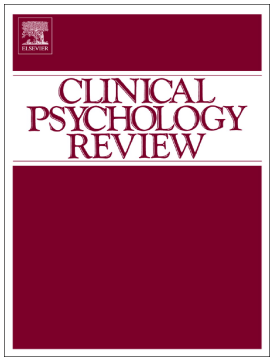

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A scoping review of human-support factors in the context of Internet-based psychological interventions (IPIs) for depression and anxiety disorders

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Abstract

Internet-based psychological interventions (IPIs) may provide a highly accessible alternative to in-person psychotherapy. However, little is known about the role of human-support in IPIs for depression and anxiety disorders.

The purpose of this study was to evaluate the evidence in the literature regarding the role of human-support in IPIs for depression and anxiety disorders; identify research gaps; and provide recommendations.

A scoping review of randomized controlled trials was conducted using seven databases. Two reviewers screened citations, selected studies, and extracted data. Data was analyzed and summarized by common human-support factors.

Seven categories for support factors were identified from 19 studies: guided versus unguided IPIs, level of therapist expertise, human versus automated support, scheduled versus unscheduled contact, mode of communication, synchronicity of communication, and intensity of support. Only one feature had a significant effect on treatment outcomes, with scheduled support resulting in better outcomes than unscheduled support. There were mixed findings regarding guided versus unguided interventions and human versus automated support.

Providing structured support in a fixed-interval schedule is recommended to enhance the utilization of IPIs for depression and anxiety disorders. Findings should be interpreted with caution due to the limited available research. Further research is needed to draw robust conclusions.

Key Words: Internet Interventions, Guided Self-help, Depression and Anxiety Disorders, Cognitive Behavior Therapy, Scoping Review, eHealth

Introduction

Depression and anxiety disorders are the two most prevalent and disabling health conditions worldwide (Strine et al., 2008). In the United States, over 21% of adults (18 - 64 years) are affected by anxiety disorders and up to 8% of adults experience major depressive disorder each year. Lifetime prevalence is 29% for anxiety disorders and 17% for major depression (Kessler et al., 2012). Moreover, it is predicted that by the year 2020, depression will be the second leading cause of the global disease burden (WHO, 2012). Additionally, both depression and anxiety disorders are associated with elevated risk for other physical health conditions (i.e., cardiovascular disease and diabetes) and other mental health disorders, impairment in health-related quality of life and social functioning, as well as excess disability (Anderson, Freedland, Clouse, & Lustman, 2001; Barger & Sydeman, 2005; Kawachi, Sparrow, Vokonas, & Weiss, 1994; Kessler et al., 2005). However, despite these risks, the majority of those suffering from these conditions do not seek treatment (Titov, Dear, Johnston, Lorian, Zou, Wootton, Spence, Rapee, et al., 2013). Barriers to receiving treatment include clinician shortage, long wait times, appointment scheduling conflicts, social stigma, high treatment costs, and accessibility barriers such as transportation and childcare (Berger et al., 2011; Renton et al., 2014; Spek et al., 2007). Consequently, there is a critical need for alternative treatment options that can help overcome these barriers and enable individuals to receive adequate mental health services.

Advances in digital information and communication technology offer a means of improving the accessibility to psychological interventions and mental health care (Lustria et al., 2009). The wide use of electronic devices and increasing consumer comfort with technology have enabled the delivery of mental health care to those who were previously unwilling or

unable to obtain such care (Hollis et al., 2015). In addition, electronic communication methods also have the potential to increase the range and quality of available mental health services, improve the cost-efficiency of care, and enable treatments to be more precisely tailored to individual patient needs (Shore, 2013). The delivery of health services via electronic means has been labeled with various terminologies including *e-health, telehealth, telemedicine, m-health,* and *connected health*. Terms are often used interchangeably and with little consistency (Hollis et al., 2015), creating possible confusion. To more closely capture a specific intervention type and delivery mode, we now operationalize a new term - Internet-based psychological interventions (IPIs). IPIs refer specifically to psychotherapeutic treatment delivered via the Internet. IPIs usually consist of a series of structured sessions that emulate face-to-face psychotherapy and are delivered via the Internet through web-based/online programs. For example, many IPIs utilize protocols based on structured short-term, interventions such as Cognitive Behavioral Therapy (CBT) (Christensen & Petrie, 2013).

There has been significant development and growth of IPIs for the treatment of common mental disorders such as depression and anxiety. In addition, IPIs have been researched extensively over the past two decades (Baumeister et al., 2014; Johansson & Andersson, 2012; Mewton et al., 2014) and studies have continuously demonstrated that IPIs are not only effective, but also have effect sizes equivalent to those observed in face-to-face psychotherapy and pharmacotherapy for depression and anxiety disorders (Cuijpers, Mark, & van Straten, 2009; Mewton, Smith, Rossouw, & Andrews, 2014; Newman, Erickson, Przeworski, & Dzus, 2003). Thus, IPIs may have great potential to provide evidence-based care without high accessibility barriers, personal costs and adverse side effects.

While IPIs may be valuable as stand-alone treatments, the majority of IPI clinical trials for depression and anxiety disorders incorporate some form of therapist contact and support (either remotely or in person). In fact, a meta-analysis indicated that human-supported IPIs, performed better than IPIs without support in terms of treatment response and adherence (Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010). Researchers have also evaluated other human-support factors affecting treatment outcomes and adherence to IPIs for depression and anxiety disorders (Gellatly et al., 2007; Newman et al., 2003; Palmqvist, Carlbring, & Andersson, 2007). Understanding different human-support factors and their role in IPIs will help to determine the best ways to effectively implement IPIs and optimize patient outcomes (Newman, Szkodny, Llera, & Przeworski, 2011).

In just over a decade, the number of randomized studies examining the comparative effect of varying human-support factors has grown rapidly. Therefore, the objective of this scoping review was to evaluate the evidence in the literature regarding the role of human-support in IPIs for depression and anxiety disorders; identify major research gaps; and provide recommendations for future research.

