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The effectiveness of internet cognitive behaviour therapy (iCBT) for social anxiety disorder across two routine practice pathways

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ABSTRACT

Social anxiety disorder (SAD) is a common, chronic and disabling mental disorder. Cognitive Behaviour Therapy (CBT) is a highly effective treatment of SAD and internet CBT (iCBT) offers a cost-effective and convenient alternative to face to face approaches, with high fidelity and demonstrated efficacy. The aim of the current paper was to evaluate the effectiveness of an iCBT programme for SAD (The This Way Up Clinic Shyness Programme) when delivered in routine practice through two different pathways. Patients in the prescription pathway (Study 1, N = 368, 50% female, mean age = 34) were 'prescribed' the Shyness Programme by a registered practitioner of the This Way Up Clinic who supervised their progress throughout the programme. Patients in the referral pathway (Study 2, N = 192, 50% female, mean age = 36) were referred to the This Way Up Clinic and supervised by a specialist CBT clinician at the clinic. Intention-to-treat marginal model analyses demonstrated significant reductions in primary outcomes of social anxiety symptoms (Mini-SPIN) and psychological distress (K10), corresponding to large effect sizes (Cohen's d = .82–1.09, 95% CIs .59–1.31) and secondary outcomes of impairment (WHODAS-II) and depressive symptoms (PHQ9), corresponding to small effect sizes (Cohen's d = .36–.46, 95% CIs .19–.68) for patients in both pathways. Results provide evidence of the effectiveness of iCBT for social anxiety disorder when delivered in routine practice.

1. Introduction

Social anxiety disorder (SAD), characterized by an excessive fear of negative evaluation or judgement (American Psychiatric Association, 2013), is one of the most common mental disorders with lifetime prevalence rates estimated at 12.1% (Kessler et al., 2005). SAD is characterized by an early onset and chronic course, and is associated with significant distress and impairment (American Psychiatric Association, 2013). Moreover, a majority of individuals with SAD also experience comorbid mental health concerns such as depression, which is associated with increased distress, impairment and risk of suicide (Ruscio et al., 2008). Cognitive Behavioural Therapy (CBT) has shown to be highly effective in the treatment of SAD and is recommended as a first line treatment of choice in clinical guidelines (Pilling et al., 2013). Meta-analyses of CBT for SAD report controlled medium to large effect sizes of Cohen's d = 0.70–0.86 (Acarturk et al., 2009; Powers et al., 2008). Although effective treatments exist, less than half of sufferers seek treatment (Crome et al., 2014; Gross et al., 2005; Issakidis and Andrews, 2002). An even smaller proportion (about 24%) receives minimally adequate treatment (Issakidis and Andrews, 2002). Access to treatment is further reduced amongst individuals in rural areas, in individuals with low income, in ethnic minorities, and in individuals over 60 years of age (Wang et al., 2005).

One cost-effective and pragmatic means of increasing the quality of treatment available and the reach to under-serviced populations is through the use of internet-based cognitive behavioural therapy (iCBT) programmes. Internet-based treatment affords many benefits over the traditional face-to-face modality, such as high fidelity, greater accessibility, convenience, and reduced cost to patients (Andersson and Cuijpers, 2009). In addition, internet-based interventions may have specific advantages for patients with SAD when considering the specific fears that characterize the disorder (e.g., fear of revealing information or interacting directly with a therapist). Several international research groups have been instrumental in the development and evaluation of iCBT for social anxiety (Andersson et al., 2006; Berger et al., 2009; Titov et al., 2008c) and randomized controlled trials document the efficacy of these (and similar) programmes for SAD (see Andersson et al., 2014). In a review of 21 studies (N = 1801) of both guided and unguided iCBT, large within-group effect sizes and

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superiority over both waitlist and active control comparators were reported (Boettcher et al., 2013). Treatment gains have been maintained when measured from 3 months to 5 years post-treatment with mean pre-to-follow-up medium to large effect sizes (d = .64–1.67) (Hedman et al., 2011b). Evidence also suggests that iCBT can produce comparable effect sizes to best-practice face-to-face CBT (Andrews et al., 2011; Hedman et al., 2011a).

