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Self-guided internet–delivered cognitive behavior therapy (ICBT) for obsessive-compulsive symptoms: A randomized controlled trial

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ABSTRACT

Internet-delivered cognitive behavior therapy (ICBT) for obsessive-compulsive disorder (OCD) has been demonstrated to be efficacious across multiple clinical trials. However, most of these interventions include clinician support, and many individuals with OCD prefer to manage their own symptoms. Self-guided ICBT overcomes this problem, but to date the efficacy of self-guided interventions has only been studied in uncontrolled trials. The present study aims to examine the efficacy and acceptability of ICBT for OCD symptoms when delivered in a self-guided format using a randomized controlled trial design. In the present study, 190 participants were randomized to either a self-guided ICBT condition or a waitlist control group. 140 participants completed the baseline assessment, initiated treatment, and were included in the analyses. The between-group effect size at post-treatment was large on the self-report version of the Yale-Brown Obsessive-Compulsive Scale (d = 1.05; 95% CI 0.89–1.21). Twenty-seven percent of the ICBT condition met conservative criteria for clinically significant change at post-treatment, which increased to thirty-eight percent at three-month follow-up. Participants rated the program as highly acceptable. The results indicate that self-guided ICBT may be a viable treatment option for some individuals with OCD symptoms.

1. Introduction

Obsessive-compulsive disorder (OCD) is characterized by the presence of unwanted obsessive thoughts, images, or urges; and time-consuming compulsive behaviors (APA, 2013). The condition causes significant impairment in functioning (Eisen et al., 2006) and is costly to society (Tolin, Gilliam, & Dufresne, 2010). Fortunately, effective cognitive-behavioral treatments exist for this disorder (Olatunji, Davis, Powers, & Smits, 2013), however many patients have difficulty accessing these treatments due to numerous barriers (Marques et al., 2010; Belloch, Valle, Morillo, Carrió, & Cabedo, 2009; Wootton, Titov, Dear, Spence, & Kemp, 2011). Internet-delivered interventions may overcome these barriers and improve access to evidence-based treatments for individuals with OCD. It has also been noted that delivery of treatments using such technologies may help to reduce the global burden of mental health (Kazdin & Blase, 2011).

A recent meta-analysis demonstrated the efficacy of internet-delivered cognitive-behavior therapy (ICBT) for OCD with large pooled within-group effect sizes found from pre-treatment to post-treatment (g = 1.40) and from pre-treatment to follow-up (g = 1.21) (Wootton, 2016). Such interventions can be administered in either a guided or self-guided fashion. In guided treatments the patient is supported by a clinician who provides brief support as the individual works through the internet program. On the other hand, self-guided interventions do not involve clinician support during the intervention. However, it is important to note that there is considerable variability in the delivery of self-guided ICBT. For example, some studies have significant involvement with a clinician during the recruitment stage and involve a pre-treatment assessment interview via telephone, while others are fully automated, with no clinician involvement during any aspect of the study (i.e., recruitment, assessment or treatment). Those that include contact with a clinician at any point of the study may increase supportive accountability (Mohr, Cuijpers, & Lehman, 2011), and may subsequently lead to enhanced outcomes (Boettcher, Berger, & Renneberg, 2012).

Guided ICBT for OCD has been demonstrated to be effective in a number of clinical trials with adult samples (Andersson et al., 2011, 2012; Diefenbach, Wootton, Bragdon, Moshier, & Tolin, 2015; Mahoney, Mackenzie, Williams, Smith, & Andrews, 2014; Wootton, Dear, Johnston, Terides, & Titov, 2013; Wootton, Titov, Dear, Spence,

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Andrews et al., 2011) and more recently adolescent samples (Lenhard et al., 2014, 2017). There is also emerging data indicating that promising results can also be obtained when ICBT is administered in routine clinical care (Titov, Dear et al., 2017). In these studies participants are provided with regular contact from a clinician as they work their way through the internet program. While guided internet delivered interventions arguably assist many individuals in overcoming barriers to accessing treatment, other patients, who prefer to manage their own symptoms, may be reluctant to utilize guided ICBT interventions.

While studies investigating individuals with diagnosed OCD symptoms are lacking, several studies have indicated that many individuals with other mental health problems prefer to manage their own symptoms. For example a recent epidemiological survey Prins et al. (2011) found that a desire to manager one's own mental health symptoms was one of the primary reasons for not accessing professional treatment. In a study investigating treatment barriers for anxiety disorders in a community and student sample almost half the sample (49%) indicated that they can or should work out their own problems, rather than seeking professional help from a psychologist (Langley, Wootton, & Grieve, 2018). Finally, in a sample of individuals with undiagnosed OCD symptoms, Gentle, Harris, and Jones (2014) found that one third of participants preferred to manage their own symptoms rather than seeing a mental health professional. A preference to manage one's own symptoms may be a particular barrier for individuals with OCD as many patients may be unwilling to disclose ego-dystonic obsessions to a health care provider. Therefore, it is important to evaluate the effectiveness of self-guided ICBT interventions for OCD as this form of intervention may be the only option for many patients with OCD symptoms.

While self-guided interventions for individuals with OCD symptoms provide a treatment option for those who do not wish to speak with a clinician or prefer to manage their own symptoms, there are also other important advantages of this treatment approach. Firstly, because it requires very little clinician time, the intervention is likely to be more cost effective than those that use considerable clinician support. Secondly, clinicians may utilize such a program to supplement their own work, for example, using the ICBT program to provide psychoeducation and get the client started with the treatment, leaving valuable in-session resources to focus on key intervention strategies, or using it as an option for homework (Reynolds, Griffiths, Cunningham, Bennett, & Bennett, 2015). Finally, such an intervention may be useful in developing stepped care approaches for individuals with OCD symptoms, whereby patients can commence with the least restrictive intervention before progressing on to interventions that are more intensive as needed (Bower & Gilbody, 2005).

To date there have been two pilot open trials that have examined the efficacy of self-guided ICBT for adults with OCD symptoms (Wootton, Dear, Johnston, Terides, & Titov, 2014). In both these studies there were significant reductions on measures of OCD symptomatology with large within-group effect sizes at post-treatment (d = 1.05–1.64) and three-month follow-up (d = 1.03–2.86) (Wootton et al., 2014). Additionally, approximately one third of participants met criteria for clinically significant change in both studies at post-treatment (Study 1: 19% and Study 2: 36%) and three-month follow-up (Study 1: 31% and Study 2: 32%). Importantly these effects were durable with large within-group effect sizes seen from pre-treatment to 12-month follow-up on measures of OCD symptomatology (d = 1.08–1.30) (Wootton, Dear, Johnston, Terides, & Titov, 2015). Additionally, 25% of the sample met conservative criteria for clinically significant change at 12-month follow-up (Wootton et al., 2015).