Methods

A search of seven databases (PubMed, PsycINFO, Cochrane, EMBASE, CINAHL, Scopus and Web of Science) was conducted for studies published in peer-reviewed journals in the last 15 years (January 2000–October 2016). This timeframe was selected to capture intervention development occurring simultaneously with the proliferation of hand-held technologies (e.g., smart phones), advanced multimedia and broadband Internet services. In addition, we conducted a reverse snowballing (i.e., scanned references from relevant articles) to identify other papers that may not have been identified. For the purpose of this study, human-

support was operationalized as any supplementary provision of care delivered by a human therapist, case manager, or patient navigator in the context of the IPI.

An extensive search strategy was utilized and included various search terms related to IPIs including computer assisted therapy, online therapy, telepsychiatry, eHealth, cyber-intervention, remote consultation, guided self-help, and low intensity therapy (full search strategy is available upon request). Two reviewers independently screened titles and abstracts to determine preliminary inclusion status. A second screen of articles' full-text, again by two independent reviewers, ensured that the studies described human-support in the context of an IPI.

Inclusion criteria were: (1) published in a refereed journal in English, (2) participants 18+ years with depression or anxiety (including specific anxiety disorders), (3) intervention studied was an IPI for the treatment of depression or anxiety disorders, (4) treatment conditions included varying degree or modes of human-support in the context of an IPI, (5) included reliable and valid outcome measures for assessing depression or anxiety symptoms, (6) treatment effectiveness was investigated based on a randomized controlled trial (RCT) design, and (7) focused directly upon how different degree or mode of human-support affected the treatment response and acceptability in the context of an IPI.

Data extracted included: sample size and demographic characteristics, study design, type of therapeutic approach, specific IPI utilized, duration of intervention, type of treatment conditions, outcome measures, support features, support delivery mode, detailed description of the support, therapists' level of expertise, effect size, treatment satisfaction, and drop-out (discontinuing the study) and non-usage rates (treatment non-adherence).

Cochrane Risk of Bias tool (Higgins and Altman, 2008) was used to assess the methodological quality of the included studies including selection bias (e.g., random sequence generation and allocation concealment), performance and detection bias (e.g., blinding of participants and personnel), attrition bias (e.g., incomplete outcome data addressed), and reporting bias (e.g., selective reporting). Judgments for each bias (i.e., low risk, high risk, unclear risk) as well as the supporting quotes for the judgments were recorded. Results were analyzed by the subgroups of support factors that were identified during the data extraction process.

Results

Search flow. The comprehensive search terms across 7 databases resulted in 2,475 papers- PubMed (n=441), PsycINFO (n=424), Cochrane (n=35), EMBASE (n=73), CINAHL (n=305), Scopus (n=574), and Web of Science (n=623). Titles and abstracts of all papers were screened against the established inclusion criteria and relevant studies were reviewed, yielding 19 papers. (See figure 1 for the flow chart) The most common reasons for exclusion were: no condition including human support, no control condition(s), treatment targeting conditions other than anxiety and depression (e.g., insomnia, addiction), non-psychological interventions, and no IPI (e.g., national hotlines for depression).

Study samples. Most studies included participants with a diagnosable mood or anxiety disorder, however, 5 studies included individuals with sub-threshold clinical symptoms. Study samples included participants with major depressive disorder (*n*=8) and a variety of anxiety-related problems including, nonspecific anxiety symptoms (*n*=4), generalized anxiety disorder (GAD) (*n*=3), social phobia (*n*=1), social anxiety symptoms (*n*=1), obsessive-compulsive disorder (OCD) (*n*=1), and panic disorder (*n*=1). The mean age of the participants was 38.8 years with 67.7% females.

Countries. The country of origins for the included studies were; Australia (*n*=9), Sweden (*n*=4), the Netherlands (*n*=2), the United States (*n*=3), and Spain (*n*=1). All reviewed papers were, however, published in English.

Therapeutic approaches. Most of the studies utilized CBT (*n*=16) as the main psychotherapeutic approach. Other approaches included applied relaxation therapy (*n*=2), and problem solving therapy (PST) (*n*=1).

Support content and functions. Therapist support most frequently focused on reminding users to complete the online session (*n*=10), reinforcing progress (*n*=11), and giving instruction or information about the program usage and resources (*n*=10). Other frequently used functions were answering questions (*n*=6), confirming diagnosis (*n*=6), providing feedback on the assignment (*n*=4) and troubleshooting (*n*=4).

Support factors. We identified seven human-support factors within the IPIs: (1) guided vs. unguided IPI; (2) level of therapist expertise; (3) human vs. automated support; (4) scheduled vs. unscheduled contact; (5) mode of support communication; (6) synchronicity of support communication; and, (7) intensity of support. By far, the most researched human-support factor in Internet-based self-help treatment for mood and anxiety disorders were guided vs. unguided IPIs (*n*=9), level of therapist expertise (*n*=5) and schedule of support (*n*=3). Table 1 outlines selected characteristics of the studies included. Table 2 and 3 provide the summary of included studies by support factors and disorder types.

Guided versus unguided IPIs. Among the 19 studies included in the analysis, there were 9 that compared the effect of IPIs with or without guidance. Types of guidance in the context of IPIs included reminders to complete lessons, tracking progress, troubleshooting, giving feedback

on the homework, answering of technical and clinical questions, and providing resources. The most utilized delivery modes for guidance were email (*n*=7) and telephone calls (*n*=7). Other delivery modes included feedback provided via online discussion forums (*n*=2), online real-time chat via a messenger service (*n*=1), short message service (SMS) text-messaging (*n*=1) and postcards (*n*=1). The extent of guidance varied from minimal (e.g., automated email reminders) to intensive (e.g. telephone support including tracking progress, trouble shooting, and goal setting).

There were mixed findings regarding the role of guidance on the effectiveness of IPIs. Four of the included studies (*n*=4; Farrer et al., 2011; Kleiboer et al., 2015; Titov et al., 2008; Titov et al.,, 2009) found that guided IPI was superior to the unguided IPI in reducing mood and anxiety related symptoms, whereas the remaining five studies (Berger al., 2011a; Berger et al., 2011b; Dear et al., 2015; Kobak et al., 2015; Santucci et al., 2014) reported no significant difference between guided and unguided treatment. The magnitude of the difference between groups in these studies was small for depression (*d*=0.14 – 0.34) and small to large for anxiety (*d*=0.2 – 0.66).