The next step is to move beyond evaluations of feasibility and efficacy to demonstrate that iCBT for SAD can be effectively delivered in routine healthcare settings. Initial evaluation data supports the effectiveness of iCBT when incorporated into routine practice (Andersson and Hedman, 2013; Hedman et al., 2013, 2014; Mewton et al., 2012; Newby et al., 2014; Williams and Andrews, 2013). To add to the body of effectiveness literature, in the current studies we investigated outcomes of our iCBT programme for SAD when delivered to patients in routine practice via two separate pathways: when supervised by primary care practitioners in the community and when supervised by specialist clinicians.[1] In both pathways, patients were treated as part of routine clinical care and a clinical audit was conducted to determine outcomes in these patients. In the first pathway, patients who presented to primary care clinicians (e.g., doctor or psychologist) who were existing users of our online service were directly prescribed the SAD iCBT course and supervised by their primary care clinician. In the second pathway, patients were referred for assessment and treatment by their primary care clinician, and supervised by a clinician based at our university hospital clinic, where we have been using iCBT as part of routine care for several years (see the Method section below for additional details). We predicted significant reductions in core symptoms of social anxiety, psychological distress, disability and comorbid depressive symptoms when iCBT was delivered in both treatment pathways.

2. Method

2.1. Prescription and referral pathways

Patients in the prescription pathway (Study 1) were 'prescribed' the Shyness Programme by a registered practitioner of the This Way Up Clinic of the Clinical Research Unit for Anxiety and Depression (CRUfAD). Registered practitioners included the patient's doctor (general practitioner, psychiatrist, or primary health care physician), psychologist, or other mental or allied health professional. Registered practitioners were located across all of Australia. Practitioners could prescribe the SAD iCBT course to any patient they deemed would benefit from the program. The prescribing practitioner assessed the patient and supervised them through the program. Supervision refers to retention of clinical responsibility as users of the service agree to take responsibility for a patient and to monitor the patient's progress throughout the program. The clinician who retains clinical responsibility is also the contact point for the patient should they have any difficulties as they progress through the course. Data for Study 1 were extracted for patients with a prescription for the Shyness Programme from September 2010 to February 2014.

Patients in the referral pathway (Study 2) were referred to the This Way Up Clinic by either the traditional referral pathway or the online referral pathway. In the traditional referral pathway all patients were referred for a face-to-face assessment by a senior psychiatrist at the Anxiety Disorders Clinic (ADC) of CRUfAD. If iCBT was deemed to be appropriate for the patient (i.e., the patient was not suicidal, not suffering from substance abuse, or psychosis) they were allocated to an ADC clinician who supervised their progress throughout the programme. In the online referral pathway, all patients were referred from registered practitioners of the This Way Up Clinic to be supervised by an ADC clinician. The same ADC clinicians were available for supervision of patients from both referral pathways. The ADC clinician took clinical responsibility for the patient's progress throughout the programme. Upon completion, patients were 'discharged' back to the referring practitioner. Data for Study 2 were extracted for patients with a referral for the Shyness Programme from October 2010 to April 2014.

2.2. Ethics statement

Prior to enrolment in the programme, all individuals were informed that data would be collected and used as per the following: "*By participating in This Way Up clinic, you acknowledge that your data will be pooled, analysed and periodically published in scientific articles to enhance scientific knowledge in anxiety and depression. In any publication, information will be provided in such a way that you cannot be identified*". Patients could opt out of the use of their data for these purposes via email. All patients provided electronic informed consent that their pooled data could be used for these purposes.

2.3. The Shyness Programme

The core components of the Shyness Programme have been described in detail previously (Titov et al., 2008c) and the programme has been evaluated in a number of trials (Aydos et al., 2009; Titov et al., 2008a,b,c). The Shyness Programme was further developed for delivery in routine practice so that a patient could not advance to the subsequent lesson without first completing the preceding lesson, downloading the associated homework components, and then waiting for 5 days (to ensure sufficient time to review materials and complete homework tasks). All patients had 90 days to complete the programme and were encouraged to progress through each lesson at a pace of 1 lesson every 1–2 weeks. Patient progress was tracked automatically through the This Way Up Clinic software system. The programme consisted of six online lessons representing best practice CBT as well as regular homework assignments and access to supplementary resources (e.g., assertiveness, self-esteem, conversation skills, public speaking, and managing mood). Each lesson was designed using a cartoon narrative and course components included: psycho-education, graded exposure, cognitive restructuring, and relapse prevention.