The acceptability of self-guided ICBT interventions has also been demonstrated to be high. For example, in the two previous open trials of self-guided ICBT 80% of participants who completed the treatment in Study 1 and 88% of participants who completed the treatment in Study 2 indicated that they were *very satisfied* or *mostly satisfied* with the intervention (Wootton et al., 2014). These acceptability rates are consistent with previous ICBT studies for other diagnostic groups, which have indicated acceptance rates between 92–99% (Dear et al., 2013, 2015; Titov et al., 2015). Previous studies have also indicated that individuals with OCD symptoms find that internet-delivered treatments are convenient due to the reduced time involved, reduced costs involved, and increased privacy and anonymity (Wootton, Titov, Dear, Spence, Kemp, 2011).

Self-guided computerized interventions for OCD have been examined in one previous RCT (Greist et al., 2002). In this study the self-guided computerized intervention, BT STEPS, was compared with standard face-to-face treatment with a therapist, and a self-guided relaxation therapy condition. In this study participants in the self-guided computerized CBT condition improved significantly more than those in the relaxation condition, and large within-group effect sizes were observed for the self-guided intervention (d = 0.84) and 38% of the participants met treatment responder criteria. However, participants in the face-to-face treatment condition improved significantly more than the self-guided computerized CBT condition, and large within-group effect sizes were also observed in this group (d = 1.22; 58% met treatment responder criteria).

To date there have been no controlled trials comparing guided ICBT with self-guided ICBT for symptoms of OCD, however, such comparisons have been studied in some of the anxiety disorders, including social anxiety disorder (Berger et al., 2011; Dear et al., 2016) and generalized anxiety disorder (Dear et al., 2015). While some older meta-analyses have indicated a non-significant trend towards larger pooled effects for guided interventions over self-guided interventions (Haug, Nordgreen, Öst, & Havik, 2012), these included a variety of remote treatment methodologies, and more recent studies have found equivalent outcomes across guided and self-guided interventions (Dear et al., 2016; Fogliati et al., 2016; Titov, Fogliati et al., 2016).

A number of meta-analyses have also investigated effects sizes for guided and self-guided interventions for OCD. Firstly, Pearcy, Anderson, Egan, and Rees (2016) found that effect sizes for self-help interventions increased as the amount of contact increased in individuals with OCD symptoms, however the authors indicated that there was significant heterogeneity in the self-help mediums studied. Similarly, Wootton (2016) found larger effect sizes for remote OCD interventions that were guided (g = 1.36) compared with self-guided (g = 0.58), however in this analysis self-guided ICBT interventions still produced large effects overall (g = 0.82). Comparing remote treatments across methodologies is problematic given that ICBT has many advantages over other remote intervention approaches, such as bibliotherapy (Wootton et al., 2014). For example, in ICBT the content is more easily controlled, more visually engaging, and can deliver prompts and reminders automatically (Wootton et al., 2014). Such prompts and reminders have been found to enhance patient outcomes in previous studies (Titov et al., 2013).

In summary, self-guided ICBT appears to be an efficacious and acceptable treatment for individuals with symptoms of OCD. Self-guided ICBT provides those who wish to manage their own symptoms an opportunity to access evidence-based treatment. However, to date this treatment format has only been investigated in uncontrolled trials. Therefore, the aim of this study was to investigate the acceptability and efficacy of self-guided ICBT when compared to a waitlist control group for individuals with symptoms of OCD. It was hypothesized that 1) participants in the ICBT group would demonstrate significant reductions in OCD symptomatology from pre-treatment to post-treatment and pre-treatment to three-month follow-up; 2) participants in the ICBT group would find the self-guided ICBT program to be acceptable; and 3) the ICBT group would perform significantly better than the WLC group at post-treatment.

2. Method

2.1. Design

A randomized controlled trial comparing a self-guided ICBT group to a WLC group was used to assess the study hypotheses. Given that this is the first examination of self-guided ICBT, a waitlist control was considered an appropriate comparison group. Results were compared from pre-treatment to post-treatment, pre-treatment to three-month follow-up (i.e., three months post-treatment), and post-treatment to three-month follow-up.

2.2. Participants

Participants were informed about the study via emails to individuals who had previously expressed an interest in the eCentreClinic OCD program as well as social media advertising. Information about referral source was not monitored. Participants applied for the study online via the eCentreClinic website, a research clinic that evaluates the efficacy of ICBT and other remote treatment programs for physical and mental health conditions. Participation in the study was open to local as well as international applicants. The assessment process was completed online and there was no clinician contact with the participants during the assessment process.

Participants were included in the program if they were: 1) English speaking; 2) 18 years or older; 3) had regular access to the Internet; 4) scored at least a 7 on one of the subscales of the Dimensional Obsessive Compulsive Scale (DOCS) (Abramowitz et al., 2010); and 5) scored at least 14 on the Yale-Brown Obsessive-Compulsive Scale (self-report version) (Goodman et al., 1989). Participants were excluded from the trial if they: 1) had suicidal plans or intention or had a recent history of suicide attempts or deliberate self-harm; 2) had severe depressive symptoms (a score of 20 or greater on the Patient Health Questionnaire – 9 item (PHQ-9) (Kroenke, Spitzer, & Williams, 2001); 3) had a self-reported history of psychotic illness or bipolar disorder; and 4) were drinking alcohol or using illicit drugs on a daily basis. Given that previous studies have found an enhanced effect from conducting a pre-treatment diagnostic interview (Boettcher et al., 2012), and individuals with OCD symptoms may be unwilling to disclose their symptoms to a mental health clinician (Gentle et al., 2014), we opted to enter clients based on their self-report YBOCS score rather than an OCD diagnosis.

During the assessment stage, participants who did not meet the study criteria were sent an email informing them of such and encouraging them to discuss their symptoms with the primary care physician. The majority of these emails were automated; however, a clinician assessed applications that likely met criteria to review YBOCS and DOCS scores. Participants who were excluded based on their YBOCS and/or DOCS scores were sent a template email informing them whether they did or did not meet study criteria. Participants who met study criteria were sent a template email welcoming them to the study and group assignment was outlined in this email.

Participant flow can be seen in Fig. 1. Three hundred and nineteen participants provided consent and commenced an application between August 2015 and July 2017. One hundred and ninety participants met entry criteria and were randomized on a 1:1 basis to either the immediate or delayed treatment using an online random number generator (www.random.org), which was generated prior the recruitment of participants. The randomization process was not blinded as the clinician involved in assessing applications, was the same author responsible for allocating participants to groups. Randomization was handled by the first author and recruitment ceased when 190 participants had been randomized. One hundred and forty-four out of the 190 recruited participants commenced treatment (n = 69 in the immediate treatment group and n = 75 in control group). Four participants in the immediate treatment group did not commence using any of the Course materials and were excluded from analysis. Therefore the data from 65 participants was analyzed in the ICBT group and 75 in the WLC group. The characteristics of the sample are outlined in Table 1. The Human Research Ethics Committee of Macquarie University approved the trial and it was registered with the Australian and New Zealand Clinical Trials Register (ANZCTR) as ACTRN12615000577516.

