for the present study was 0.753.

2.2.3.4. Sheehan Disability Scale (SDS) (Sheehan et al., 1996). The SDS is a commonly used 3-item measure that assesses how much psychiatric symptoms have interfered with work, social, and home life functioning. Each domain is scored from 0 (not at all) to 10 (very severely). The three domains can be summarized to evaluate global functional impairment by adding the scores of each of the three domains, resulting in global SDS score ranges from 0 (unimpaired) to 30 (highly

impaired). A cut score of 5 on any subscale has been used to identify individuals with clinically relevant symptoms in previous studies (Leon et al., 1992). The Cronbach's alpha for the present study was 0.802.

2.2.3.5. NIMH Clinician Global Impression (CGI) Improvement Scale (self-report version) (Guy, 1976). The CGI-I is a commonly used single-item measure of improvement in symptoms. Improvement scores range from 1 (very much improved) to 7 (very much worse). The CGI-I has been shown to be a valid and reliable clinical outcome measure in previous studies (Berk et al., 2008; Zaider et al., 2003). While the CGI-I is typically administered by a clinician, the self-report format was used in this study. The self-report and clinician-administered versions have shown adequate concordance in previous samples (Hannan & Tolin, 2007).

2.2.4. Process/acceptability measures

2.2.4.1. Client Satisfaction Questionnaire (CSQ) (Larsen et al., 1979). The CSQ is an 8-item measure of the participant's satisfaction with the treatment they were provided. The scale has demonstrated adequate psychometric properties in previous studies (Kelly et al., 2017; Larsen et al., 1979). A score of 22 or above has previously been used to indicate adequate satisfaction with treatment (Kelly et al., 2017). The Cronbach's alpha for the present study was 0.897.

2.2.4.2. Acceptability Questionnaire (AQ). The AQ is a 10-item measure of acceptability of remote treatments. Participants are instructed to rate their experience of the treatment in relation to how satisfied they were with treatment, whether they had noticed improvement in symptoms, or would recommend the treatment to others. The questionnaire has been used in examining acceptability for remote treatments of other disorders (Wootton et al., 2019).

2.5. Treatment

Treatment was provided from a university outpatient clinic in Australia and was based on a manualized VCBT intervention which was informed by the Intolerance of Uncertainty Model of GAD

(Dugas & Robichaud, 2007; Robichaud et al., 2019). Participants received 5 weekly (50 min) treatment sessions conducted via Zoom (Zoom Video Communications Inc., 2016). The treatment covered the following: (1) psychoeducation, (2) cognitive restructuring to challenge hypothetical worries and problem-solving training to reduce negative problem orientation, (3) behavioral experiments to develop a greater tolerance to uncertainty, (4) imaginal exposure to address cognitive avoidance, and (5) relapse prevention. Participants were also required to complete homework tasks between sessions. Treatment was delivered by 7 provisionally registered or fully registered psychologist(s) (2 male; 5 female) under the supervision of an experienced clinical psychologist. All treating psychologists were familiar with delivering manualized treatments and thoroughly trained in the administration of the treatment protocol. To ensure treatment fidelity, treating clinicians received weekly supervision to review client progress and address clinical issues arising from sessions. Clinician competence was also reviewed formerly through a review process. All sessions were recorded and at least 10% of sessions were randomly selected for treatment adherence and integrity checking. The content of the treatment and homework tasks in the brief treatment intervention described in the current study did not differ from that of the 10-session treatment in the broader randomized controlled trial (Trenoska Basile et al., 2024). Homework tasks were reflective of skills learnt in each session and participants had a week to practice prior to subsequent sessions.

2.6. Statistical methods and analysis

Treatment adherence and acceptability were examined using descriptive statistics. Drop out analyses consisted of analyzing group differences between treatment completers and non-completers on demographic data and GAD severity measures with independent samples t-tests with Bonferroni-corrected *p*-values (continuous measures) and chi-square tests (categorical measures). Fisher's exact test was used to ascertain significance in instances where expected values were less than 5.

