A Review on Online Intervention for Anxiety Disorder

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Anxiety Disorders share features of excessive fear and anxiety related behavioral disturbances. Diagnosis of Anxiety Disorders often leads to a high financial burden to the sufferers and economical lost to the society with high rates of health care costs and days on sick leave. Online intervention is seen as a good option to deal with anxiety issues. Therefore this paper aimed to review past studies on online intervention programs for anxiety related problems and its effectiveness. Eight studies from electronic databases PubMed, PsycINFO, MEDLINE, and CINAHL were identified. The findings suggest that an online intervention program can be effective in reducing anxiety symptoms. Several different psychological treatments for Anxiety Disorders exist, but Cognitive Behavioral Therapy (CBT) is the most used in online intervention program. Online program using CBT targeting Anxiety Disorders is commonly based on psychoeducation, cognitive restructuring, and relaxation. Additional interventions components often used in online intervention programs are problem-solving, worry exposure, mindfulness, and relapse prevention. In conclusion, the online interventions for Anxiety Disorders could serve as cost and time effective alternatives, but with certain considerations, especially on adherence towards the treatment.

Keywords: anxiety disorders, online intervention, cognitive behavior therapy

Mental illness is an alarming issue globally. It's a silent killer of the population as it is hard to identify the sufferer through physical means. One of the major mental illnesses concerning the Malaysian population is Anxiety Disorders. According to Wong et al. (2016), anxiety prevalence in general population in Malaysia at primary care is around 6-8%.

Individuals with anxiety disorders experience excessive anxiety (fear or worry) which is disproportionate to the actual threat or danger and significantly interferes with normal daily functioning. Anxiety disorders can include a range of physical (for example, trembling, tense muscles, rapid breathing), cognitive (for example, worries, difficulty concentrating), emotional (for example, distress, negative affect, irritability), and behavioral (for example, difficulty sleeping, hyperarousal) symptoms.

To this date, several treatment approaches have opted to help individuals with anxiety disorders to alleviate the symptoms and

improve their quality of life. Treatment of anxiety disorders has largely consisted of pharmacological treatments, psychological therapies or a mixture of both (Gould et.al, 1997). However, completion and cessation of pharmacological therapy without continuing to take maintenance drugs can result in relapse (Davidson. et.al., 2008).

Psychological therapies are often preferred, especially where they have produced similar outcomes to pharmacological treatments, along with lower relapse rates (Sturmey and Hersen, 2012). Among several psychotherapies options, Cognitive-behaviour therapy (CBT) is commonly chosen as the psychological treatment of choice for Anxiety Disorders. CBT for Anxiety Disorders is consisted many elements, such as cognitive restructuring, graded exposure, mindfulness, relaxation techniques and psychoeducation about the disorder (Dugas et.al., 2003).

Despite the availability of various treatments, healthcare providers faced a discrepancy between the burden of mental health conditions and the availability of cost-effective psychological treatments (Kohn et al., 2004). There are multiple barriers to accessing treatment, including waiting-lists, costs, distance from service locations, negative perception of treatments, and personal stigma (Mohr et al., 2010).

These issues act as contributing factors to the development of internet-based intervention therapies or e-psychotherapy. This e-psychotherapy is a form of self-help treatment which gives access to important materials and links users to necessary treatment plans for their respective issues. The use of e-psychotherapy has been rapidly expanding in the last two decades, with growing evidence suggesting that the provision of mental health services over the internet is both clinically efficacious and cost-effective (Sucala,Schnur, Constantino, Miller, Brackman, and Montgomery 2012)

Method

Search Strategy

We searched PubMed, PsycINFO, MEDLINE Complete, and CINAHL Plus for reports on online intervention for anxiety disorder that used CBT as their main psychotherapy medium, from the first date available to October 2019. The search focused on titles and abstracts that included the keywords ‘online intervention’* in combination with ‘anxiety disorder’ AND (cognitive behavior therapy*). Both American-English and British-English spellings were used as search terms.

Online Intervention Framework for Anxiety Disorders

There are few online interventions for Anxiety Disorders, such as the Mindfulness-Enhanced iCBT Program, the I-AiMentalWELLness, the Uni Virtual Clinic, the MindWise (2.0), ThisWayUP Clinic, The Chilled Out Program, The Managing Stress, and Anxiety Course, and program by Hadjistavropoulos et al. (2015). Most of the modules originated from Western countries such as Australia, Canada, and Ireland. Yet, there’s one pilot study protocol from Indonesia that intended to moderate their intervention in the Indonesian language. In general, all the modules aim to provide online-based services for the mental health but the differences are in terms of with or without therapist guidance, target participants, duration of the modules, and applied CBT’s constructs.