2.3. Outcome measures

The primary outcome measure was the self-report version of the *Yale Brown Obsessive Compulsive Scale (YBOCS-SR)* (Goodman et al., 1989). The YBOCS-SR is a 10-item self-report questionnaire that measures the severity of OCD symptoms independently of the symptom subtype. The self-report version of the scale is highly correlated with the clinician-administered YBOCS in clinical samples (.79; Steketee, Frost, & Bogart, 1996). The self-report version of the YBOCS has demonstrated good reliability in previous ICBT treatment studies (Diefenbach et al., 2015; Wootton et al., 2014). Alpha was .85 in the current study.

The secondary outcome measures were the *Dimensional Obsessive Compulsive Scale (DOCS)* (Abramowitz et al., 2010) and the *Patient Health Questionnaire (9-item) (PHQ-9)* (Kroenke et al., 2001). The DOCS is a 20-item self-report questionnaire of OCD symptomology, which measures the four empirically validated subtypes of OCD including contamination, responsibility, unacceptable thoughts, and symmetry. A total score, as well as subscale score, can be derived on the DOCS. In the current study we used both the DOCS total score, DOCS (Total), as well as the dominant subscale, DOCS (Main), as outcome measures. Total scores range from 0 to 80 and subscale scores range from 0 to 20 (Abramowitz et al., 2010). The DOCS has been demonstrated to have excellent internal consistency across a number of samples (α = .83–.96) (Abramowitz et al., 2010) and Cronbach's alpha was .90 in the current study.

The PHQ-9 is a brief 9-item self-report measure of depressive symptoms. Total scores on the measure range from 0 to 27 with higher scores indicating more severe symptoms of depression. A score of 10 or greater has been previously used to indicate those with a likely diagnosis of major depressive disorder (Kroenke et al., 2001). The PHQ-9 demonstrates excellent internal consistency in previous studies (α = .74–.89) (Kroenke et al., 2001; Titov et al., 2011). In the current study Cronbach's alpha was .85.

All outcome measures were administered online via the secure eCentreClinic system. All measures were administered at pre-treatment, mid-treatment, and post-treatment. The YBOCS-SR and PHQ-9 were also administered each week throughout treatment, and at three-month follow-up. Participants were required to complete the YBOCS and PHQ-9 prior to accessing the intervention materials. At post-treatment and three-month follow up participants were sent a sequence of up to 5 automated emails encouraging them to complete the questionnaires; these explained that it was essential to get everyone's responses whether or not they found the course helpful or their symptoms had stayed the same or worsened over the period.

2.4. Intervention

The OCD Course has been used in previous clinical trials (Wootton et al., 2013, 2014, 2015) and the treatment components are outlined in Table 2. The treatment protocol is a five-lesson intervention delivered over 8 weeks. Lessons are released according to a timeline and participants must complete the previous lesson before the subsequent lesson is released. Participants are given one week to complete Lessons 1 and 3 and two weeks to complete Lessons 2, 4, and 5. The information in the lessons is delivered via text-based online slides. Each lesson contains homework tasks for the participant to complete, however this information is not uploaded to the site nor checked by a clinician. The program delivers automatic email prompts and reminders when a new lesson is available, when a lesson is completed, and when a lesson is

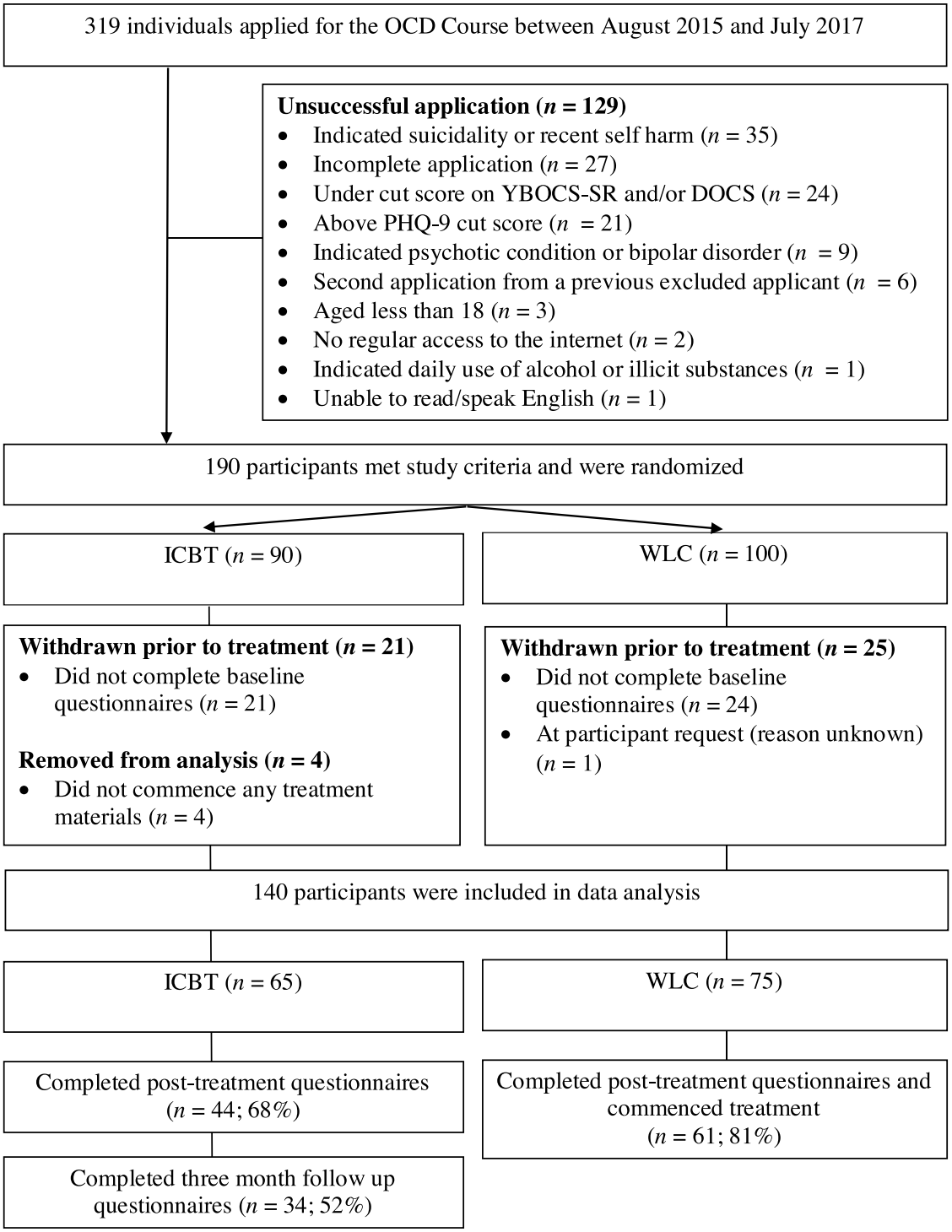

Fig. 1. Participant Flow.

missed (i.e., the participant has not yet commenced a lesson that is available). Because the weekly self-report questionnaires (i.e., PHQ-9 and YBOCS) are embedded within the system these automated emails also served as a prompt to complete the study questionnaires. Participants did not receive any clinician support as they worked their way through the program, however, technical questions were answered via email when they arose, which was infrequent. Participants scores on the weekly outcome measures (PHQ-9 and YBOCS) were monitored by a clinician on a daily basis and elevated scores on the PHQ-9 (a score of > 5 points or a total score > 20) or an increase of 5 points on the YBOCS triggered an email being sent to the participant to check on their safety and to encourage participants to access local services if required. This email was manually sent by the clinician.