Treatment efficacy was examined using mixed-linear models. Effect sizes using Cohen's *d* were calculated for within-group differences, based on pooled standard deviations for the entire sample using the estimated marginal means (Feingold, 2015). A *d* value of .20 indicates a small effect, .50 a medium effect, and >.80 a large effect (Cohen, 1992). Significance of pairwise comparisons were analyzed using Bonferroni-corrected *p*-values. All analyses were conducted based on the total score of the relevant outcome measure and were performed using IBM SPSS Statistics (Version 29). Analyses were conducted according to the intention-to-treat (ITT) principles, wherein missing data at mid-treatment, post-treatment and follow-up was replaced using multiple imputation (Jakobsen, et al. 2017; Lee & Shi, 2021). Sensitivity analyses were also conducted using the completer data (i.e. non-imputed data) and results were similar. Thus, only imputed data is reported in this manuscript. A post-hoc power analysis was conducted to ensure sufficient power to conduct the analyses. With alpha set a .05, power set at 0.80, and using the smallest effect-size found in the study (SDS: *d* = 0.57), 21 participants were required, and this number was exceeded in the current study.

Clinical improvement was analyzed based on change in diagnostic status from pre-treatment to post-treatment and pre-treatment to 3-month follow up and was assessed using the DIAMOND. Benchmarking analyses were conducted by comparing the magnitude of symptom change observed in the brief VCBT sample was against outcomes of a standard length VCBT intervention (Trenoska Basile et al., 2024) and a recent meta-analysis of in-person CBT (Carpenter et al., 2018). The benchmarking analyses followed the methodology outlined by Minami and colleagues (Minami et al., 2008), where differences in the rate of change between the groups are considered substantive if they exceed, or fall short of, a margin of ±0.2 of the standardized mean difference.

3. Results

3.1. Adherence and attrition

27/36 (75%) participants were deemed to have completed treatment (i.e., completed all 5 treatment sessions). Post-treatment questionnaires were completed by 25/36 (69.4%) participants and follow-up questionnaires were completed by 25/36 (69.4%) participants. Post-treatment diagnostic interviews (GAD module from DIAMOND) were completed with 24/36 (66.7%) participants at post-treatment and 23/36 (63.9%) at follow-up. There were no significant differences between those who completed treatment and those who dropped out of treatment based on demographic variables such as age, gender, education level, employment status, pre-treatment diagnostic severity, or scores on the symptoms severity measures at pre-treatment (all *p's* >.05). Results on Little MCAR's test failed to reject the null hypothesis, providing evidence that data was missing at random; X^2 (1043, 36) = .000; p = 1.000.

3.2. Preliminary Treatment Outcomes

Pre-treatment, post-treatment, and 3-month follow-up estimated marginal means and standard deviations on the primary and secondary outcome measures, and effect sizes with 95% confidence intervals are outlined in Table 2.

3.2.1. Primary outcome measures

On the primary outcome measure (GAD-7) the mixed-models analyses revealed a significant effect for Time (F(3, 144)=17.494, p<.001). Pairwise comparisons revealed that that there was a significant change on the GAD-7 from pre-treatment to mid-treatment (p <.001; d = 0.76, 95%*CI*: 0.27 – 1.23), pre-treatment to post-treatment (p <.001; d = 1.13, 95%*CI*: 0.62 – 1.61), and pre-treatment to follow-up (p <.001; d = 1.58, 95% *CI*: 1.04 – 2.10).