In both pathways, prescribing and referring practitioners were advised that patients are unlikely to benefit if they have very severe depression, persistent suicidal thoughts, drug or alcohol dependence, schizophrenia, bipolar disorder, or were taking atypical antipsychotics or benzodiazepines. In both pathways, the supervising practitioner received automatic updates via email regarding each patient's progress. The supervising practitioner also received an email alert if a patient's scores on the Kessler-10 (K10) Psychological Distress Scale indicated elevated distress. Practitioners are encouraged to make direct contact with the patient (preferably via telephone) in response to receiving a high distress alert and to conduct a risk assessment if clinically indicated.

2.4. Measures

2.4.1. Mini-Social Phobia Inventory (Mini-SPIN; Connor et al., 2001)

The Mini-SPIN is a 3-item screening measure for social anxiety that includes questions about avoidance and fear of embarrassment. Each item is rated using a 5-point scale, ranging from 0 (not at all) to 4 (extremely). Receiver operating characteristic analysis revealed that using a cut-off score of 6 or greater demonstrates excellent sensitivity, specificity, as well as positive and negative predictive values (Seeley-Wait et al., 2009). The MINI-Spin correlates with change scores for other

[1] The Clinical Research Unit for Anxiety and Depression (CRUfAD), a not-for-profit joint initiative of the University of New South Wales and St. Vincent's Hospital, in Sydney, Australia operates an internet-based clinical service known as This Way Up Clinic (https://thiswayup.org.au/clinic/). We provide iCBT programmes for anxiety disorders and depression for patients to access under the supervision of a registered practitioner of the service (see Andrews and Williams, in press for details on this clinical service).

validated measures of social anxiety and demonstrates comparable sensitivity to cognitive-behavioural treatment effects across measures, therefore is indicated in treatment outcome studies that require minimal assessment (Seeley-Wait et al., 2009).

2.4.2. Kessler-10 (K10) psychological distress scale (Kessler et al., 2002)

The K10 consists of 10 items ranked on a 5-point scale designed to measure non-specific psychological distress. The K10 is completed prior to each lesson as a means of tracking patient distress. If a patient endorses K10 scores in the severe range (>30), an automatic alert is emailed to the prescribing clinician. The K10 possesses strong psychometric properties (Andrews and Slade, 2001; Kessler et al., 2002; Sunderland et al., 2012).

2.4.3. World Health Organization disability assessment schedule-II (WHODAS-II)

The WHODAS-II contains 12 items designed to measure disability and activity limitation in the past 30 days in a variety of domains: 1) understanding and communicating, 2) self-care, 3) mobility, 4) interpersonal relationships, 5) work and household roles, and 6) community roles. Each of these domains loads significantly onto one underlying latent factor of global disability (Andrews et al., 2009). The WHODAS-II demonstrates strong psychometric properties (Federici et al., 2009).

2.4.4. Patient health questionnaire (PHQ-9; (Kroenke et al., 2001))

The PHQ-9 is a self-report questionnaire corresponding to the DSM-IV criteria for major depressive disorder. Each item is rated in frequency on a 4-point scale (0 = not at all, 3 = nearly every day). Total scores range from 0 to 27 with higher scores reflecting higher levels of psychopathology. A PHQ-9 score of ≥10 is used as a clinical cut-off for probable DSM-IV diagnosis of MDD (Zuithoff et al., 2010).

2.4.5. Treatment outcomes questionnaire

Patients rated their satisfaction with the programme: *Overall, how satisfied are you with your treatment?* (1 = very dissatisfied to 5 = very satisfied) and *How confident would you be recommending the programme to a friend with social anxiety?* (1 = not at all confident to 10 = extremely confident).