Participants were sent a brief template email when they completed post-treatment or three-month follow-up questionnaires. This email thanked them for completing the questionnaires, provided basic feedback about their symptoms (e.g., noting whether they had remained the same, improved or worsened), and encouraged either continued reading of the course materials and practice of the course skills or seeking support from their primary care physician to facilitate higher intensity services. These emails took an average of 2 to 3 min to compose and send to participants.

Table 1
Characteristics of Each Group.

Variable	ICBT group (n = 65)	WLC group (n = 75)	Waldχ^2	p-value
Age				
Mean (SD)	34.03 (10.80)	33.39 (10.25)	0.796	0.37
Range	18–64	19-59		
Gender (% female)	(53) 81.5%	(61) 81.3%	0.001	0.98
Marital Status (%)				
Single/never married	(28) 43.1%	(32) 40.0%	0.069	0.79
Married/defacto	(31) 47.7%	(36) 48.0%	0.372	0.54
Separated/ divorced/widowed	(4) 6.2%	(5) 5.3%	< 0.001	> .99
Other	(2) 3.1%	(2) 6.7%	1.199	0.27
Education (%)				
High school	(11) 16.9%	(13) 28.0%	3.018	0.08
Trade/vocational certificate	(3) 4.6%	(8) 10.7%	2.099	0.15
Tertiary education	(51) 78.5%	(59) 61.3%	0.258	0.61
Employment status (%)				
Working	(39) 60.0%	(45) 46.7%	0.216	0.64
Unemployed	(8) 12.3%	(9) 8.0%	0.284	0.59
At home parent	(5) 7.7%	(6) 16.0%	2.704	0.10
Retired	(1) 1.5%	(1) 1.3%	< 0.001	> .99
Registered sick/disabled	(4) 6.2%	(5) 8.0%	0.395	0.53
Student	(8) 12.3%	(9) 20.0%	2.062	0.15
Participant location (%)				
Australia	(31) 47.7%	(36) 40.0%	0.016	0.90
United States	(13) 20.0%	(15) 20.0%	0.04	0.92
United Kingdom	(13) 20.0%	(15) 16.0%	0.143	0.71
Canada	(4) 6.2%	(5) 9.3%	0.797	0.32
Other	(4) 6.2%	(5) 14.7%	2.156	0.08
Previous treatment for OCD (% yes)	(42) 64.6%	(48) 58.7%	5.193	0.02
Taking psychotropic medication for OCD (% yes)	(31) 47.7%	(36) 52.0%	0.258	0.61
Length of symptoms (years)				
Mean (SD)[a]	17.92 (10.52)	17.58 (12.14)	0.032	0.86
Range (years)	3–45	1–47	0.519	0.47
Dominant DOCS subscale; DOCS (Main) [a,b]				
Contamination	(12) 18.8%	(14) 32.0%	3.099	0.08
Responsibility	(27) 42.2%	(32) 29.3%	2.479	0.12
Unacceptable thoughts	(24) 37.5%	(28) 33.3%	0.262	0.61
Symmetry	(13) 20.3%	(15) 25.3%	0.49	0.48
YBOCS-SR total baseline	22.52 (4.91)	22.44 (5.55)	0.009	0.93
Lesson completion				
Lesson 1	65 (100%)	–	–	–
Lesson 2	53 (82%)	–	–	–
Lesson 3	45 (69%)	–	–	–
Lesson 4	41 (63%)	–	–	–
Lesson 5	26 (40%)	–	–	–
Missing cases @ Post-treatment	(12) 19.0%	(14) 32.0%	3.459	0.06
Missing cases @ 3MFU	(35) 46.0%	–	–	–

Note. [a] $N = 139$. [b] DOCS totals do not equal 100% as participants can have multiple co-primary dominant subscales. YBOCS-SR: Yale-Brown Obsessive-Compulsive Scale (self-report version). DOCS: Dimensional Obsessive Compulsive Scale.

2.5. Data analysis

SPSS version 25 and R version 3.5.2 (R Core Team, 2013) were was used to conduct all statistical analyses using data from patients who commenced the first lesson (N = 140). Descriptive statistics were used to describe patient characteristics, intervention use, treatment satisfaction, and working alliance. Group differences were assessed using binomial regressions and general linear models. The alpha significance level for these analyses was adjusted from 0.05 to 0.01 to account for the number of analyses conducted. An analysis of statistical power was conducted prior to treatment to ensure adequate sampling and minimize statistical type II error. The necessary sample size was determined by drawing on symptom change information from comparable previous self-guided ICBT interventions for OCD (Wootton et al., 2014). Using previously observed means and variances as a benchmark, a sample of fifty participants was determined as sufficiently powered to detect minor differences between the effects of each condition (Cohen's $d > 0.2$), with the current sample exceeding this threshold.

Consistent with previous research (Karin, Dear, Heller, Gandy, & Titov, 2018), generalized estimation equation (GEE) (Liang & Zeger, 1986) models were used to examine symptom changes over time. GEE models for clustered longitudinal data (repeated measures) are a common statistical technique for modeling the changed in health outcome data (Hubbard et al., 2010). In this study, all GEE model specified a gamma with log link response scale to address skewness within the dependent variables, and an unstructured working correlation to account for different rates of change from pre- treatment to post-treatment (i.e., the bulk of the therapeutic effect), and post-treatment to follow-up (i.e., unchanged scores reflecting outcome maintenance). The estimated marginal means from the GEE analyses were used to calculate the average percentage change across time for each of the outcome variables with 95% confidence intervals. The statistical power of each model was estimated using dedicated software for longitudinal GEE technique (Donohue & Edland, 2016), taking into account the available sample size, change over time, outcome score variance of symptom scores at each time point, and within-subject correlation associated with each model.

Cohen's *d* effect sizes and associated 95% confidence intervals were also derived from the GEE models for within-group and between-group effects. Cohen's *d* (with 95% confidence intervals) was also calculated for the completer group. Within and between-group effect sizes were calculated according to the formula: $\frac{X_1 - X_2}{SD_{pooled}}$ where X_1 is the pre-treatment score and X_2 is the post-treatment (or follow up) score of each condition. SD_{pooled} was calculated as: $\sqrt{\frac{(N_1 - 1) \times SD_1^2 + (N_2 - 1) \times SD_2^2}{N_1 + N_2 - 2}}$, where N_1 is the sample size at pre-treatment, N_2 is the sample size at post-treatment (or follow-up), SD_1 is the standard deviation at pre-treatment, and SD_2 is the standard deviation of the post-treatment (or follow-up). Between-group effect sizes were calculated according to the same formulas, however for these analyses X_1 is the post-treatment score, N_1 is the sample size, and SD_1 is the standard deviation of the self-guided ICBT condition while X_2 is the post-treatment score, N_2 is the sample size, and SD_2 is the standard deviation of the WLC condition. Consistent with the recommendations of Cohen (1992) effect sizes of 0.20, 0.50, and 0.80 were interpreted as small, medium, and large respectively.