The Mindfulness-Enhanced iCBT program incorporated formal and informal mindfulness exercises within an existing trans-diagnostic iCBT program by Newby

et al (2014) for mixed depression and anxiety. The program consisted of traditional CBT strategies, such as behavioral activation, cognitive restructuring, and graded exposure, which were supplemented by mindfulness instruction and practice exercises, including seven audio guided meditations adapted from the Mindfulness-Based Cognitive Therapy (MBCT) protocol (Segal et al., 2004) and provided to participants on a CD. The program was self-paced, with one lesson becoming available each week during the first 7 weeks of the study. It was delivered via a website in the form of an illustrated story about individuals who gain mastery over their symptoms by practicing mindfulness and CBT skills. After completion of first two lessons, participants were contacted by the clinician through email to enquire about their experience with the lessons and answer any inquiries that participants might have. The participant's level of distress also was constantly monitored and the clinician will initiate contact if necessary.

Next, a pilot study protocol originated from Indonesia is designed to be moderated in their mother tongue. The I-AiMentalWELLness adopted the theoretical framework of Barrera et al. (2013). There are total of eight sessions. The first seven-session given consequently, while the last session will be given after an interval of four weeks and aimed to refresh content learned in the previous session. All online sessions include text, exercises, testimonials, audio, and illustrated pictures, which help participants to integrate the content of the sessions into their daily lives. Each of the sessions lasts approximately 60 minutes. Participants will be provided limited feedback by Clinical Psychology master students and licensed psychologists.

The Uni Virtual Clinic (UVC) is a trans-diagnostic online mental health program designed specifically for Australia university students. During the 6 weeks intervention period, participants received a weekly generic email and a text message encouraging them to engage with the UVC. The UVC delivers online information via tailored factsheets, screening and formative feedback, and psychotherapeutic modules based on cognitive behavior therapy and mindfulness. Users can freely access all content within the intervention; and if preferred, the program also contains tools designed to guide students to the most appropriate content based on their needs and level of mental health literacy.

MindWise (2.0) is an online program designed to assist adults with mild depression or anxiety to manage their mood by introducing them to CBT theory and techniques based on Beck's model (Beck, 2011; Beck & Haigh, 2014). The program consisted of four modules that help to increase participant's psychological and behavioral flexibility to change patterns of learned helplessness, through decreasing avoidance and decreasing fear of failure. The module was completed by users at their own pace. Modules comprises on-screen presentation of diagrams and written content. Video examples, on-screen quizzes, and downloadable worksheets are incorporated into the on-screen material. Modules took approximately 20–40 minutes to complete, depending on the pace of the user and can be reviewed and repeated as needed. Program participants were guided by trained practitioners that demonstrated how to log in to the website and answers any related inquiries.

ThisWayUp Clinic is an online treatment clinic for depression and anxiety. The Depression and Anxiety program is a six-lesson online CBT program for users experiencing mental health issues. Lesson content is presented in the form of an illustrated comic-style story about two

characters who experience anxiety and depression and gain mastery over their symptoms with the help of a clinician and through the use of CBT techniques. Participants have access to frequently asked questions for each lesson, and extra resources on key information. At the end of each illustrated lesson, participants were asked to download and print out a lesson summary that also includes homework for the lesson. Participants have 30 days to complete the first two lessons and are allowed up to 90 days to complete the entire program. The progress of the participants was monitored by their supervising clinician, they will receive an email once participants complete each lesson.

Moreover, the Chilled Out program comprises eight online modules. Each module took approximately 30 minutes to complete. The modules created to teach adolescents to gradually manage their anxiety. The program was presented in interactive form as it includes a combination of different multimedia channels such as text, audio, illustrations, worksheets, cartoons, and video vignettes, to deliver CBT-inspired activities and exercises. Participants were introduced to six video cases of adolescents presenting with different anxiety issues. Throughout the program, these adolescent characters reappear as they are shown applying various program skills and coping strategies to manage their problem. Once every week the adolescents received a phone call from a therapist, to ensure they have a full understanding of the program. Parents of the adolescent also received a booklet explaining the program. Yet it's up to the adolescent whether they want their parent's support or not.

The Managing Stress and Anxiety Course is a structured intervention that participants complete over 8 weeks. The program used narrated cartoons to teach therapeutic material and skills. The course was based on the Wellbeing Course created by the authors (Titov et al., 2013; Titov et al., 2014). It's comprised of material presented in a didactic form (i.e., text-based instructions and information) combined with case-enhanced learning examples (i.e., detailed case studies). The primary difference between the Wellbeing Course and Managing Stress and Anxiety Course was that the latter employed age-appropriate cases for older adults. There are five lessons in total, with each lesson presented in a slide show format combining text and images, with approximately 60 slides per lesson and 50 words per slide. Participants are instructed to read lessons over 8 weeks and are provided access to the lessons according to a timetable. Participants received a reminder through notification emails and have access to secure email-type interaction with the therapist.