2.5. Statistical analyses

Intent-to-treat (ITT) marginal model analyses were used to measure the change in outcome measures across time in the full sample (including drop-outs and non-completers). This method is appropriate for pre-post only designs (Salim et al., 2008). Effects were modelled using the restricted maximum likelihood (REML) model estimation method. Patients were classified into three groups based on the number of lessons completed. Patients who completed all six lessons are referred to as 'completers'. Non-completers were separated into two groups based on evidence that the treatment dose curve for our iCBT programmes peaks at Lesson 4 (Sunderland et al., 2012), therefore patients who completed 4–5 lessons are referred to as 'non-completers' and patients who completed between 1 and 3 lessons are referred to as 'drop-outs'. Baseline data was collected at the time a patient accessed Lesson 1 of the programme and post data was collected at the time a patient accessed Lesson 6 of the programme.

For secondary analyses based on completion status, ANOVA and χ^2 were conducted. The groups were compared on a range of variables including: age, gender, clinician's profession, rurality (yes, no), and baseline mean scores on the outcome measures. Conservative Cohen's *d* within-group effect sizes were computed based on the following formula: $d = t^*SQRT [[2(l–r)/n]]$. All analyses were conducted using SPSS version 22.

3. Study 1 results: the prescription pathway

3.1. Sample characteristics

After removal of 35 patients who did not commence the programme and 12 patients with missing baseline data, the final sample included 368 patients (50% female) with a mean age of 33.75 years (SD = 13.39). Mean social anxiety scores on the Mini-SPIN were 8.56 (SD = 2.58) and the majority (86%, n = 317) met probable diagnostic threshold criteria (MINI-SPIN ≥ 6) at intake. The profession of the prescribing clinician was as follows: 38% (n = 139) GP, 36% (n = 132) psychologist, 18% (n = 65) medical specialist, 7% (n = 27) 'other' allied health professional, and 1% (n = 5) nurse. The majority (68%, n = 249) of prescribing clinicians were registered as practising in an urban location.

3.2. Adherence and attrition

Regarding programme adherence, 52% of patients (n = 191) completed all 6 lessons of the programme (completers), 23% (n = 84) completed 4 or 5 lessons (non-completers), and 25% (n = 93) completed between 1 and 3 lessons (drop-outs). Programme completion (coded as a binary outcome 0 = completed 1–5 lessons, 1 = completion of all 6 lessons) was unrelated to a number of variables, including patient gender, the profession of the prescriber and whether the patient lived in a rural area or not, all p's > .05. Programme completion did, however, vary as a function of age, F (2, 365) = 12.92, p < .001, η^2 = .06. Bonferroni adjusted post-hoc comparisons revealed that completers were significantly older (M = 36.81, SD = 14.21) than non-completers (M = 32.46, SD = 13.07) and drop-outs (M = 28.63, SD = 9.85), p < .001. Age did not differ significantly between the non-completers and drop-outs, p = .15. In order to gain a better understanding of variables related to treatment drop-out, patients' baseline scores on the primary measures were also compared. There were no differences between scores on the Mini-SPIN, WHODAS-II, or PHQ9 based on completion status, all Fs <3, all ps > .05. There was a difference for K10 scores, F (2, 365) = 3.98, p < .05, η^2 = .02. Post-hoc comparisons indicated higher mean baseline scores in non-completers (28.44, SD = 6.74) relative to completers (26.05, SD = 7.57), p = .04. K10 scores did not systematically differ relative to drop-outs (27.89, SD = 6.91). These variables were also entered as predictors in a multivariate logistic regression model predicting completion status (0 = completed <6 lessons, 1 = completed 6 lessons). The only significant predictor was age (p < .01), indicating that each additional year in age was associated with a 1.03 increase in the likelihood of completing all 6 lessons.[2]

3.3. Change in outcome measures

Separate marginal model analyses with an unstructured covariance structure were conducted in the full sample. There were main effects of time for the Mini-SPIN, F (1, 203.27) = 229.61, p < .001, and K10 scores, F (1, 232.31) = 232.31, p < .001, indicating significant reductions corresponding to large effect sizes (see Table 1). There were also significant main effects of time for the secondary measures of disability (WHODAS-II), F (1, 197.84) = 115.45, p < .001 and depressive symptoms (PHQ9[3]), F (1, 96.72) = 60.02, p < .001, corresponding to small effect sizes.