Clinical significance was analyzed in three ways. Firstly, via percentage change over time using the *exp(β)* change factors derived from the GEE models. Secondly, consistent with previous self-guided ICBT for OCD studies (Wootton et al., 2014) clinically significant change was defined as reliable change according to the Jacobson and Truax (1991) criteria (Jacobson & Truax, 1991) (in this case a reduction of at least five points on the YBOCS-SR), as well as a YBOCS-SR post-treatment or three-month follow-up total score ≤ 14. Reliable deterioration was defined as an increase of five YBOCS-SR points above the patients pre-treatment score at either post-treatment or follow-up. Finally, we also analyzed clinical significance in line with the recommendations of Farris, McLean, Van Meter, Simpson, and Foa (2013), whereby those participants who obtained a 35% decrease or greater in YBOCS scores were considered to be a treatment responder.

To address missing values a multiple imputations procedure (MI) was applied to generate replacement values for all dependent variables at post-treatment and 3-month follow-up. Consistent with clinical missing data guidelines (Little et al., 2012) and dedicated psychotherapy missing data research (Fernandez, Salem, Swift, & Ramtahal, 2015; Karin, Dear, Heller, Crane, & Titov, 2018), missing data patterns were explored for evidence of systematic dropout and non-ignorable mechanisms of missing data. An exploration of the range of available variables (presented in more detail in Table 1) identified lesson completion as a single large predictor of missing data at post-

Table 2
OCD Course Content.

Lesson	Number of Weeks	Content	Homework Task
1	1	• Psychoeducation on OCD including the main symptom subtypes • Information on a basic CBT model of OCD introducing the concept of maladaptive thoughts and behaviors.	• Identification of the patient's dominant symptom subtype • Identification of common thoughts, physical symptoms, and maladaptive behaviours • Development of personalized 'model' of symptoms
2	2	• Psychoeducation on unhelpful thinking styles in OCD including: 1 Misinterpreting/trying to control obsessions; 2 Overestimating risk and responsibility 3 Aiming for certainty and perfection • Information on constructing behavioral experiments to address unhelpful thinking.	• Identification of the patient's unhelpful thinking style(s) • Construction of behavioural experiments to address these using common examples provided.
3	1	• Psychoeducation on physical over-arousal and under-arousal • Introduction of controlled breathing to tackle over-arousal and activity scheduling to tackle under-arousal	• Identification of over-arousal and/or under-arousal symptoms. • Practice controlled breathing and/or activity scheduling if relevant.
4	2	• Psychoeducation on maladaptive nature of compulsions and avoidance. • Psychoeducation on exposure and response prevention and habituation	• Identification of compulsions and avoidance behaviors. • Development of an exposure and response prevention 'step-ladder'. • Practice exposure and response prevention tasks.
5	2	• Psychoeducation on lapses and relapses and the development of relapse prevention plans	• Construction of a relapse prevention plan.

treatment (expβ(4/5) = 1.84; expβ(3/5) = 4.00; expβ(2/5) = 20.00; expβ(1/5) = 132.00, Wald's = 19.89, $p < 0.001$, Nagelkerke R Square = 56.8%). These outcomes imply that a MAR assumption would be suitable pending replacement of missing cases adjusted (stratified) by an individual's lesson completion (Karin, Dear, Heller, Crane et al., 2018; Little, Jorgensen, Lang, & Moore, 2014). The impact of missing cases was also explored through a sensitivity analyses, comparing the estimates of each outcome, with the MI procedure (considered as the primary analyses) and without the imputations (representing completer analyses). Each of the MI models included pooled estimates from ten imputations.

3. Results

3.1. Adherence and attrition

We examined differences between those who were randomized but did not go on to complete baseline assessment (n = 46) with those who did (n = 144) on key demographic and symptom severity characteristics. These analyses found there was a significant difference between the groups in terms of age ($(t_{(59.92)} = 2.81, p > .01)$ and baseline PHQ-9 scores ($t_{(188)} = 2.09, p = .04$), with those not going on to complete the baseline assessment being older ($M = 40.39$ vs $M = 33.69$), with higher PHQ-9 scores ($M = 10.89$ vs. $M = 9.08$). Similarly, we also compared those who did not commence the treatment in the ICBT group (n = 4) with those who did (n = 65) on key demographic and symptom severity characteristics. However, these analyses demonstrated that the two groups did not differ in terms of age, gender, baseline YBOCS scores, baseline PHQ-9 total, length of symptoms, or experience with past psychological treatment.

The mean number of lessons completed was 3.54 (SD = 1.56; range 1–5). Lesson completion rates for each lesson are outlined in Table 1. The mean number of logins to the platform for those who commenced the program was 9.78 (SD = 8.44; range = 1–37). Questionnaire response rates for each week for those who commenced the program were 65/65 (100%) for Week 1, 51/65 (78%) Week 2, 35/65 (54%) Week 3, 27/65 (42%) for Week 4, 39/65 (60%) for Week 5, 32/65 (49%) for Week 6, 26/65 (40%) for Week 7, and 19/65 (29%) for Week 8. Post-treatment questionnaires were collected from 44/65 (68%) and three-month follow-up questionnaires were collected from 34/65 (52%) of those who commenced treatment. When taking in to consideration all randomized participants post-treatment questionnaires were collected from 44/90 (49%) at post treatment and 35/90 (39%) at 3-month follow up.

3.2. Efficacy

Table 3 outlines the within-group and between-group comparison of clinical effects for both the total sample and completer sample on the YBOCS-SR, DOCS (Total), DOCS (Main), and PHQ-9. Table 4 outlines the estimated marginal means and effect sizes (Cohen's d) with 95% confidence interval for from the GEE analyses. Table 5 displays the means and effect sizes for the completer sample.

For the primary outcome measure, the YBOCS-SR, a statistically significant effect for Time, Group, and Group by Time interaction was found, indicating that a significant change from baseline occurred for both groups, but the treatment group experienced significantly greater rate of change than the control group. At post-treatment there was a significant difference between the two groups (29% reduction over the waitlist estimate; $d = 1.05$ and) with the ICBT group having significantly lower YBOCS-SR scores ($M = 15.42$) than the WLC group ($M = 21.61$). There was a significant reduction on the YBOCS-SR from pre-treatment to post-treatment (32% reduction in symptoms; $d = 1.25$) and from pre-treatment to three-month follow-up for the ICBT group (35% reduction in symptoms; $d = 1.23$). There was no significant difference from post-treatment to three-month follow-up for the ICBT group, indicating that participants maintained their gains across the follow-up period. There was also no significant change from pre-treatment to post-treatment on the YBOCS-SR for the WLC group (4% reduction in symptoms; $d = 0.15$).