Five of the 9 studies examined treatment satisfaction. Three studies indicated that people were more satisfied when IPIs were combined with guidance than IPIs without guidance (Berger et al, 2011a; Kleiboer et al., 2015; Kobak et al., 2015); the remaining 2 studies reported no significant difference in treatment satisfaction between conditions (Berger et al., 2011b; Dear et al., 2015). Eight studies reported dropout attrition. The majority (n=8) reported that there was no difference in dropout rate between guided vs. unguided conditions. Only one study (Farrer, et al., 2011) reported lower dropout attrition in the guided condition compared to the unguided condition. Non-usage attrition was reported in all of the studies. Results indicated that 4 out of

the 9 studies found lower non-usage attrition in the guided condition compared to the unguided condition; the remaining studies indicated no significant differences in non-usage rates.

Clinician expertise. Five studies specifically evaluated the effect of the clinician's level of expertise/experience/training and found that for depression and anxiety disorders, the clinician's level of expertise did not significantly affect treatment outcomes. Four studies (Andersson et al., 2012; Johnston et al., 2011; Kobak et al., 2015; Robinson et al., 2010; Titov et al., 2010) investigated outcomes from clinicians and non-clinicians (lay technicians) support conditions. All of these studies found that support from trained clinicians and lay technicians resulted in similar outcomes; no significant differences were noted by training status.

There were 2 studies that reported on treatment satisfaction. Both studies reported no significant difference in treatment satisfaction based on clinician expertise (Kobak et al., 2015; Robinson et al., 2010). Three of the studies reported dropout rates and 4 studies reported non-usage rates. In terms of dropout, two of the studies reported less dropout in the expert clinician condition compared to the non-clinician condition (Robinson et al., 2010; Titov et al., 2010), and one study (Johnson et al., 2011) found no significant difference. Only one of the studies (Titov et al., 2010) reported a significant difference for treatment non-usage based on clinician expertise, with lower attrition reported in the non-clinician condition compared to the clinician condition.

Human vs. automated support. Three studies examining the impact of human interaction in computerized CBT (CCBT) and Internet CBT (ICBT) reported somewhat different findings. Titov et al (2009a) demonstrated that CCBT for social phobia with telephone-based human support, in addition to automatic emails and SMS reminders was slightly more effective than CCBT with automatic emails and SMS reminders only (d=0.3). However, Christensen et al (2013) did not find significant effects when patients with GAD received ICBT with either

telephone calls by a layperson or automated reminders. Kelders et al (2015) also found that the change of depression symptoms was not significantly different between groups receiving emails from a counselor (*d*=1.00) versus automated emails (*d*=0.89). Whether support is provided by human or automated system had negligible to no effect on the treatment outcomes in patients with depression and anxiety disorders. None of the three studies examined treatment satisfaction.

There were mixed findings regarding dropout rates. Specifically, Christensen et al. (2014) reported lower dropout in the automated support condition compared to the human support condition; Kelders et al. (2015) reported lower dropout in the human support condition compared to the automated support condition; and, Titov et al. (2009a) reported no significant difference in dropout between automated and human support conditions. Two of the three studies found lower non-usage attrition in the human support condition compared to the automated condition (Christensen et al., 2014; Titov et al., 2009a) and one study (Kelders et al., 2015) showed no significant difference in the two conditions.

Schedule of support. Three studies evaluated the schedule of support, specifically, support at fixed intervals versus as-needed support initiated at the request of participants. Oromendia and colleagues found that scheduled email-based support was superior to as-needed participant initiated email support in a sample of patients with panic disorder (*d*=1.18). Similarly, Kleiboer et al. (2015) also found that scheduled phone-based support was superior to as needed phone support in an Internet-based problem solving treatment (PST) for anxiety and depression symptoms. Those receiving weekly scheduled support reported greater improvements in depression (*d*=0.34), and anxiety (*d*=0.31) symptoms than the people who received support on an as needed basis. Berger et al (2011a), however, found no group differences in participants with social phobia regarding treatment response based on varying schedules of support.

Two studies reported treatment satisfaction. Kleiboer et al (2015) reported that treatment satisfaction was higher in the scheduled support condition compared to the non-scheduled support condition, while Berger et al (2001a) found no significant difference between scheduled and unscheduled conditions. Oromendia et al (2016) reported that both dropout and treatment non-usage occurred less often in IPI conditions that contained scheduled support compared to non-scheduled support conditions; while Berger et al (2016) found no difference between conditions. In addition, Kleiboer and colleagues (2015) indicated that dropout occurred less often in on-request support condition compared to scheduled support or no support condition. There was no significant difference in non-usage attrition between conditions in all of the studies.

Delivery mode and the synchronicity of the communication platform. Two studies compared the effect of different modes of delivering the therapist support, and found that delivery mode may not be the main factor in improving depression and social phobia symptoms. Clarke et al (2005) randomized people with depression to ICBT with postcard or telephone reminders to examine which mode is more effective for increasing the frequency of visiting the ICBT website. Participants in the two conditions did not significantly differ in the number of log-ons to the ICBT website (t=0.45, p=.65). However, both of the groups together accessed the ICBT website significantly more often than participants in a previous study by the same authors (Clarke et al., 2002) that did not receive any reminders. Titov et al (2009b) reported similar results with participants being treated for social phobia. Specifically, they compared ICBT with telephone calls by technicians and ICBT supplemented with online forums supported by a clinician, and found that there was no significant difference in treatment outcomes between the two groups (d=0.18). In addition, the findings from these two studies indicated that there were no significant differences in treatment outcomes when support was provided through synchronous

(e.g., telephone calls) versus asynchronous (e.g., post card, web massages via online forum) communication platforms. Both studies did not examine treatment satisfaction.

Titov et al. (2009b) reported no significant difference in both dropout and non-usage attrition between synchronous (telephone) vs. asynchronous (web message) support conditions; whereas Clarke and colleagues (2005) indicated that dropout occurred less often in synchronous mode of reminder condition (telephone) compared to the asynchronous reminder condition (postcard). Clarke and colleagues (2005) also found that dropout was lowest in the no-reminder condition followed by the telephone reminder and the postcard reminder conditions.

