The efficacy of Internet-supported intervention for social anxiety disorder: A brief meta-analytic review

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Abstract

The purpose of this article is to critically review the new generation of Internet-supported interventions and to investigate their efficacy in reducing social anxiety symptoms. Included studies were identified through a computer search in PsychInfo and PubMed databases for English language articles. Finally, eight studies met our inclusion criteria. It seems that Internet-supported interventions are effective in reducing social anxiety (d=0.86), and modestly effective in improving the quality of life (d=0.53), and comorbid anxiety and depression (d=0.40). Using the Internet technology in psychotherapy appears to be a promising way to bridge distances and remotely offer validated interventions for anxiety sufferers.

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Keywords: social phobia, social anxiety disorder, Internet-supported interventions, comorbid anxiety and depression, life quality

1. Introduction

Social phobia, also known as social anxiety disorder (SAD), represents "a persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others" accompanied by a tendency to avoid feared stimuli (DSM-IV, 1994). For socially anxious individuals, one of the main concerns is the fear of being looked at and negatively evaluated by others due to the manifest anxiety symptoms, self-perceived inadequate appearance or social behaviors. It is the third most common psychiatric disorder, with a life-time prevalence of about 13% in the general population (Rao, Beidel, Turner et al., 2007). Once developed, SAD tends to become chronic and does not remit without treatment (Khalid-Khan, Santibanez, McMicken, & Rynn, 2007). If left untreated, beyond its own symptoms and impairments, SAD renders the sufferers with vulnerable spots for the development of additional disorders in later life.

In the present article, we question the efficacy of Internet-supported interventions for this clinical condition. Before starting to investigate the above mention issue, we wondered whether socially anxious individuals find cyberspace an appealing environment for both communication and information gathering. The cognitive-behavioral models of social anxiety (Clark & Wells, 1995, Clark, 2001) asserts that socially phobic individuals develop excessively high standards for social performance, while holding unconditional negative beliefs about the self (ex: “I’m boring/odd.”). Therefore, despite their need for social contact, they tend to avoid both social and performance situations. However, communicating with others on-line may allow them to avoid aspects of social situations they fear (i.e. shaking, blushing, not coming up with a prompt reply etc.) while at the same time contributing to social
connectedness. Starting from the idea that cyberspace may be a surrogate environment for socially anxious individuals Shepherd and Edelmann (2005) found a positive relationship between social phobia and Internet use. Being less intimidated by the virtual interactions due to the anonymity provided by the Internet, socially anxious individuals seem to use the on-line environment to alleviate the fear of being observed by others and the possible social rejections. In a similar study Erwin et al., (2004) found that Internet communication is attractive to SAD participants because it conceals physical appearance and aspects of behavior that are typically viewed as negatively evaluated by others. Socially anxious individuals may gain comfort while interacting in cyberspace, but at the same time they continue to avoid face-to-face interactions and retain their maladaptive beliefs (i.e. fear of negative evaluations). Although socially anxious individuals search for new information about SAD and its treatment over the web, this did not lead them to take actions such as seeking psychotherapy or medications (Erwin et al., 2004). Considering that Erwin’s survey was active online in 2000 (when internet-supported interventions were in their infancy), we could speculate that SAD participants might have sought treatment if it would have been offered online. To date, a considerable number of web-pages generously offer detailed information about SAD, reflecting the advances in the filed. Noting this proliferation, Khazaal et al. (2008) had the idea to rigorously assess 58 sites that virtually provided information about SAD. Unfortunately, the author found the quality of web-based information to be poor, arguing for the stringent need to disseminate the evidence based approach in cyberspace.