Similar results were seen for the secondary OCD symptomatology outcome measure, the DOCS. We analyzed change for both the DOCS total score (DOCS Total) as well as the primary DOCS subscale (DOCS Main). On the DOCS (Total) a statistically significant effect for Time, Group, and Group by Time interaction was found. There was a significant difference between the two groups on the DOCS (Total) at post-treatment, with the ICBT group having significantly lower DOCS (Total) scores ($M = 20.11$) than the WLC group ($M = 31.11$) (22% reduction over the waitlist estimate; $d = 0.84$). There was also a significant reduction from pre-treatment to post-treatment for the ICBT group (28% reduction in symptoms; $d = 0.66$). The DOCS was not administered at follow-up. There was no significant reduction in symptoms on the DOCS

Table 3
Clinical Efficacy.

Symptom improvement rates within groups								Between groups effects	
	Pre-treatment to post-treatment			Pre-treatment to 3-month follow up		Post-treatment to 3-month follow up		GroupsΔ@Post-treatment	
	% improvement (95% CI)	*p*-value (β Time $_{pre\text{-}post}$)	*p*-value (β Time $_{pre\text{-}post}$ * Group)	% improvement (95% CI)	p-value (β Time $_{pre\text{-}3MFU}$)	% improvement (95% CI)	p-value (β Time $_{post\text{-}3MFU}$)	% change (95% CI)	p-value (β Time $_{pre\text{-}post}$)
Total Sample									
YBOCS-SR									
ICBT	32% (24%–39%)	0.014	< 0.001	35% (25%–45%)	< 0.001	−14% (−47% to 18%)	0.616	29% (19%–37%)	< 0.001
WLC	4% (−2% to 10%)	0.390	–	–	–	–	–		
PHQ-9									
ICBT	26% (8%–44%)	0.000	0.010	15% (−9% to 39%)	0.200	4% (−10% to 19%)	0.428	29% (9%–45%)	< 0.01
WLC	−5% (−17% to 8%)	0.131	–	–	–	–	–		
DOCS (Total)*									
ICBT	28% (17%–40%)	0.000	0.004	–	–	–	–	22% (7%–34%)	< 0.005
WLC	9% (−3% to 20%)	0.091	–	–	–	–	–		
DOCS (Main)									
ICBT	−31% (−22 to −41)	0.000	< 0.001	–	–		–	27% (15%–38%)	< 0.001
WLC	−6% (2 to −13)	0.114	–	–	–	–	–		
Completer Sample									
YBOCS-SR									
ICBT	31% (22%–39%)	0.000	< 0.001	29% (20%–38%)	< 0.001	−2% (−17% to 10%)	0.544	–	
WLC	3% (−3% to 9%)	0.228	–	–	–	–	–		
PHQ-9									
ICBT	33% (17%–45%)	0.000	< 0.001	16% (−1% to 30%)	0.039	−25% (−51% to −4%)	0.060	–	
WLC	−6% (−19% to 6%)	0.166	–	–	–	–	–		
DOCS (Total)*									
ICBT	31% (22%–41%)	0.000	0.000	–	–	–	–	–	
WLC	6% (−2% to 13%)	0.054	–	–	–	–	–		
DOCS (Main)									
ICBT	33% (23%–41%)	0.000	0.000	–	–	–	–	–	
WLC	4% (−3% to 11%)	0.118	–	–	–	–	–		

Note. YBOCS-SR: Yale-Brown Obsessive-Compulsive Scale (self-report version). DOCS (Total): Total score on the Dimensional Obsessive Compulsive Scale. DOCS (Main): Total score on the participant's main subscale on the Dimensional Obsessive Compulsive Scale. PHQ-9: Patient Health Questionnaire – 9 Item. * indication of significant baseline differences, as determined by a test of baseline* group means with $p < 0.05$.

Table 4
Effect Sizes (Cohen's d with 95% CI) for Total Sample.

Measures	Estimated Marginal Means (with 95%CI)			Within-group effect sizes			Between groups effects
	Pre	Post	Follow-up	Pre-treatment to post-treatment	Pre-treatment to 3 month follow up	Post-treatment to 3 month follow up	Post-treatment
YBOCS-SR							
ICBT	22.52 (21.34–23.71)	15.42 (13.67–17.17)	14.74 (12.49–16.99)	1.25 (1.08–1.42)	1.23 (0.79–1.68)	0.14 (−0.18 to 0.45)	1.05 (0.89–1.21)
WLC	22.44 (21.19–23.69)	21.61 (20.31–22.91)	–	0.15 (0.01–0.3)	–	–	
PHQ-9							
ICBT	11.12 (9.78–12.46)	8.24 (6.27–10.21)	9.43 (6.78 - 12.07)	0.53 (0.38–0.69)	0.42 (0.01–0.84)	−0.07 (−0.42 to 0.28)	0.58 (0.43–0.73)
WLC	10.89 (9.56–12.22)	11.43 (10.06–12.79)	–	−0.09 (−0.24 to 0.05)	–	–	
DOCS (Total)*							
ICBT	28.11 (24.98–31.23)	20.11 (16.97–23.24)	–	0.66 (0.5–0.81)	–	–	0.84 (0.69–1.00)
WLC	34.11 (30.85–7.37)	31.11 (27.2–35.02)	–	0.21 (0.07–0.35)	–	–	
DOCS (Main)							
ICBT	12.47 (11.55–13.39)	8.56 (7.39–9.73)	–	1.02 (0.86–1.18)	–	–	1.02 (0.86–1.17)
WLC	13.16 (12.35–13.97)	12.42 (11.43–13.4)	–	0.21 (0.06–0.35)	–	–	

* indication of significant baseline differences, as determined by a test of baseline* group means with $p < 0.05$.

(Total) from pre-treatment to post-treatment for the WLC group (6% reduction in symptoms; $d = 0.21$).

On the DOCS (Main) there was a statistically significant effect for Time, Group, and Group by Time interaction. There was a significant difference between the two groups at post-treatment, with the ICBT group having significantly lower DOCS (Main) scores ($M = 8.56$) than the WLC group ($M = 12.42$) (27% reduction over the waitlist estimate; $d = 1.02$). There was also a significant reduction on the DOCS (Main) from pre-treatment to post-treatment in the ICBT group ($d = 1.02$; 31% reduction in symptoms). There was no significant change in symptoms on the DOCS (Main) from pre-treatment to post-treatment for the WLC group (6% reduction in symptoms; $d = 0.21$).

On the PHQ-9 there was a statistically significant effect for Time, Group, and Group by Time interaction was found. There was a significant difference between the two groups at post-treatment with the ICBT group having significantly lower PHQ-9 scores ($M = 8.24$) than the WLC group ($M = 11.43$) (29% reduction over the waitlist estimate; $d = 0.58$). There was also a significant reduction from pre-treatment to post-treatment (35% reduction in symptoms; $d = 0.53$) and pre-treatment to three-month follow-up (15% reduction in symptoms; $d = 0.42$) on the PHQ-9 for the ICBT group. There was no significant difference between pre-treatment and post-treatment for the WLC group (5% increase in symptoms; $d = -0.09$).