3.2.2. Secondary outcome measures

On the GAD-D there was a significant effect for Time (F(3, 144)=10.013, p<.001). Pairwise comparisons revealed that that there was a significant change on the GAD-D from pre-treatment to mid-treatment (p =.002; d = 0.73, 95%*CI*: 0.24 – 1.20), pre-treatment to post-treatment (p <.001; d =

1.00, 95%*CI*: 0.50 – 1.48), and pre-treatment to follow-up (p <.001; d = 1.10, 95% *CI*: 0.60 – 1.59). On the PSWQ-3 there was a significant effect for Time (F(3, 144)=6.931, p<.001). Pairwise comparisons revealed that that there was a significant change on the PSWQ-3 from pre-treatment to post-treatment (p =.025; d = 0.69, 95%*CI*: 0.21 – 1.16), and pre-treatment to follow-up (p <.001; d = 0.93, 95% *CI*: 0.43 – 1.40). There was no significant change from pre-treatment to mid-treatment observed (p = .622). Finally, analyses examining the SDS revealed a significant effect for Time (F(3, 144)=3.549, p<.05). Pairwise comparisons revealed that that there was a significant change on the SDS from pre-treatment to follow-up (p =.036; d = 0.66, 95% *CI*: 0.18 – 1.12). No significant change was observed from pre-treatment to mid-treatment (p = 1.00) and from pre-treatment to post-treatment (p = .117).

3.2.3. Depressive symptoms

On the PHQ-9 there was a significant effect for Time (F(3, 144)=6.305, p<.001). Pairwise comparisons revealed that that there was a significant change on the PHQ-9 from pre-treatment to post-treatment (p <.001, d = 0.87, 95%*CI*: 0.38 – 1.34), and pre-treatment to follow-up (p =.004; d = 0.75, 95% *CI*: 0.26 – 1.22). There was no significant change observed from pre-treatment to mid-treatment (p =.055).

3.3. Clinical improvement and deterioration

Using the completer sample, 19/24 (79.2%) at post-treatment and 20/23 (87%) at 3-month follow up no longer met diagnostic criteria for GAD. Using the last observation carried over method, where diagnostic status was carried forward from the last observation, 19/36 (52.8%) and 21/36 (58.3%) of treatment participants no longer met diagnostic criteria for GAD at post-treatment and follow-up respectively. One out of 36 (2.8%) of participants reported a “minimally worse”/mild increase in GAD symptoms at mid treatment and follow-up, respectively. There was no reported deterioration at post treatment.

Table 2

Estimated marginal means, standard deviations, and effect sizes (Cohen's d) for total sample (N = 36).

Measure	**Mean (SD)**				**Within Group Effect sizes (95% CI)**	
	Pre-treatment	Mid-treatment	Post-treatment	Follow-up	Pre-treatment to post-treatment	Pre-treatment to follow-up
GAD-7	11.86 (4.51)	8.61 (4.03)	7.29 (3.54)	6.28 (2.11)	1.13 (0.62-1.61)	1.58 (1.04-2.10)
GAD-D	17.39 (6.62)	12.87 (5.75)	11.33 (5.41)	10.71 (5.41)	1.00 (0.50-1.48)	1.10 (0.60-1.59)
PSWQ-3	10.78 (2.56)	10.10 (2.63)	9.07 (2.36)	8.47 (2.43)	0.69 (0.21-1.16)	0.93 (0.43-1.40)
PHQ-9	10.44 (4.61)	8.25 (4.30)	7.00 (3.17)	7.23 (3.95)	0.87 (0.38-1.34)	0.75 (0.26-1.22)
SDS	15.19 (6.20)	13.92 (6.77)	11.70 (5.96)	11.11 (6.22)	0.57 (0.10-1.04)	0.66 (0.18-1.12)

Note. GAD-7: Generalized Anxiety Disorder Scale (7-item), GAD-D: Generalized Anxiety Disorder Dimensional Scale, PWSQ-3: Penn State Worry Questionnaire (3 item), PHQ-9: Patient Health Questionnaire (9 item), SDS: Sheehan Disability Scale, effect sizes (Cohen's d) were calculated based on pooled standard deviations, CI: confidence intervals.