1.1. Current status of Internet-supported intervention literature

In the last decade many randomized control trials (RCT) for various psychological disorder have investigated whether Internet-supported interventions can remotely improve psychological symptoms. The scientific support is rapidly growing, making meta-analysis and review papers a pertinent initiative. Until now, several review articles have focused broadly on different kinds of interventions for different types of disorders (Amstadter, et al., 2009; Andersson, et al., 2007; Cuijpers, et al., 2009; Newman, et al., 2011). Analyzing six Swedish studies, Andersson et al. (2007) found a high effect size (d=0.91) of Internet-supported cognitive behavioral intervention for reducing anxiety and mood disorder symptoms. On the other hand, Internet-supported intervention aimed at alcohol and smoking cessation generally yielded lower effect size than those addressing trauma related mental health problems (Amstadter et al., 2009). Other review papers included a wide range of technological interventions (i.e. virtual reality, palmtop and desktop computers, CD-ROMS, DVD, USB-sticks, cell and smart phones, and Internet-supported interventions) that address various psychopathologies. Both Newman et al. (2011) and Cuijpers et al. (2009) investigated the degree of therapist contact that is advisable to remotely reduce participants’ symptoms. It seems that a brief, structured support given by a person (be it a therapist or just a technician) is important in treatment, minimum contact interventions being the most beneficial ones. Moreover, in their meta-analysis of 23 trials Cuijpers et al. (2009) reported that computer-aided psychotherapy have a strong, overall effect at post treatment (d=1.08) in reducing anxiety problems.

While previous reviews have generally focused on a wide range of technological interventions for a wide variety of problems, relatively little is known about the efficacy of Internet-supported intervention for social anxiety disorder. The present study summarizes the current state of the literature on this circumscribed problem, estimating the degree of improvement in symptoms and social functioning for social anxiety sufferers. More precisely, we questioned whether Internet-supported interventions effectively improve SAD symptoms and comorbidty (i.e. depression) for socially anxious individuals.

2. Methods

Potentially relevant papers were identified using PsychInfo and PubMed databases where English language articles were searched using the following key words: social anxiety disorder, social phobia, internet intervention, computer, psychological treatment. The bibliographies of the identified articles revealed additional sources. A total of 21 articles were found, but only eight met our inclusion criteria. Studies were included in this meta-analysis if they: (a) were Internet-supported interventions for diagnosed socially anxious individuals, (b) compared the effects of the intervention with a wait list control group, and (c) had a randomized design. Effect sizes were averaged across primary (social anxiety) and secondary (comorbid depression and anxiety) outcome measures.
<table>
<thead>
<tr>
<th>Author (year)</th>
<th>N</th>
<th>Study conditions</th>
<th>Session/ modules</th>
<th>Clinician involvement</th>
<th>Research design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andersson et al. (2006)</td>
<td>64</td>
<td>1. ICBT, 2. WL</td>
<td>9 week program = 186 pages with 9 CBT modules + discussion group + 9 email feedback on homework + 2 group exposure sessions</td>
<td>Seven therapist providing feedback and conducting exposure sessions</td>
<td>RCT, compared with WL</td>
</tr>
<tr>
<td>Carlbring et al. (2007)</td>
<td>60</td>
<td>1. ICBT, 2. WL</td>
<td>9 week program = 186 pages with 9 CBT modules + discussion group + 9 email feedback on homework + 9 weekly telephone calls from therapist</td>
<td>Two therapist providing feedback and weekly telephone calls</td>
<td>RCT, compared with WL</td>
</tr>
<tr>
<td>Titov et al. (2008a)</td>
<td>105</td>
<td>1. ICBT, 2. WL</td>
<td>Shyness 1 = 6 online CBT modules + homework + forum + email from therapist (10 wks.)</td>
<td>One therapist provided forum + emails</td>
<td>RCT, compared with WL</td>
</tr>
<tr>
<td>Titov et al. (2008b)</td>
<td>81</td>
<td>1. ICBT, 2. WL</td>
<td>Shyness 2 = 6 online CBT modules + homework + forum + email from therapist (10 wks.)</td>
<td>One therapist provided forum + emails</td>
<td>RCT, compared with WL</td>
</tr>
<tr>
<td>Titov et al. (2008c)</td>
<td>98</td>
<td>1. ICBT, 2. CaICBT, 3. WL</td>
<td>ICBT = Shyness 3 = 6 online CBT modules (10 wks) + homework + forum, without emails from therapist CaICBT = Shyness 3 + email with therapist (10 wks)</td>
<td>One therapist moderated forum + emails.</td>
<td>RCT, between-group comparisons</td>
</tr>
<tr>
<td>Berger et al. (2009)</td>
<td>52</td>
<td>1. ICBT, 2. WL</td>
<td>10 weeks of self-help CBT including 5 on-line sessions (with 57 websites)</td>
<td>Six therapist provided feedback</td>
<td>RCT, compared with WL</td>
</tr>
<tr>
<td>Furmark et al. (2009)</td>
<td>Trial I. 120</td>
<td>1. ICBT, 2. Bib., 3. WL</td>
<td>1. ICBT = 186 pages with 9 CBT modules (9 wks) + weekly email feedback + discussion group 2. Bibliography = read a self-help manual + weekly reminders to complete LSAS 3. WL = weekly reminders to complete LSAS</td>
<td>Therapists moderated discussion group + weekly emails to ICBT participants.</td>
<td>RCT, between-group comparisons</td>
</tr>
<tr>
<td>Botella et al. (2010)</td>
<td>127</td>
<td>1. ICBT, 2. Th.CBT, 3. WL</td>
<td>1. Talk to me = 3 on-line protocols (educational, cognitive restructuring, and 5 exposure exercises) 2. Direct CBT with therapist (matched to the on-line protocols)</td>
<td>A therapist administered the direct CBT intervention.</td>
<td>RCT, between-group comparisons</td>
</tr>
</tbody>
</table>