Intensity of support. Only one study (Alfonsson et al., 2015) examined the duration and intensity of human-support in a sample of individuals with anxiety (n=162). Participants were randomized to an IPI with general feedback from a therapist within 24 hours during weekdays only or to the same IPI with enhanced feedback by a therapist with motivational interviewing within 12 hours on any day of the week. The results indicated that there were no significant differences in changes of anxiety and stress based on intensity of support (d=0.08). With regard to treatment satisfaction, participants who had an IPI with enhanced support reported higher treatment satisfaction than those who had IPI with normal support condition. There were no significant differences in dropout rate between enhanced and normal support conditions. No results were reported regarding non-usage.

Discussion

The objective of this scoping review was to evaluate the research pertaining to the role of human-support in IPIs for depression and anxiety disorders; identify major research gaps; and provide recommendations for future research. Results of the review suggest that relatively little

research has been conducted on the role, effect, and varying types of human support as they relate to treatment response, adherence, and satisfaction in the context of IPIs for depression and anxiety disorders. As the dissemination and uptake of IPIs grows, it will be crucial to continue the systematic evaluation of how complementary human support affects treatment engagement, adherence and treatment outcomes.

Half of the studies identified were conducted in Australia, followed by Sweden and the USA. The higher number of publications in Australia may be related to the fact that Australia has led the way in the development, research and dissemination of computerized mental health interventions (e.g. MoodGym); beginning as early as the late 90's (Rosenberg, 2015). Seven studies examined the IPIs for depression and 12 studies focused on the treatment of various anxiety disorders including GAD, social anxiety, social phobia, panic disorder, and OCD. Most of the studies (n=16) utilized CBT, with a duration ranging from 8 to 12 weeks. The majority of studies (n=15) included more than three treatment arms (3 to 5 arms) to examine the comparative effects of various support conditions. Two studies utilized a factorial design in which different combinations of treatment conditions were tested (Alfonsson et al., 2015; Kelders et al., 2015).

In contrast to the previous findings from meta-analyses (Richards & Richardson, 2012; Spek et al., 2007) concluding that IPIs with complementary guidance yield better outcomes and greater retention than unguided interventions, our review found that based on the available research, it is unclear whether adding guidance to IPIs is necessary to improve treatment adherence and outcomes. There are several possible explanations for these mixed findings. First, differing findings may be due to the variations in the amount of guidance and the structure of guidance conditions imposed within the studies (e.g., telephone vs. email guidance, scheduled vs. unscheduled guidance) (Newman et al., 2003). Second, the characteristics of the participants

engaging in treatment and the symptom presentation associated with the mental health condition they are being treated for may affect the need and utilization of guidance. It is possible that people with specific mental health conditions may have different preferences or ways of responding to particular types and amount of guidance, as well as varying interest or motivation to seek out support. For example, Newman and colleagues (2011) reported that for those with anxiety disorders, self-guided interventions are most effective for motivated patients, while treatment that incorporates therapist guidance works better for people with clinical levels of depression. Other individual difference factors such as personality characteristics may play a role in determining the effect that guidance has on treatment outcomes and adherence. Thus, the amount of human support and guidance for the optimal treatment outcome likely varies by disorder and individual differences (Newman, Szkodny, Llera, & Przeworski, 2011). Third, the role of individual patients' abilities to work purposefully and independently at therapeutic tasks should be considered in determining the amount and structure of guidance provided in IPIs (Newman et al., 2003). Last, the quality and navigability of the IPI may affect the need for and utilization of human support and guidance. Specifically, as treatment programs evolve and new technologies emerge, including artificial intelligence, the additional impact of and need for human guidance will need to be evaluated. Therefore, future studies evaluating IPIs ought to consider assessing the quality of programs including usability and navigability.

Other findings of note are the role of guidance on treatment adherence and satisfaction. Available data suggests that although adding therapist guidance may not prevent people from discontinuing the study (dropout attrition), it may encourage people to utilize and adhere to the treatment (decreasing non-usage attrition). In addition, it appears that therapist guidance might be helpful in increasing treatment satisfaction. Specifically, studies that examined treatment

satisfaction reported an equal or greater satisfaction in conditions in which IPIs are supplemented with therapist guidance.

Although not included in the analysis of this review, therapeutic alliance with the online therapist is another factor that could play a role in determining the effects of therapist support in IPIs. A systematic review on therapeutic relationships in e-therapy for mental health (Sucala et al., 2012) found that there is a positive relationship between the therapeutic alliance and e-therapy treatment outcomes. Moreover, findings from several studies indicated that establishing a therapeutic alliance during the early phase of treatment might be positively associated with clinical outcomes (Johansson & Andersson, 2012; Nordgren, Carlbring, Linna, & Andersson, 2013). However, studies have not directly manipulated this factor in the context of IPIs, and thus, it is unclear if pretreatment contact and a strong early therapeutic alliance contributes to the better treatment outcomes in the context of IPIs. The exploration of the moderating effect of pretreatment contact, the optimal time point for therapist contact and strength of therapeutic alliances within IPIs are topics for future research. Furthermore, future studies are needed to examine whether and how people experience a therapeutic alliance with IPIs themselves and supplemental human therapists.

Regarding therapist expertise/qualifications, the finding of our review is in line with the results of a former systematic review (Baumeister, Reichler, Munzinger, & Lin, 2014), indicating that the level of therapist expertise/qualifications may not affect the effectiveness of treatment. Non-clinician support had equal effects when compared to clinician support. In addition, support provided by less-experienced clinicians (e.g. students in training) was as effective as support from more experienced clinicians (e.g. licensed clinician). A possible explanation for these findings might be the nature of IPIs being highly standardized treatments designed to be used as

self-help tools, and the focus of therapist support as practical guidance and supplemental clarification to maximize the effect of the IPI itself. Thus, there may be less need for advanced psychotherapeutic knowledge and techniques from supplemental therapist support. Although more evidence should be examined before firm conclusions are drawn, the consistent findings from these studies, combined with the previous evidence on the effects of IPIs comparable with to face-to-face therapy, suggest that IPIs can be a cost-effective alternative to face-to-face therapy for depression and anxiety.