3.4. Treatment satisfaction and acceptability

The mean (SD) score on the CSQ was 26.56 (3.87) with a minimum of 17 and maximum of 32. Twenty-five out of 36 participants (69.4%) completed the acceptability questionnaire. Of those who completed the post-treatment questionnaires, 23/25 participants (92%) reported feeling satisfied or very satisfied with treatment. Twenty out of 25 (80%) reported that taking part in the treatment was worth their time and 22/25 participants (88%) indicated that they would recommend the treatment to others with similar symptoms.

3.5. Benchmarking

The effect sizes on the primary outcome measure (GAD-7) are compared with a standard length VCBT intervention (10 sessions) as well as a recent meta-analysis of in-person CBT for GAD in Table 3. The effect sizes from pre-treatment to post-treatment were consistent across all treatments at all time-points. The effect sizes from pre-treatment to follow-up were consistent between the standard length and brief VCBT interventions.

Table 3

Effect sizes (Cohen's d) with 95% CI for total sample.

Sample	**Within Group Effect Sizes (95% *CI*)**	
	Pre-treatment to post-treatment	Pre-treatment to follow-up
Brief VCBT (current study)	1.13 (0.62-1.61)	1.58 (1.04-2.10)
Traditional length VCBT	1.03 (0.55-1.50)	1.50 (0.98-1.99)
Meta analysis	1.01*(0.44–1.57)	-

Note. The data from the traditional length VCBT was obtained from (Trenoska Basile et al., 2024). Data from the meta-analysis was obtained from Carpenter et al. (2018). * indicates Hedge's g.

4. Discussion

The aim of this study was to examine the acceptability and efficacy of brief VCBT for GAD. Overall, we hypothesized that 1) brief VCBT would result in significant reductions in symptoms from pre-treatment to post-treatment with large effect sizes; 2) improvements would be maintained at 3-month follow-up; 3) that brief VCBT would be acceptable to individuals with GAD; and 4) that brief VCBT would be comparable to traditional length of treatment. All hypotheses were supported in this study.

The results indicated that participants improved significantly from pre-treatment to post-treatment on the primary outcome measure (GAD-7: *d* = 1.13). Significant reductions in GAD symptoms from pre-treatment to post-treatment and pre-treatment to follow-up were also seen on secondary outcomes measuring GAD symptoms (GAD-D: *d* = 1.00 and *d* = 1.10 respectively). These findings are consistent with previous research suggesting that a dosage of 5 sessions is sufficient in achieving a significant reduction in anxiety symptoms for individuals who were treated in-person at a specialist anxiety clinic (Levy et al., 2020). The findings are also consistent with the results of existing research that have found that 5-session in-person treatment protocols are efficacious for other anxiety disorders (Otto et al., 2012).

Benchmarking analyses indicated that these outcomes are consistent with traditional length (i.e., 10 sessions) of VCBT (Trenoska Basile et al., 2024), as well as a meta-analysis of in-person CBT (Carpenter et al., 2018). However, it is important to highlight that despite these large effect sizes, 47% of participants still met criteria for GAD at post-treatment, and 42% continued to meet criteria at 3-month follow up. Given this is the first study to demonstrate the efficacy of brief VCBT for GAD it is important for future research to examine the efficacy and clinical significance of this treatment approach in larger controlled trials. Studies directly comparing the efficacy and clinical significance of standard length versus brief treatment are particularly needed.

A significant decrease in worry was also observed from pre-treatment to post-treatment (*d* = 0.69) and pre-treatment to 3-month follow-up (*d* = 0.93), but not pre-treatment to mid-treatment. The lack of change on this outcome measure from pre-treatment to mid-treatment, and the medium effect size at post treatment compared to the large effect at 3-month follow-up may be due to the sequencing of interventions in this study. Specifically, worry exposure was conducted as one of the final interventions in this course of treatment which may have led to a delayed response to the full effects of treatment. It may also indicate that the treatment is more effective at reducing the physiological effects of GAD, which is measured more prominently in the GAD-7 (Spitzer et al., 2006), than worry per-se, as measured by the PSWQ-3 (Berle et al., 2011).