3.4. Treatment satisfaction

The mean score for overall treatment satisfaction (collected for completers only) was 3.86 (range 1 = 5; SD = .94). The mean rating of

[2] Age has been identified as a predictor of adherence in the This Way Up iCBT programme for depression, GAD, and mixed depression and anxiety.

[3] Data for the PHQ9 was available for 182 patients who commenced the Shyness Programme after March, 2012.

Table 1
Estimated marginal means (standard errors) and within-group effect sizes (Cohen's *d*).

Group	Lesson 1		Lesson 6					
Study 1 prescription pathway	M	(SE)	M	(SE)	*t* (df)	*r* (for within-group ES)	Effect size Cohen's *d**	(95% CI)
Mini-SPIN	8.56	(.13)	5.70	(.20)	15.10** (1, 204.03)	.54	.99	.82–1.15
K10	26.98	(.37)	20.34	(.50)	15.11** (1, 218.16)	.66	.85	.68–1.01
WHODAS	28.08	(.41)	24.22	(.50)	10.68** (1, 201.47)	.81	.45	.28–.61
PHQ9	11.20	(.47)	7.86	(.54)	7.74** (1, 96.72)	.77	.36	.19–.52
Study 2 referral pathway	M	(SE)	M	(SE)	*t* (df)	*r* (for within-group ES)	Effect size Cohen's *d**	(95% CI)
Mini-SPIN	8.36	(.18)	5.77	(.24)	10.75** (1, 129.38)	.48	1.09	.86–1.31
K10	24.83	(.51)	19.17	(.63)	10.06** (1, 129.34)	.60	.82	.59–1.04
WHODAS	25.75	(.53)	22.55	(.62)	6.03** (1, 127.90)	.66	.46	.23–.68
PHQ9	9.52	(.43)	7.18	(.51)	5.09** (1, 101.85)	.66	.42	.13–.71

Note. Mini-SPIN = Mini Social Phobia Inventory; K10 = Kessler Distress Scale — 10 items; WHODAS = World Health Organization Disability Assessment Schedule-II; PHQ9 = Patient Health Questionnaire — 9 item; *r* = Pearson correlation between Lesson 1 & Lesson 6 scores; **$p < .001$.

confidence in recommending the programme to a friend with social anxiety was 8.09 (range 1–10; *SD* = 2.03).

4. Study 2 results: the referral pathway

4.1. Sample characteristics

After removal of 16 patients who did not commence the programme and 13 patients with missing baseline data, the final sample included 192 patients (50% female, n = 96) with a mean age of 35.58 (*SD* = 12.05). The mean social anxiety score on the Mini-SPIN was 8.36 (*SD* = 2.58) and the majority (85%, n = 163) met probable diagnostic threshold criteria (MINI-SPIN ≥ 6) at intake. The majority of patients (70%, n = 135) presented via the traditional referral pathway. The remainder were referrals from registered This Way Up practitioners across Australia (27%, n = 52) and from a participating health fund (3%, n = 5). The profession of the supervising clinician was as follows: 70% (n = 135) clinical psychologist, 24% (n = 46) psychiatry registrar, and 6% (n = 11) intern clinical psychologist. All referring clinicians were registered as practising in an urban location.

4.2. Adherence and attrition

Regarding programme adherence, 59% of patients (n = 113) completed all 6 lessons of the programme (completers), 28% (n = 54) completed 4 or 5 lessons (non-completers), and 13% (n = 25) completed between 1 and 3 lessons (drop-outs). The mean number of lessons completed was 5.12 (*SD* = 1.30). Programme completion was unrelated to patient gender, χ^2 (1) = .19, $p > .05$ and the profession of the supervising clinician, χ^2 (3) = 1.81, $p > .05$. Contrary to the results in Study 1, programme completion did not vary as a function of age, F (2, 189) = .22 $p > .05$. There were also no differences in baseline scores on the Mini-SPIN, K10, or WHODAS-II based on completion status, all $Fs < 2$, all $ps > .05$.