**Note:** ICBT=Internet-supported Cognitive Behavioral Therapy, WL=Wait List, CaICBT=Clinician-assisted Internet Cognitive Behavioral Therapy, LSAS=Leibowitz Social Anxiety Scale, SPS=Social Phobia Scale, SIAS=Social Interaction and Anxiety Scale, SAD=Soc Avoidance and Distress, FPSQ=Fear of Public Speaking Questionnaire, IST=Impromtu Speech Task, SSDPS=Self-Statement During Public Speaking, BDI=Beck Depression Inventory, SCL-90-R=Symptom Check List, IIP=Inventory of Interpersonal Problems, GAS=Goal Attainment Scale, MADRS=Montgomery and Asberg Depression Rating Scale, QoL=Quality of Life, PHQ-9=Patient Health Questionnaire, K-10=Kessler-10 (depression), WHODAS-II=World Health Organization Disability Assessment Schedule, SDS=Sheehan Disability Scale, CGI=Clinician Global Impression, MS=Maladjustment Scale.

Attrition rates were computed as the difference in percentage between pre- and post-test participations.

* All effect sizes were averaged across primary outcome measures (i.e. social anxiety), and only between-group comparisons are presented.
3. Analysis

We computed the effect sizes (ESs, Cohen’s $d$) by subtracting (at post-test) the average score of the wait list control group ($M_c$) from the average score of the intervention group ($M_i$) and dividing the result by the pooled standard deviation of the above mentioned groups ($SD_{ci}$). Effect sizes of .80 or higher are assumed to be large, while effect sizes between .50 and .79 are moderate, and lower effect sizes are considered small.

We examined the outcome on three types of measures: primary outcome (SAD symptoms), secondary outcome (comorbid depression and anxiety) and the quality of life. In most trials primary and secondary outcomes were rated on more than one scale, therefore the mean ESs of all relevant scales for each outcome type was computed. We ended up with one mean ES for social anxiety, one for comorbidity, and one for quality of life.