Whether human support is superior to automated support remains unclear. Limited studies have examined this support factor and two of the three existing studies found no impact of human versus automated support in the effectiveness of and adherence to IPIs. There are several factors that might be associated with the comparable effect between human and automated support, such as sense of self-agency in completing the treatment and achieving treatment outcomes, or the effect of therapeutic alliance. Kelders and colleagues (2015) suggested that the utilization of "persuasive technology" might be one explanation for the equivalence observed between human and non-human support. For example, they suggested that using an avatar for the automated counselor might enhance social presence; making the automated support closely resemble human feedback. Automated feedback systems may also provide other advantages over human support such as providing instantaneous, timely feedback to users. Thus, the incorporation of automated support may be useful for optimizing the clinical utility of supplemental support within IPIs and may aid in reducing costs for these treatments. It is important also to note that when determining the use of human support versus automated support, the severity of patients' symptoms should be examined in order to ensure patient safety.

With regard to the schedule of support, although preliminary results are somewhat inconsistent, it appears that schedule of support may be a factor in treatment outcomes and should be examined further. When compared to conditions in which users were given options to request support on a as needed-basis, positive treatment outcomes (larger effect sizes, lower dropout rates, and better adherence to treatment) were more often observed when support was provided at regular, fixed intervals. However, the reasons why fixed interval support is associated with better outcomes remains unclear. One potential reason for this may be that support-upon-request conditions may result in the provision of less overall support due to underutilization of support resources by participants (e.g., Oromendia et al., 2016). Studies conducted thus far have not examined the reasons why participants did not request support; potential hypotheses include a lack of motivation, reluctance to seek help due to embarrassment, or belief that they did not need additional help. Since the optional support condition was associated with poorer treatment effects as well as participant disappointment, dropout and deterioration (Rozental et al., 2014), more research is needed to identify factors related to the underutilization of available support in the context of IPIs.

Only 2 studies examined support communication modes and both found no difference between the groups that received support via synchronous (telephone calls) versus asynchronous (email, post card, web message) communication platforms in patients with depression and social phobia. Although more research is needed to draw a robust conclusion, the available research suggests that more cost and time-efficient modes of support can be utilized without sacrificing the overall treatment efficacy and acceptance.

Only one study evaluated the intensity of human support as a primary factor in IPIs. Alfonsson and colleagues (2015) found that although enhancing the amount of support yielded

greater level of participant satisfaction, it did not improve the treatment effect of the IPI beyond what can be achieved in a less supportive IPI for anxiety. As such, a subsequent research question might be - what is the minimal imposed structure and amount of therapist contact sufficient for positive treatment outcomes in the context of IPIs? For example, Titov et al (2008) examined the effect of CCBT for social phobia and found that the average therapist time needed in the therapist-guided condition was less than 3 hours during the 10-week program (Titov et al., 2008). Further research is needed to determine the necessity of the dose-response of therapist-support for the optimal treatment outcome in various patient groups and with different IPIs.

Limitations

There are several limitations to our scoping review that must be considered when interpreting our description and summary of research on therapist support in IPIs. First, there were only 19 relevant studies meeting inclusion criteria. The limited empirical study of supplemental support in IPIs makes it difficult to draw firm conclusions on the role of each support feature. Second, the current review was limited to studies published in English and approximately half of the included studies were conducted in Australia. Thus, findings may be influenced by cultural differences and treatment factors specific to Australia. Third, given that research on the evidence for IPIs are being published rapidly due to the fast growing interest and development of the Internet and technology-based interventions for mental health, it is possible that we might have missed relevant studies which could have yielded a different set of results and conclusions. Fourth, although the majority of studies indicated specific attrition rates, 4 studies reported only dropout attrition or non-usage attrition. This is a major issue in eHealth interventions and clinical trials in general, as there are many reasons why participants do not choose to complete a study (Eysenbach, 2005). Nevertheless, future studies should carefully

track participant attrition and evaluate associations with various IPI features including human support factors. Lastly, although we have discussed some of the most prominent findings of the available research on support factors for IPIs, there are likely other important factors to consider in terms of treatment outcomes and user engagement including user satisfaction, access barriers and individual user characteristics. Another major factor to consider is the quality of the IPIs being examined. Specifically, whether human support and the various types of support matters in the context of the IPIs may be confounded by the design and effectiveness of the IPIs. As such, future investigations regarding human support factors in IPIs should include well-validated and robust psychological interventions.

Conclusion

Therapist support is considered to be an important feature that contributes substantially to the positive outcome of IPIs for the treatment of depression and anxiety disorders. The findings from this scoping review highlight the possibility that some therapist support factors (e.g., having a fixed schedule for support) may be more important than others (e.g., therapist expertise) in predicting adherence to and efficacy of IPIs. As such, these findings may be helpful in IPI development decisions including which support features and structure of support to utilize in order to maximize treatment impact and costs. The development and optimization of IPIs for depression and anxiety disorders is increasingly critical given rising healthcare costs and the unmet mental healthcare needs of individuals living in rural communities. Moreover, IPIs may also play an important role in facilitating human exploration (e.g., on long-duration space missions, oceanic and Antarctic research), where remote access to mental health services could have an important impact on team cohesion and prevention of work burnout. Despite these growing needs, there remains limited evidence from RCTs on this topic and considerable work

remains to be done in order to draw robust conclusions on the impact of these support factors. Additional studies are needed to determine the optimal quantity (dose) and quality (structure and delivery modes) of therapist support in the context of IPIs.