4.3. Change in outcome measures

Separate marginal model analyses with an unstructured covariance structure were conducted in the full sample. There were main effects of time for the Mini-SPIN, F (1, 129.38) = 115.66, $p < .001$, and K10 scores, F (1, 129.34) = 101.37, $p < .001$, indicating significant reductions corresponding to large effects sizes (see Table 1). There were also main effects of time for the secondary measures of disability (WHODAS-II), F (1, 127.90) = 36.42, $p < .001$, and depressive symptoms (PHQ9), F (1, 101.85) = 25.91, $p < .001$, corresponding to small effect sizes.

4.4. Treatment satisfaction

The mean score for overall treatment satisfaction was 3.99 (range 1–5; *SD* = .75) and for confidence in recommending the programme to a friend with social anxiety was 8.35 (range 1–10; *SD* = 1.79).

5. Discussion and conclusions

The current study provides evidence of the effectiveness of an internet-based CBT (iCBT) programme for Social Anxiety Disorder when delivered in routine practice via two separate care pathways. Intention-to-treat analyses demonstrated that the Shyness Programme is effective in reducing social anxiety symptoms, distress, impairment, and depressive symptoms when delivered in routine practice. Symptom reduction corresponded to small to large effect sizes, irrespective of whether clinical guidance was provided by general practitioners or specialty-trained CBT clinicians. These results complement initial findings of the transferability of iCBT effects from controlled trials and provide encouraging support for the integration of iCBT for social anxiety in routine care. Programme adherence in the current investigation (52% in the prescription pathway; 59% in the referral pathway) was consistent with average completion rates for our depression — 55% (Williams and Andrews, 2013), GAD — 55% (Mewton et al., 2012) and transdiagnostic — 47% (Newby et al., 2014) iCBT programmes when delivered in routine care. Although this rate aligns with median completion rates (56%) reported in a meta-analysis of computerised CBT (Waller and Gilbody, 2010), identifying moderators of adherence should be a focus of future research in order to improve uptake of the full treatment package. Our research group has previously demonstrated that much of the therapeutic benefit (as indexed by psychological distress — K10 scores) is achieved by completion of Lesson 4 of our iCBT programmes (see Sunderland et al., 2012). However, as relapse prevention is presented in the final Lesson (and is arguably a core component of CBT), we would encourage adherence to the full programme to ensure exposure to all active treatment ingredients.

The current findings should be considered in light of the limitations of the naturalistic design. Data were collected to ensure ongoing quality assurance and therefore measures were limited to validated questionnaires that imposed minimal response burden on the patient while facilitating interpretation on the part of the supervising practitioner. The Mini-SPIN was designed to screen for individuals with social anxiety disorder in primary care, psychiatric, and other medical settings where brevity in assessment is crucial. Although brief, the Mini-SPIN does demonstrate sensitivity to treatment effects and correlates well with more comprehensive social anxiety measures (Seeley-Wait et al., 2009). Further, the Mini-SPIN has demonstrated good discriminant validity to distinguish individuals with SAD from those without SAD, covering avoidance of speaking or performing activities (Connor et al., 2001).

In the absence of a structured diagnostic assessment, we cannot be assured that all patients met full diagnostic criteria for social anxiety disorder. However recent evidence from our research group suggests that outcomes following iCBT are similar whether patients are assessed by a specialist psychiatrist or are screened for suitability based on an automated questionnaire battery (Mason and Andrews, in press).

As data were collected in the context of routine clinical practice and there was no comparison group, the effects of natural remission or placebo response over the programme access period (typically 3 months) cannot be separated from response to the specific treatment. Further, we did not assess outcomes beyond the treatment period, therefore it is unknown whether gains were maintained over time. It is also important to note that we did not collect information on medication use. It is possible that a proportion of patients would have also been prescribed medication; however clinical guidelines (e.g., NICE, 2013) only recommend pharmacological interventions after non-response to recommended psychological therapies. Effectiveness research is aimed at evaluating the feasibility, acceptability, and effectiveness of treatments in environments where most patients will be treated (Roy-Byrne et al., 2003). We are confident that the current results reflect routine practice of one form of iCBT delivery currently operating in Australia. Future research should explore the feasibility of delivering iCBT in a range of health care settings to maximize uptake by individuals who may be particularly resistant to traditional treatment options.

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