3.3. Clinical significance

Using the Jacobson and Truax (1991) criteria 27% (18/65) (95% CI: 16%–42%) of the ICBT group met criteria for clinically significant change (compared with 1% (1/75) (95% CI: 0–9%) in the WLC group) at post-treatment. At three-month follow-up 38% (25/65) (95%CI: 24–55%) participants in the ICBT group met criteria for clinically significant change. Less than 1% (1/65) (95%CI: 0–1.5%) of participants in the ICBT group met criteria for reliable deterioration at post-treatment (compared with 5% (4/75) in the WLC group). At three-month follow-up 4% (3/65) (95%CI: 2%–9%) of participants in the ICBT group met criteria for reliable deterioration. There were no adverse events reported during the trial or follow-up period. Using the Farris et al. (2013) criteria 27% (18/65) (95% CI: 16%–42%) in the ICBT group met criteria for treatment response at post-treatment and 32% (21/65) (95% CI: 19%-50%) met this criteria at follow-up. For the WLC group 2% (2/75) (95%CI: 0%–11%) of participants met this criteria at post-treatment.

3.4. Treatment satisfaction

Satisfaction with the ICBT treatment was assessed at post-treatment only. Participants reported high levels of satisfaction with the materials

Table 5
Effect Sizes (Cohen's d with 95% CI) for Complete Case Analyses.

Measures	Estimated marginal Means (with 95%CI)			Within-group effect sizes			Between groups effects
	Pre	Post	Follow-up	Pre-treatment to post-treatment	Pre-treatment to 3 month follow up	Post-treatment to 3 month follow up	Post-treatment
YBOCS-SR							
ICBT	22.52 (21.37–23.74)	15.52 (13.7–17.59)	15.89 (13.93–18.14)	1.19 (0.78–1.61)	1.39 (1.22–1.57)	−0.04 (−0.38 to 0.31)	−0.98 (−1.39 to −0.57)
WLC	22.44 (21.23–23.72)	21.77 (20.52–23.10)	–	0.14 (−0.19 to 0.48)	–	–	
PHQ-9							
ICBT	11.12 (9.86–12.55)	7.48 (6.07–9.21)	9.36 (7.77–11.27)	0.63 (0.24–1.02)	0.29 (0.14 to 0.45)	−0.3 (-0.62 to 0.01)	−0.66 (−1.06 to −0.27)
WLC	10.89 (9.64–12.31)	11.53 (10.27–12.94)	–	−0.08 (−0.42 to 0.26)	–	–	
DOCS (Total)*							
ICBT	7.85 (6.75–9.13)	7.84 (6.63–9.27)	–	–	–	–	−0.98 (−1.39 to −0.57)
WLC	6.29 (5.15–7.68)	5.09 (4.08–6.35)	–	–	–	–	
DOCS (Main)							
ICBT	12.47 (11.58–3.42)	8.34 (7.31–9.52)	–	–	–	–	−1.15 (−1.57 to −0.73)
WLC	13.16 (12.38–14.00)	12.64 (11.79–13.56)	–	–	–	–	

* indication of significant baseline differences, as determined by a test of baseline* group means with $p < 0.05$.

with 36/44 (82%) reporting they were either *very satisfied* or *mostly satisfied*. Similarly, 36/44 (82%) of the participants who completed post-treatment questionnaires reported it was *worth their time doing the Course* and 42/44 (96%) of participants indicated that they would *recommend the Course to a friend with OCD*.

4. Discussion

The aim of this study was to conduct a preliminary investigation of the efficacy and acceptability of a self-guided ICBT program for obsessive-compulsive symptoms when compared to a WLC group. To our knowledge this is the first study to examine the acceptability and efficacy of self-guided ICBT for OCD symptoms using a randomized controlled design. Based on the previous literature it was expected that 1) participants in the ICBT group would demonstrate significant reductions in OCD symptomatology and report significantly lower symptoms than the WLC group at post-treatment; 2) the improvements observed among the ICBT group would be maintained from post-treatment to three-month follow-up; and 3) participants in the ICBT group would find the self-guided ICBT program to be acceptable. These hypotheses were supported in the current study and the results provide preliminary evidence to support the efficacy of self-guided ICBT for reducing OCD symptoms.

At post-treatment the ICBT group performed significantly better than the WLC group (with large between-group effect sizes) on measures of OCD symptomatology and 27% of participants in the ICBT group (compared with 1% of the WLC group) met conservative criteria for clinically significant change. These results are consistent with other controlled trials of clinician-guided ICBT for OCD, which have found that at post-treatment clinician-guided ICBT outperforms waitlist controls (Mahoney et al., 2014; Wootton et al., 2013) and attentional controls (Andersson et al., 2012). Previous ICBT and face-to-face interventions for OCD have previously found approximately one third to one half of participants meet conservative criteria for clinically significant change after treatment (Diefenbach et al., 2015; Wootton et al., 2013, 2014), which compares favorably to the results of the current study. It is important for future studies to replicate these findings. Such studies may wish to use an attentional control condition as a comparison, which would provide a stronger comparator than the WLC group used in the present study.

The large within-group effect sizes seen on the primary outcome measure (the YBOCS-SR) at post-treatment (d = 1.25) were maintained at three-month follow-up (d = 1.23) and there were no significant changes in OCD symptomatology from post-treatment to three-month follow-up in the ICBT condition indicating that participants maintained their treatment gains across the follow-up period. At follow-up there continued to be a significant reduction in OCD symptoms and 38% of participants met conservative criteria for clinically significant change. This finding is consistent with other self-guided ICBT studies for OCD which have demonstrated that improvements in symptoms are durable across the short-term (Wootton et al., 2014) and long term (i.e., 12 month follow-up) (Wootton et al., 2015).

Participants also reported high levels of acceptability with the ICBT program despite their being no clinician contact involved in the program. A large proportion of participants who completed the program (36/44; 82%) indicated that they were either *'satisfied'* or *'very satisfied'* with the program, and a large number of participants (42/44; 96%) indicated that they would recommend the program to a friend if they had OCD symptoms. These acceptability ratings are consistent with previous self-guided ICBT trials, which found 80–88% of participants were *'satisfied'* or *'very satisfied'* and 80–100% of participants recommending the program to a friend (Wootton et al., 2014). They also compare favorably with previous guided ICBT treatments for OCD symptoms, which found 70% of participants were *'satisfied'* or *'very satisfied'* with the Course (Wootton et al., 2013). It is important to note, however, that only 40% (26/65) of participants completed all the treatment modules in this trial and only 63% (41/65) of participants reached the ERP stage of the intervention. While this rate of completion is less than other guided ICBT for OCD interventions (Andersson et al., 2012; Mahoney et al., 2014) it is consistent with other self-guided ICBT interventions for OCD symptoms (Wootton et al., 2014). As outlined by Mohr et al. (2011), this may be related to a lack of supportive accountability and it is important to examine this in future trials, which may compare satisfaction and completion rates across guided and self-guided interventions.

It is important to note that the baseline characteristics of this sample are generally similar to other large randomized controlled trials of guided ICBT for OCD. For example, the mean age of participants in the current study was 34 years, which is consistent with the wider literature where most participants have a mean age in their 30 s (Andersson et al., 2012; Mahoney et al., 2014; Wootton et al., 2013). Similarly, the sample was predominantly female, which is also seen across the wider literature (Andersson et al., 2012; Mahoney et al., 2014; Wootton et al., 2013). Participants had on average a score that was in the 'moderate' range of symptoms on the YBOCS and individuals have experienced OCD symptoms for around 18 years. This is again consistent with the wider ICBT for OCD literature (Andersson et al., 2012).