The treatment appeared to be less effective at reducing disability associated with GAD, as indicated by the smaller effect sizes on the SDS (Sheehan et al., 1996), which were medium in size, and the lack of significant change from pre-treatment to mid-treatment and pre-treatment to post-treatment. Additionally, it is important to highlight that although participants scores shifted significantly, resulting in medium treatment effects, this may not reflect real clinical change (i.e., participants may still have significant levels of disability after completing the treatment). It may be that disability related to GAD may take longer to change than measures of GAD severity. Longer term follow ups are needed to assess long term change in symptom scores and related disability.

Results also indicated that brief VCBT for GAD may be helpful in the reduction of comorbid depression (Ruscio et al., 2017), with results on the PHQ-9 showing significant reductions in symptoms from pre-treatment to post-treatment (*d* = 0.87) and pre-treatment to follow up (*d* = 0.75). While there was a small reduction in treatment effects at follow up compared with post-treatment, these may not be clinically significant. However, it is important for future studies to examine the long-term effects of brief VCBT on depression symptoms. Overall, the treatment effects for depression are particularly important given the high rates of comorbid depressive symptoms seen in this population (Ruscio et al., 2017). While transdiagnostic treatments have become

widespread recently (Barlow et al., 2017; Rostami et al., 2023), brief targeted treatments for the primary mental health condition may be preferable over transdiagnostic treatments when time to deliver treatment is limited. Future research may wish to compare the relative efficacy of brief disorder specific and brief transdiagnostic treatments in the future to determine if transdiagnostic interventions have any additional effect on the treatment of comorbid depressive disorders.

The improvements in GAD symptoms were maintained at 3-month follow-up (GAD-7: *d* = 1.58), suggesting the results for brief VCBT may be durable. This is consistent with other research that has demonstrated CBT has durable outcomes. For example, Wootton et al. (2015) observed large effect sizes from pre-treatment to yearly follow-up for a period of three years (*d* = 1.11–1.60) in 98 individuals with anxiety and related disorders treated in an outpatient setting using a case formulation CBT approach (Wootton et al., 2015). Given this is the first study to examine the longer-term efficacy of brief VCBT it is important that future research with larger samples and longer follow up timeframes examine the durability of VCBT for GAD.

The results of the current study demonstrate that participants found the brief VCBT intervention to be acceptable. For example, participants reported high levels of satisfaction across various acceptability measures, with 92% reporting that they were “satisfied” or “very satisfied” with treatment. While the acceptability for brief treatment is high, these results should be interpreted with caution as we are unable to determine the reason for dropout for the three participants that were lost to follow-up once treatment commenced. This finding is consistent with VCBT interventions of traditional length (Trenoska Basile et al., 2024), as well as low intensity treatment, such as internet-delivered CBT (Titov et al., 2009). In this study, participants were aware they were receiving a VCBT intervention. However, previous research suggests that individuals may prefer in-person CBT over VCBT (Trenoska Basile et al., 2024). Thus, future research may wish to compare the relative acceptability of in-person CBT and VCBT using a randomized controlled design.

Our final hypothesis that brief VCBT would result in comparable outcomes to standard length of treatment was also met. Specifically, benchmarking analyses demonstrated that the results of the current study are comparable with previous research on VCBT for GAD that have included 10 sessions (within-group effect sizes of *d* = 1.03 at post-treatment and *d* = 1.50 at 3-month follow-up; Trenoska Basile et al., 2024), and in-person CBT of traditional length, where large effect sizes (Hedge's g=1.01) are typically seen (Carpenter et al., 2018). This provides preliminary evidence to suggest that both brief and standard length VCBT may be as efficacious as standard in-person CBT, however, this requires further examination in randomized controlled trials. The results also suggest that brief VCBT may be an important alternative for participants on waitlists for in-person GAD treatment, as the treatment is able to be widely disseminated.