To compute the average and overall effect sizes, we used the Comprehensive Meta-Analysis program (version 2.2.021). Both fixed effects models and random effects models were calculated. Although only eight studies were eligible for this meta-analysis, we calculated both Q- and $I^2$-statistics as indicators of heterogeneity (with $I^2$ expressing heterogeneity in percentages: 0% = no, 25% = low, 50% = moderate and 75% = high heterogeneity of ES). We also computed Orwin’s fail-safe N to show how many studies with an ES of zero should be found to reduce the ES to a smaller value (e.g. 0.20). A large N indicates that the ES found can be further generalized.

4. Results

The effect of four Internet-supported intervention systems coordinated by four research teams from Australia (3), Spain (1), Sweden (3) and Switzerland (1) were tested. The eight studies that satisfied our inclusion criteria provided a total sample of 707 socially anxious individuals. Participants were recruited by various combinations of media ads, newspaper articles, radio or TV interviews, and internet links. Cognitive behavior therapy (CBT) principles were used to reduce social anxiety symptoms in each trial. Exposure sessions, either in vivo or mediated by the virtual environment, were used in most studies, except for two (Carlbring et al., 2007 and Furmark et al., 2009). Participants completed between 6 and 9 on-line intervention modules, the mean intervention time being 8.8 weeks. Participant dropout ranged from 2.5 to 39%, with a dropout mean of 10%. In six studies (Andersson et al., 2006; Berger et al., 2009; Botella et al., 2010; and Titov et al., 2008a, 2008b, 2008c) an intention-to-treat design was used by following all randomized patients until the end of the trial, whether or not they dropped out from the study. For each included article, a brief description is presented in Table 1. All studies were published between 2006 and 2010.

<table>
<thead>
<tr>
<th>Study name</th>
<th>Std diff in means</th>
<th>Lower limit</th>
<th>Upper limit</th>
<th>Z-Value</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andersson et al. (2006)</td>
<td>0.70</td>
<td>0.19</td>
<td>1.21</td>
<td>2.71</td>
<td>0.01</td>
</tr>
<tr>
<td>Berger et al. (2009)</td>
<td>0.76</td>
<td>0.16</td>
<td>1.36</td>
<td>2.47</td>
<td>0.01</td>
</tr>
<tr>
<td>Botella et al. (2010)</td>
<td>0.79</td>
<td>0.21</td>
<td>1.36</td>
<td>2.67</td>
<td>0.01</td>
</tr>
<tr>
<td>Carlbring et al. (2007)</td>
<td>1.05</td>
<td>0.49</td>
<td>1.61</td>
<td>3.67</td>
<td>0.00</td>
</tr>
<tr>
<td>Furmark et al. (2009)</td>
<td>0.64</td>
<td>0.18</td>
<td>1.09</td>
<td>2.74</td>
<td>0.01</td>
</tr>
<tr>
<td>Titov et al. (2008a)</td>
<td>0.94</td>
<td>0.51</td>
<td>1.37</td>
<td>4.31</td>
<td>0.00</td>
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<tr>
<td>Titov et al. (2008b)</td>
<td>1.20</td>
<td>0.72</td>
<td>1.68</td>
<td>4.87</td>
<td>0.00</td>
</tr>
<tr>
<td>Titov et al. (2008c)</td>
<td>0.74</td>
<td>0.22</td>
<td>1.25</td>
<td>2.80</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>0.86</td>
<td>0.68</td>
<td>1.03</td>
<td>9.36</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Figure 1. Standardized effect size of Internet-supported interventions for social anxiety disorders with wait list control condition at post-test.