Taken together the findings of the present study provide preliminary evidence to indicate that self-guided ICBT may significantly reduce OCD symptoms for some individuals. Self-guided ICBT interventions are relatively cost-effective, taking very little clinician time, and may improve symptoms significantly in up to half the sample completing the treatment. However, while this intervention was largely automated, a clinician was still minimally involved in terms of assessing applications and providing emails on outcomes, and thus it was not entirely automated. Previous research has outlined the importance of automated prompts and reminders in the delivery of ICBT interventions (Titov et al., 2013), and it is likely that the inclusion of such in the current trial contributed to overall positive outcomes. Similarly, the intervention had a clear end date which may motivate clients to work through the intervention faster than they ordinarily would. This may also have contributed to the overall positive outcomes.

Patient safety is an important consideration when examining the efficacy of self-guided interventions. In the current study there were low levels of deterioration in the ICBT group (i.e., 1% at post treatment), which was less than that seen in the WLC group (i.e., 5% at post-treatment). These results are consistent with a recent systematic review of symptom deterioration in ICBT interventions, which found symptom worsening in 0–5% of treatment groups and 2–9% of comparison groups (Arnberg, Linton, Hultcrantz, Heintz, & Jonsson, 2014). While the issue of patient safety requires further investigation in future studies, the results of the current study provide preliminary evidence to support the safety of self-guided ICBT interventions for patients with OCD symptoms.

While the results of this study are promising and provide preliminary evidence of the efficacy of ICBT for OCD symptoms when delivered in a self-guided format there are a number of important limitations to this study. First, while participants in the study reported elevated symptoms of OCD, a diagnostic interview was not administered prior to treatment, and thus results may not generalize to individuals with diagnosed OCD. While the omission of the diagnostic interview reduces the generalizability of the findings to those with diagnosed OCD, it does ensure that the results of the intervention are a true reflection of the treatment content, as previous studies have found the use of a pre-treatment diagnostic interviews can enhance the clinical efficacy of the program (Boettcher et al., 2012). Additionally, given that self-guided ICBT is the lowest intensity intervention option the omission of the diagnostic interview reduces costs, making self-guided ICBT a possible first step in a stepped-care model for OCD. Finally, the omission of a diagnostic interview enhances the dissemination potential of the intervention, and is consistent with the principles of first-line interventions in stepped-care models of care (Bower & Gilbody, 2005).

Secondly, participants completed baseline measures after they were randomized to either the treatment or control group, and thus there is a risk that the baseline outcomes may have been biased. The randomization process was also not blinded, as the clinician involved in assessing applications was the same clinician involved in allocating participants to groups. In this study we also opted to conduct multiple imputation procedures rather than intention-to-treat analyses, and thus it is possible that the controlled effect of ICBT may be confounded. However, there were no significant baseline differences between the groups on baseline characteristics, thus there is reason to suggest the results are robust. Furthermore, the study relied on self-report questionnaires, rather than clinician-administered measures, and these may be subject to bias. It is important for future studies investigating self-guided ICBT for OCD to conduct diagnostic interviews during assessment to ensure that participants meet criteria for OCD. It would also be beneficial to utilize clinician-administered measures to enhance the evidence supporting self-guided ICBT for OCD.

Thirdly, this was a treatment seeking sample who were willing to try a self-guided ICBT intervention, and not all individuals with OCD symptoms may be willing to utilize such services. For this reason the results of the current study may not generalize to the wider population of individuals with OCD symptoms or individuals unwilling to try self-guided ICBT. An investigation of self-guided ICBT for OCD clients in routine practice will help to elucidate whether the results seen in this study translate to individuals seeking care through more traditional treatment services.

Fourthly, treatment outside of the ICBT protocol was not monitored and it is possible that benefits experienced by individuals in the ICBT condition may be related to other treatments that the participants were undertaking during the active treatment or follow-up period. Similarly, adherence to the intervention components through homework tasks also was not monitored, and thus it is not clear if those who benefitted from the program did so because of the information provided within the intervention, or some other reason. While concurrent treatments and treatment adherence within the program should be monitored in future studies the use of an active control group, such as an attentional control or comparison intervention, rather than an inactive control group, as used in the current study, would also be advantageous as the field progresses.

Finally, approximately one-quarter of participants did not progress on to assessment and/or treatment after randomization and outcomes were only analyzed for those who completed the baseline questionnaires and commenced some aspect of the treatment. While the high rate of attrition may be due to any number of factors (e.g., participant time constraints, low expectation for success, participant motivation), those who did not progress on to commence the program tended to be older and have higher PHQ-9 scores than those who did progress on to treatment. It is possible that having some clinician contact at the front-end of the intervention may help to enhance supportive accountability and thus reduce this attrition rate. This is something that warrants examination in future research. Further study regarding the acceptability of purely self-guided interventions for individuals with OCD symptoms would also be welcomed.

Similarly, despite concerted efforts to obtain data from all participants at all time-points there were a meaningful number of participants who did not provide data at post-treatment (i.e., 21/65; 32% of included participants and 46/90; 51% of randomized participants) and three-month follow-up (i.e., 31/65; 48% of included participants and 55/90; 61% of randomized participants), and the overall results of the present study may have been different if those outcomes were obtained. Future studies would benefit from using strategies to enhance participant retention such as participant reimbursement for major follow up periods to ensure more precise estimates of outcomes and to have a more complete understanding of the acceptability of self-guided ICBT for OCD symptoms. Nevertheless, missing data was addressed in the current study using the best-practice Multiple Imputation methodology, providing some confidence in the reported results.

While this study provides preliminary evidence to support the acceptability and efficacy of self-guided ICBT for OCD symptoms replication of these results by other research groups is encouraged. There are also a number of research questions that remain unanswered in this field. Future research which focuses on the mediators and moderators of treatment outcome may help to ascertain who responds best to self-guided ICBT interventions and this information will help to inform the targeted offering of self-guided ICBT and other types of treatment within stepped-care models of care. Future research into the reasons why participants with OCD symptoms choose to have their symptoms treated via the internet rather than in face-to-face treatment is also important. This will also help to inform stepped care models of treatment as it is possible that those who complete ICBT for OCD may be unwilling to partake in face-to-face treatment regardless of their treatment needs, indicating that ICBT may be only an alternative treatment for patients, rather than a lower intensity step in a stepped-care model.

In summary, the current study suggests self-guided ICBT may be an effective and acceptable form of treatment for some individuals with obsessive-compulsive symptoms. The ICBT group demonstrated moderate-large within-group effect sizes and moderate-large between group effect sizes on measures of OCD symptomatology. The study indicates that approximately one-third to one half of patients can benefit significantly from a self-guided low intensity intervention. Future research on the mediators and moderators of outcome and understanding the reasons why patients choose to complete online treatment over face-to-face treatment will help to develop research informed stepped-care models of OCD.

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