Lastly, a Canada originated online CBT program by Hadjistavropoulos et al., (2014). It consists of 12 modules of free therapist-assisted based on the CBT framework. The psychoeducation was distributed across 12 modules and used various media (i.e., text, graphics, audio, and video). Check-in questions and mood ratings were presented at the beginning of each module and homework exercises were assigned at the end of each module. Participants were able to communicate with assigned therapist via a private messaging system on a secure server.

Contents of Online Interventions for Anxiety Disorder

Widely used principles of an online intervention for Anxiety Disorders is CBT, with components that similar to the traditionally face-to-face CBT approach. Numbers of specific components included are psychoeducation, cognitive restructuring, graded exposure, relaxation training, problem solving and relapse

prevention. The rationale are, clients overcome emotional avoidance and learns that anxiety is not debilitating, but manageable and recedes after time.

Psychoeducation

As in most cognitive-behavioral treatments, psychoeducation about Anxiety Disorders is an important aspect of therapy. Thorough knowledge of the phenomenology, etiology and common physiological response of Anxiety Disorders, patients could clear any misconception and experience relief by knowing that their experiences are not uncommon (Barlow et al. 1996; Borkovec 1994).

All eight discussed modules started intervention with psychoeducation. Some of the modules only include psychoeducation in the first part of the intervention, while Hadjistavropoulos et al. (2015) included the psychoeducation elements in all 12 modules. For all online intervention, psychoeducation component included at introduction to the program, basic premise of CBT, symptoms, and treatment of Anxiety Disorders. All these are presented in either in the forms of text, audio, illustrations, comics strip, and interactive video.

Cognitive Restructuring

Patients with anxiety disorders often overestimate the likelihood of negative events and underestimate their ability to cope with difficult situations (Beck et al. 2005). These cognitive distortions play a major role in the vicious cycle of anxiety, and they accentuate the patient's feelings of danger and threat. Thus, cognitive restructuring targets the faulty appraisal system and attempts to guide the patient toward more realistic, logical thinking (Sanderson et al. 1994).

All eight discussed modules included the concept of cognitive structuring as part of intervention. Kladnitski et al (2018), cooperated CBT strategies with mindfulness to teach participants to gain mastery and reduce their symptoms. While Collins et al (2018) applied cognitive restructuring techniques to help participants build balanced thinking and normalizing anxiety.

Graded Exposure

In exposure, patients make contact with the feared stimuli (either imaginary or in vivo) and this contact is maintained until the anxiety associated with the contact subsided (Ougrin, 2011). Exposure has been described as the most effective way to treat fear. Research indicates that the efficacy of exposure is optimal when it is gradual, repeated (Longmore et. al, 2007), and prolonged with practice tasks specified.

Only, Managing Stress and Anxiety Course (Dear et al. 2014) that exclude graded exposure in their module. All other seven includes and highlighted it in their modules. In the MindWise 2.0 module, graded exposure is the third module (*Avoidance*), explaining why avoidance is harmful and the roles of avoidance in maintaining anxiety. Mindfulness-Enhanced iCBT program implements graded exposure in their fifth and sixth lessons (*Learning to Face your Fears* and *Overcoming Your Fears*), psychoeducation about avoidance and safety behavior, the rationale of exposure and steps to build exposure hierarchy using step ladders. Participants were also taught on how to handle difficulties with exposure and use mindfulness techniques to overcome the difficulty.

Relaxation Training

The function of relaxation training is to reduce the physiological reaction of worry

and anxiety by lowering the patient's overall arousal level. Relaxation reduces arousal, but it may play other roles as well. First, relaxation may help broaden the focus of one's attention. Anxiety tends to narrow attentional focus (Barlow et al. 1996); thus, as a result of its anxiety-reducing property, relaxation may widen the scope of attention and, therefore, increase the patient's ability to consider more alternatives in an anxiety-provoking situation. Besides, relaxation may serve as a distraction. As a sole method, distraction is not effective because by constantly avoiding anxious cognitions, patients are subtly supporting their belief that their thoughts are threatening and/or harmful. However, distraction can be an effective tool when the Anxiety Disorders patient is 'stuck' in a worrying pattern and needs to break the perseverating thoughts (Huppert & Sanderson 2010).