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Table 1. Overview of the included studies

Study (Year)	Main Diagnosis	N (Mean age)	Treatment Conditions	Intervention	Support Variable	Support Provided	Main outcome, Treatment Satisfaction, Dropout and Non-usage Attrition
Alfonsson et al. (2015)	Anxiety	162 (35.3)	Factorial design 1. Text & media + enhanced support 2. Text & media + normal support 3. Text + enhanced support 4. Text + normal support	Web-based Applied Relaxation 4-week	Intensity (Normal vs. Enhanced support)	General feedback by the therapist in 24hrs on week days vs feedback with motivational interviewing in 12hrs all days	MO: Difference between Normal vs. Enhanced condition *NS* for anxiety (*d* = .08) TS: Higher TS in the Enhanced compared to the Normal support condition DO: Difference between normal vs. enhanced support condition *NS* NU: *NR*
Andersson et al. (2012)	Social Anxiety Disorder	204 (38.3)	3-arm RCT: 1. ICBT + Licensed clinician support 2. ICBT + Graduate student support 3. WLC	ICBT 9-week	Expertise (Experienced vs. Inexperienced clinician)	Feedback on the homework assignments via email	MO: Difference between experienced vs. inexperienced clinicians *NS* for social anxiety (*d* =.13) TS: *NR* DO: *NR* NU: *NR*
Berger et al. (2011a)	Social Phobia (SP)	81 (37.2)	3-arm RCT: 1. ICBT + Guidance 2. ICBT w/o guidance 3. ICBT + on demand guidance	ICBT 10-week	Guidance & Schedule (Guided vs. Unguided, Client initiated vs. Clinician initiated support)	Email messages containing feedback on behavior and progress; additional telephone calls available on demand condition	MO: Difference between guided, unguided, and on demand guidance condition *NS* for SP (*d* = .09 - .19) TS: Higher TS in the guided condition compared to the unguided condition. Difference between the clinician-initiated vs. client- initiated support condition *NS* DO: Difference between guided, unguided, and on-demand guidance conditions *NS* NS: Difference between guided, unguided, and on-demand guidance conditions *NS*
Berger et al. (2011b)	MDD or Dysthymia	76 (38.8)	3-arm RCT: 1. ICBT + Guidance 2. ICBT w/o guidance 3. WLC	ICBT (*Deprexis*) 10-week	Guidance (Guided vs. Unguided)	E-mails once/week with feedback and reminders from therapist	MO: Difference between guided vs. unguided condition *NS* for depression (*d* = .30) TS: Difference between guided vs. unguided condition *NS* DO: Difference between guided, unguided, and WLC conditions *NS* NU: Difference between guided, unguided, and WLC conditions *NS*
Christensen et al. (2014)	GAD	558 (25.6)	5-arm RCT: 1. ICBT 2. ICBT + Telephone Reminder 3. ICBT + Email reminder 4. Placebo website (health education) 5. Placebo website + Telephone reminder	ICBT (*e-Couch*) 10-week	Human Factor (Automated vs. Interpersonal)	Telephone or automated email reminders	MO: Difference between ICBT only, ICBT + Telephone reminder, ICBT + Email reminder, and Placebo website condition *NS* for anxiety (*d*= .34) TS: *NR* DO: Lower attrition in the automated support condition compared to the human support condition NU: Lower attrition in the human support condition compared to the automated support condition

Clarke et al. (2005)	Depression	255 (46.6)	3-arm RCT: 1. ICBT + Postcard 2. ICBT + Telephone 3. TAU	ICBT (*ODIN*) Duration N/A	Delivery Mode/Type of Modality (Sync vs. Async)	Reminder via postcards or telephone calls	MO: Difference between postcard vs. telephone reminder condition *NS* for depression (*d*= .28) TS: *NR* DO: Lowest attrition in the no-reminder condition followed by the synchronous reminder condition (telephone), and the asynchronous reminder condition (postcard) NU: *NR*
Dear et al. (2015)	GAD	338 (43.8)	4-arm RCT: 1. Transdiagnostic CBT 2. Disorder-specific CBT 3. Clinician Guided (CG) 4. Self-Guided (SG)	TD-CBT and DS-CBT combined with CG and SG (*Worry course & wellbeing course*) 8-week	Guidance (Guided vs. Unguided)	Telephone or Email contacts based on participant choice; reinforce material and progress, answer questions (clinical and technical), solicit feedback, normalize recovery process	MO: Difference between guided vs. unguided condition *NS* for anxiety (*d*= .03) TS: Difference between guided vs. unguided condition *NS* DO: Difference between guided vs. unguided condition *NS* NU: Lower attrition rate in the guided condition compared to the unguided condition
Farrer et al. (2011)	Depression	155 (41.1)	4-arm RCT: 1. ICBT + Telephone guidance 2. ICBT w/o guidance 3. Telephone guidance only 4. TAU	ICBT (*BluePage & MoodGym*) 6-week	Guidance (With vs. without telephone guidance)	Weekly telephone calls to keep participants on track with program (no clinical support)	MO: Difference between guided vs. unguided condition *NS* for depression (*d*= .27) TS: *NR* DO: Lower attrition rate in the guided condition compared to the unguided condition NU: Difference between guided vs. unguided condition *NS*
Johnston et al. (2011)	Anxiety Disorders	131 (41.6)	3-arm RCT: 1. ICBT+ Licensed clinician support 2. ICBT+ Coach support 3. WLC	ICBT 10-week	Expertise (Clinician vs. Non-Clinician)	Reminders, reinforcing progress, and providing direction	MO: Difference between clinician vs. non-clinician condition *NS* for anxiety (*d*= .44) TS: *NR* DO: Difference between clinician guided vs. non-clinician guided condition *NS* NU: Difference between clinician vs. non-clinician guided condition *NS*
Kelders et al. (2015)	Depression	239 (45)	Factorial Design: 1. Web-based intervention + Counselor support 2. Web-based intervention + Automated support	Web-based Applied Relaxation 12-week	Human Factor (Automated vs. Interpersonal)	Interpersonal: Opportunity to ask questions (unclear whether clinical or technical) via e-mail to their counselor Automated: received automated email feedback	MO: Difference between automated vs. human support condition *NS* for depression (*d*= .18) and anxiety (*d*= .28) TS: *NR* DO: Lower attrition in the human support condition compared to the automated support condition NU: Difference between automated vs. human support condition *NS*