Overall, these results provide preliminary evidence to suggest that brief VCBT is an efficacious and highly acceptable treatment for individuals with GAD that can potentially counteract a broad range of barriers to accessing CBT. For example, the commonly endorsed barriers of cost/affordability, logistical issues, and access to trained clinicians (Goetter et al., 2020; Heinig et al., 2021; Trenoska Basile et al., 2024) can be addressed with brief VCBT. Specifically, the shorter number of sessions are more cost effective than traditional length of treatments. Likewise, the ability to conduct a session in a location of the individual's choice provides a greater sense of privacy and may reduce stigma associated with attending in person treatment. This study has several important clinical implications. First, given the preliminary evidence to suggest that brief VCBT may be an efficacious treatment for individuals with GAD, it is important that clinicians and patients are informed about the potential benefits of VCBT. This may involve educating them about its effectiveness in treating GAD, its convenience, accessibility, and its potential to overcome logistical, stigma based and financial barriers. Second, it is important to ensure that clinicians receive adequate training in the nuances of delivering brief therapy via videoconferencing and how to adapt their techniques accordingly. This includes addressing potential challenges like establishing rapport, managing non-verbal cues, maintaining engagement over shorter treatment, and adhering to ethical

guidelines on the provision of remote therapies. Third, it is important to ensure that adequate systems (e.g., secure internet connection) and processes (e.g., protocols in case of technological difficulties) are in place for the successful delivery of VCBT for GAD. Finally, the uptake of brief VCBT is likely to depend on its endorsement and integration into broader healthcare systems. This may involve incorporating it into stepped care approaches, public health initiatives, and clinical treatment guidelines. By addressing these recommendations, governments and healthcare organizations can improve the confidence and willingness of both clinicians and GAD patients to embrace brief VCBT as a viable treatment option.

While the results of the current study demonstrate the efficacy and acceptability of brief VCBT for GAD it is important to highlight some of the limitations of the study. Firstly, the study is an open trial and did not have a control group. While it is possible that results seen are the result of symptom reduction independent of the study, this is unlikely as GAD is a chronic disease (Wittchen et al., 2002), that rarely spontaneously remits without treatment (Kelly & Mezuk, 2017). It is however important for future research to examine the efficacy of VCBT using randomized controlled trials.

Secondly, the sample was overwhelmingly female (84.4%) and while GAD is more prevalent in women than men (Ruscio et al., 2017), the high proportion of women in this sample is not consistent with prevalence data (Ruscio et al., 2017). While it is possible that women with GAD may have a preference for remotely delivered VCBT interventions, this requires further research. The sample was also highly educated. For these reasons the results of the current study may not be generalizable to all individuals with GAD. Additional studies with larger sample sizes that are representative of a GAD population are necessary to draw more concrete conclusions. Thirdly, the dropout rate in the current study of 36% is higher than those seen in other studies which included standard treatment lengths and this may be another limitation of the study. For example, 26% in a recent randomized controlled trial examining the efficacy of remote 10 session CBT for GAD

(Trenoska Basile et al., 2024), and 28% in trials of standard length in-person CBT (Timulak et al., 2022). The higher dropout rate observed in the current study may be attributed to a large proportion of the study population having a comorbid depressive disorder. For example, 50% of the sample had a comorbid major depressive disorder and 22% of the sample had comorbid persistent depressive disorder. Previous studies have indicated that patients with depressive disorder tend to have higher dropout rates (Fernandez et al. 2015). Further, the brief nature of this study may have impacted commitment and investment in treatment, however future research is required to determine if this is the actual case.

Overall, the results of the current study provide preliminary evidence to suggest that brief VCBT is an acceptable and promising treatment for patients with GAD. This is the first study to examine brief VCBT for GAD and while future research is needed, including controlled studies with larger and more diverse samples, the results of the current study contribute to the growing evidence base demonstrating the efficacy of remotely delivered high-intensity CBT. High intensity remote CBT can be widely disseminated and may be a viable option for individuals with GAD who may be unable to access in-person treatment or who may prefer the convenience of remotely delivered treatments.

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