The mean ES indicating the difference between Internet-supported interventions and control conditions for SAD symptoms was large for both fixed and random effects models ($d=0.86$, with 95% confidence intervals of 0.68–1.03). Heterogeneity indices ($Q=4.15$, NS and $I^2=0.00$) revealed that included studies report similar findings. So, no inconsistency across the eight studies was found. Orwin’s fail-safe N is 27, suggesting that almost 30 studies with a mean ES of zero would need to be found before the combined effect would become trivial (i.e. <0.20). Given that we could identify only eight studies that looked at the effect of Internet-supported interventions for SAD symptoms, it is unlikely that nearly 30 studies were missed. The individual ESs for each included trial are shown in Figure 1.
Because most papers included measures of life quality and comorbid symptoms (anxiety and depression) we were able to estimate the effect of SAD Internet-interventions on these important aspects of individuals’ functioning. The mean ES indicating the difference in quality of life between SAD interventions and contrast conditions (five comparisons) was moderate ($d=0.53;\ 95\%\text{CI}: 0.30–0.75$) with zero heterogeneity. Furthermore, the effect of SAD interventions on comorbid symptoms (five comparisons) was low ($d=0.40\ 95\%\text{CI}: 0.18–0.61$). Although the Internet interventions were designed to address SAD symptoms, a statistically small but significant effect on comorbid anxiety and depression was found.

5. Discussion

The use of the Internet technology in psychotherapy represents an effective way to disseminate empirically validated interventions. According to our results, it seems that Internet-supported interventions for SAD are effective in diminishing social anxiety symptoms, and modestly effective for quality of life, and comorbid anxiety and depression. Our results appear to be in line with the conclusions reported in recent meta-analyses (Amstadter et al., 2009; Cuijpers et al., 2009; Newman et al., 2011). The improvements in comorbid depression and anxiety, and the benefits in participants’ quality of life are somehow surprising, since the content of the Internet interventions was focused on social phobia. Internet-supported interventions are “not distracted … by the problems posed by significant comorbid disorders” (Titov et al., 2009 p. 757), but they nevertheless seem to facilitate the transfer of learned coping skills to other mood disorders.

Given that the core SAD features are the fear and avoidance of direct social interactions, Internet-supported interventions may constitute an attractive treatment option for social anxiety sufferers. They may be drawn to this treatment because it can be access privately, it is highly accessible at low costs, it bridge distances overcoming geographical barriers, it reduces stigma, saves time travel and is highly confidential. Moreover, the CBT modules and the virtual exposure sessions appear as experimental exercises conducted in front of a computer that is not going to judge or laugh at the participants because of trembling voice, shaking or sweaty hands. The computer is never going to consider someone stupid for not being able to finish a speech. However, a potential risk factor regarding the efficacy of Internet-supported intervention for SAD is associated with the possibility of reinforcing participants’ isolation and avoidance tendencies.

Considering its limitations, the results of this study should be seen with caution. First, the number of included articles, and consequently the number of socially anxious individuals treated, was small. Second, although every trial screened the participants before the intervention, the selection was made from the general population, and none of the trials used clinical population. Third, self-reports were predominantly used as outcome measures, with only few studies including behavioral assessments. Forth, though all studies used CBT principles in designing their intervention, each of the four research teams developed a separate idiosyncratic treatment version. Moreover, there are no data about the quality of the software and about its ability to facilitate learning; so we cannot say whether the treatment content, its organization, or the software caused the improvements in participants’ symptoms.

Despite the above mentioned limitations, there is evidence to support the efficacy of Internet intervention for SAD. Therefore, future developments in the field could extend the already efficient systems to other populations (by translating their content into other languages), could prolong this approach to children and adolescents (for whom a limited number of Internet interventions exists), and could design new and comprehensive interventions systems in an effort to address a broader spectrum of psychopathology (in line with the emerging transdiagnostic interventions).

Acknowledgements

This work was possible with the financial support of the Sectoral Operational Programme for Human Resources Development 2007-2013, co-financed by the European Social Fund, under the project number POSDRU 89/1.5/S/60189 with the title „Postdoctoral Programs for Sustainable Development in a Knowledge Based Society“.

References

Note: References marked with an asterisk indicate studies included in the meta-analysis