Kleiboer et al. (2015)	Anxiety and/or Depression	547 (44.5)	5-arm RCT: 1. PST w/o support 2. PST w/ requested support 3. PST w/ weekly support 4. No ICBT w/ non-specific online chat or e-mail support 5. WLC	Internet-based Problem-Solving Therapy 5-week	Guidance & Schedule (Guided vs. Unguided, On request vs. scheduled)	Weekly reminder emails; clinical guidance how to carry out the homework assignment	MO: Guided condition was superior to unguided condition. (effect size not available) Scheduled guidance was superior to on-request guidance condition for depression (*d*= .34) and anxiety (*d*= .31) TS: Highest TS in the weekly guidance condition, followed by the non-specific support and the support on request condition DO: Difference between guided vs. unguided condition NS. Lower drop-out in the IPI with on-request support condition compared to the IPI with scheduled condition and the IPI without support condition NU: Lower attrition in the guided condition compared to the unguided condition. Difference between the scheduled and on-request support conditions *NS*.
Kobak et al. (2015)	Obsessive Compulsive disorder (OCD)	87 (38.3)	3-arm RCT: 1. CCBT w/o guidance 2. CCBT + Non-clinician 4. CCBT + Clinician	CCBT 12-week	Guidance & Expertise (Guided vs. Unguided & Clinician vs. Non-Clinician	Weekly phone calls with licensed psychologist or coach for troubleshooting, goals, & support	MO: Difference between guided vs. unguided condition *NS* for OCD (effect size not available). Difference between clinician vs. non-clinician guided condition *NS* for OCD (*d*= .10) TS: Higher TS in the guided conditions compared to the unguided condition. Difference between clinician and non-clinician guidance condition *NS* DO: *NR* NU: Difference between guided vs. unguided condition *NS* Difference between clinician vs. non-clinician condition *NS*
Oromendia et al. (2016)	Panic Disorder (PD)	77 (40.7)	2-arm RCT: 1. ICBT + Non-scheduled guidance 2. ICBT + Scheduled guidance 3. WLC	ICBT *(Free From Anxiety)* 8-week	Schedule	<u>Non-scheduled:</u> Participants sent out an email to request the therapist support. <u>Scheduled</u>: Weekly-phone call from a therapist	MO: Scheduled guidance was superior to non-scheduled condition for PD (*d*= 1.18). TS: *NR* DO: Lower attrition in the scheduled support condition compared to the unscheduled support condition NU: Lower attrition in the scheduled condition compared to the unscheduled condition
Robinson et al. (2010)	GAD	150 (47)	3-arm RCT: 1. ICBT + Non-clinician support 2. ICBT + Clinician support 3. TAU	ICBT (*Worry program*) 8-week	Expertise (Clinician vs. Non-Clinician)	Weekly e-mail, telephone, or online discussion forum * Both technicians and clinicians provided technical support. Technicians did not provide clinical support.	MO: Difference between clinician vs. non-clinician support condition *NS* for anxiety (*d*= .09) TS: Difference between clinician and non-clinician support condition *NS* DO: Lower attrition in the expert clinician condition compared to the non-clinician condition NU: Difference between expert clinician vs. non-clinician condition *NS*

Santucci et al. (2014)	Depression & Anxiety	44 (22.9)	2-arm RCT: 1. CCBT + Guidance 2. CCBT w/o guidance	CCBT 8-week	Guidance (Guided vs. Unguided)	Weekly emails by lay person with reminders	MO: Difference between guided vs. unguided condition *NS* for depression (*d*= .41) and anxiety (d=.24) TS: *NR* DO: Difference between guided vs. unguided condition *NS* NU: Difference between guided vs. unguided condition *NS*
Titov et al. (2008)	Social Phobia	98 (38)	3-arm RCT: 1. CCBT + Clinician guidance 2. Self-guided CCBT 3. WLC	CCBT 10-week	Guidance (Guided vs. Unguided)	Weekly email reminders from licensed psychologist, telephone if necessary, online forum discussion	MO: Guided condition was superior to unguided condition for SP (*d*= .66). TS: *NR* DO: Difference between guided vs. unguided condition *NS* NU: Lower attrition in the guided condition compared to the unguided condition
Titov et al. (2009a)	Social Phobia	163 (NR)	2-arm RCT: 1. CCBT + Guidance 2. CCBT w/o guidance	CCBT 6-week	Guidance & Human factor (Guided vs. Unguided)	Weekly telephone, email, and SMS by research staff for reminders, feedback, and resources	MO: Guided condition was superior to unguided condition for SP (*d*= .28). Human support was superior to automated support condition for SP (*d*=.03). TS: *NR* DO: Difference between guided vs. unguided condition *NS*. Difference between human vs. automated support condition *NS* NU: Lower attrition in the guided condition compared to the unguided condition. Lower attrition in the human support condition compared to the automated support condition
Titov et al. (2009b)	Social Phobia	82 (NR)	2-arm RCT: 1. ICBT + Telephone guidance 2. ICBT+ Online forum guidance	ICBT 8-week	Delivery mode/Type of modality (Telephone vs. Web message)	Weekly telephone call with technician OR online discussion forum moderated by Licensed Psychologist	MO: Difference between telephone vs. web Message condition *NS* for SP (*d*= .18) TS: *NR* DO: Difference between synchronous (telephone) vs. asynchronous (web message) support condition *NS* NU: Difference between synchronous (telephone) vs. asynchronous (web message) support condition *NS*
Titov et al. (2010)	MDD	141 (43)	3-arm RCT: 1. ICBT+ Clinician support 2. ICBT+ Non-clinician support 3. WLC	ICBT (Sadness program) 8-week	Expertise (Clinician vs. Non-Clinician)	Weekly email, telephone, or online forum contact with therapist or technician	MO: Difference between clinician vs. non-clinician support condition *NS* for depression (*d*= .07) TS: *NR* DO: Lower attrition in the clinician support condition compared to the non-clinician support condition NU: Lower attrition in the non-clinician support condition compared to the clinician support condition

Note: MO: Main outcomes; TS: Treatment satisfaction; DO: Dropout; NU; Non-usage; NS: Not significant; NR: Not reported; WLC: Wait List Control; Sync: Synchronous; Async: Asynchronous

Table 2. Summary of included studies by support factors

Support Factor	Number	Study
Presence of Guidance Guided vs. Unguided	9	Berger et al. (2011a), Berger et al. (2011b), Dear et al. (2015), Farrer et al (2011), Kleiboer et al (2015), Kobak et al (2015), Santucci et al (2014), Titov et al (2008), Titov et al (2009a)
Therapist expertise	5	Andersson et al (2012), Johnston et al (2011), Kobak et al (2015), Robinson et al (2010), Titov et al (2010)
Human factor	3	Christensen et al (2014), Kelders et al (2015), Titov et al (2009a)
Schedule of support	3	Berger et al (2011a), Kleiboer et al (2015), Oromendia (2016),
Delivery mode	2	Clarke et al (2005), Titov et al (2009b)
Synchronicity of communication	2	Clarke et al (2005), Titov et al (2009b)
Intensity of support	1	Alfonsson et al (2015)

Table 3. Summary of included studies by disorder type

Disorder Type	Number	Study
Depression, Major Depressive Disorder	7	Berger et al (2011b), Clarke et al (2005), Farrer et al (2011), Kelders et al (2015), Kleiboer (2015), Santucci et al (2014), Titov et al (2010)
Anxiety (nonspecific)	4	Alfonsson et al (2015), Johnston et al (2011), Kleiboer (2015), Santucci et al (2014)
Social Phobia	4	Berger et al (2011a), Titov et al (2008), Titov et al (2009a), Titov et al (2009b)
Generalized Anxiety Disorder	3	Christensen et al (2014), Dear et al (2015), Robinson et al (2010)
Social Anxiety	1	Andersson et al (2012)
Obsessive-Compulsive Disorder	1	Kobak et al (2015)
Panic Disorder	1	Oromendia et al (2016)

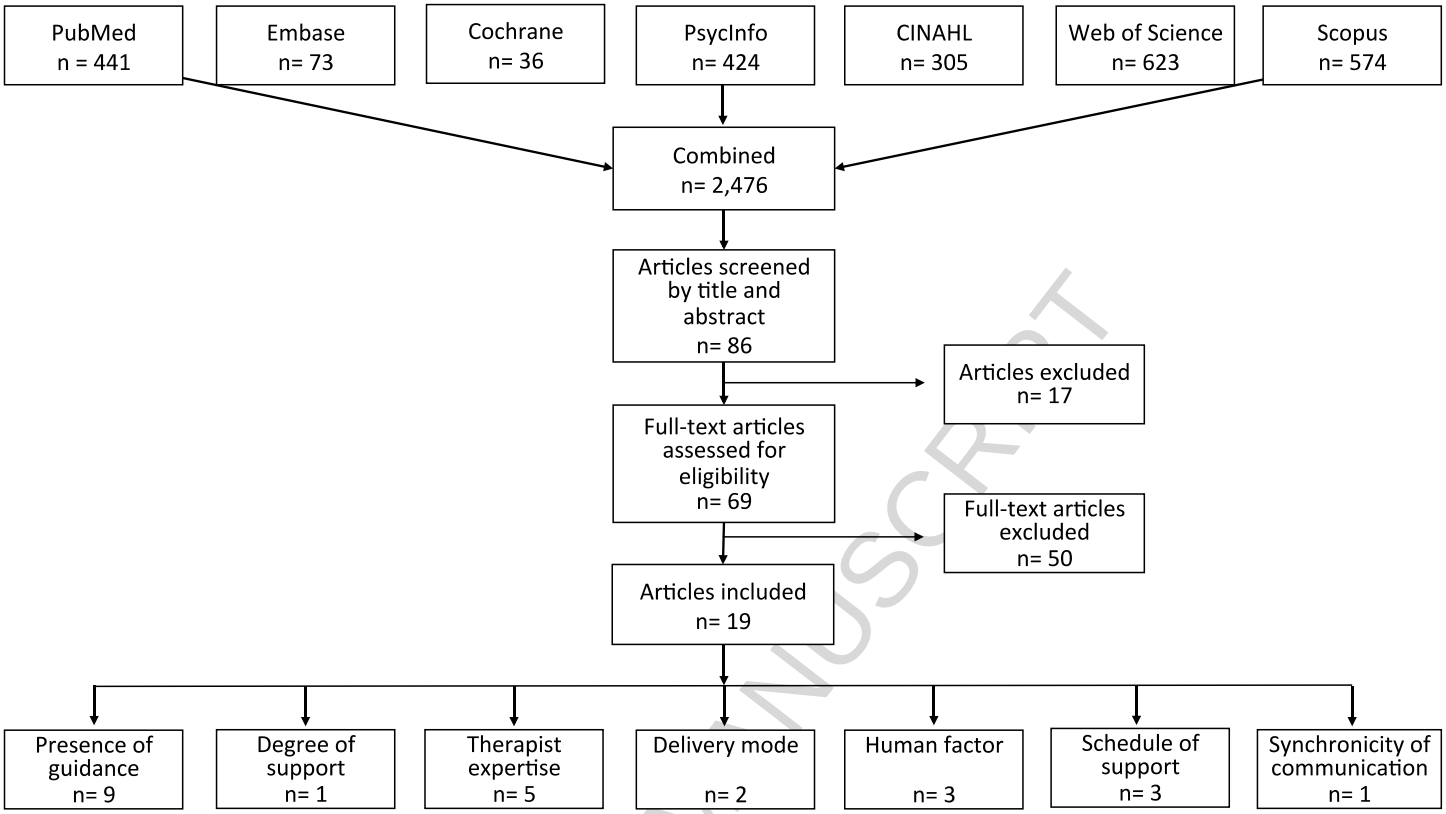

Figure 1. Flow chart of literature search

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Contributors

Authors Minjung Shim and Adam Gonzalez designed the review. Author Minjung Shim developed search strategies, conducted search, extracted the data, and wrote the first draft of the manuscript. Author Michael Bleidistel served as a second reviewer of the selected studies, conducted data extraction, and wrote the first draft of a section of the manuscript. Authors Brittain Mahaffey and Adam Gonzalez reviewed and made final edits to the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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Highlights

- We examined the role of human-support in internet based psychological interventions (IPIs) for the treatment of depression and anxiety disorders.
- Nineteen RCTs were included and 7 types of human support factors were identified.
- Only one factor, providing structured support in a fixed-interval schedule compared to unscheduled support had a significant effect on treatment outcomes.
- There were mixed findings regarding guided versus unguided interventions and human versus automated support.
- The majority of available evidence also suggests that level of therapist expertise has little to no impact on treatment outcomes.