Mindfulness-Enhanced iCBT program incorporated relaxation techniques in terms of deep breathing and mindfulness. Participants were given instructions for the relaxation technique and encouraged to practice it both during anxious periods or normal state. While the Chilled Out program, includes calming activities as part of the list of coping strategies for adolescents to overcome their anxiety symptoms. Both ThisWayUP Clinic and Managing Stress and Anxiety introduce deep breathing as part of their relaxation training component.

Problem Solving

Problem-solving and decision making skills include a set of abilities that will increase compatibility, positive feeling and efficient behavior; therefore helps in overall general well-being of individuals with anxiety symptoms.

Problem-solving techniques were included in all online intervention packages discussed except the MindWise 2.0 and Managing Stress and Anxiety courses. The six modules explained the use of problem-solving either through step by step procedure (Rahmadiana et al., 2018; Newby et al., 2014) or by asking participants to list our their problems and linked to relevant contents (Farrer et al., 2019).

Relapse Prevention

To prevent clients' relapse, most CBT-based modules have strongly strengthened their relapse prevention approach. Five intervention programs include relapse prevention in their module, as the last part before the module completion. In the Chilled Out program, an overview of coping skills and techniques was summarized and the users were asked to keep on practicing in the real-life situation. While the Mindfulness Enhanced iCBT program explained the difference of lapse and relapse, reviewed on learned skills and further support available for the participants who need it.

All discussed intervention programs, develop and construct their intervention based on theoretical framework and specialty. However the intervention techniques used frequently overlap among programs, proving the effectiveness of such techniques in care services for people with Anxiety Disorders. Below, are tables that summarizing study characteristics and contents of the discussed intervention program.

Table 1

Summary of study characteristic

No	Name of the program	Authors, Year	Target Participants	Duration of the Program	No of the Sub-Modules	Guidance or non-guidance
1	Mindfulness-Enhanced iCBT Program	Kladnitski et al (2018)	Adult, 18 years old and above	14 Weeks	7	Yes, by clinical psychologists.
2	I-AiMentalWELLness Program (Written in the Indonesian language)	Rahmadiana et al (2018)	Adult, 18 years old and above, university student	11 Weeks	8	Yes, by Clinical Psychologist Master student and licensed Psychologist
3	Uni Virtual Clinic	Farrer et al (2019)	Adult, 18 years old and above, university student	6 Weeks	Depends on the issues	No, but distressed users can contact the assigned psychologist.
4	MindWise (2.0)	Collins et al (2018)	Adult, 18 years old and above, Irish Primary Care patients	According to user's pace	4	Yes, by trained Clinical Psychologist
5	ThisWayUP Clinic	Newby et al (2014)	Adult, 18 years old, Primary Care patients	Users allowed up to 90 days to complete the program.	6	Yes, by general practitioners, psychologists, and other allied health professionals
6	The Chilled Out	Stejnerklar et al (2018)	Adolescence (13-17 years old)	12 Weeks	8	Yes, by a therapist with the help of adolescent's parents
7	The Managing Stress and Anxiety Course	Dear et al. (2014)	Older Adult (60 years and above)	8 Weeks	5	Yes
8	Hadjistavropoulos et al. (2015)	Hadjistavropoulos et al. (2015)	Adult, 18 years old and above	Not Specify	12	Yes, by a trained therapist

Table 2

Summary of Program Contents

No	Name of the program	Psychoeducation	Cognitive Restructuring	Graded Exposure	Relaxation Training	Problem Solving	Relapse Prevention
1	Mindfulness-Enhanced iCBT Program	Psychoeducation on depression, anxiety, principles of CBT, mindfulness	On identifying unhelpful beliefs, identifying positive and negative belief and challenging unhelpful beliefs.	The rationale for exposure, building exposure hierarchy, exposure to thoughts and emotions	On breathing exercises and mindfulness	Explanation of structured problem-solving techniques	Psychoeducation about lapse and relapse, review on skills, relapse prevention plan, further help available
2	I-AiMentalWELLness Program	Psychoeducation on depression and anxiety	Explanation and steps in cognitive restructuring	Exposure to anxiety-provoking situations	-	Steps in problem-solving	Focuses on planning for the future
3	Uni Virtual Clinic	Information on depression and anxiety	On positive and negative beliefs, how to challenge it	Graded Exposure	Throughout the module	Problem Solving tool- users list out their issues and linked to relevant contents	-
4	MindWise (2.0)	Overview of CBT's concept, introducing ABC model, core beliefs	Information on unhelpful thinking, building balanced thinking and normalizing anxiety	On roles of avoidance in maintaining anxiety	-	-	-

5	ThisWayUP Clinic	Psychoeducation about anxiety and depression, the fight or flight response.	Education on the cognitive model, introduction to thought monitoring, challenge positive and negative beliefs	Education about avoidance and safety behaviors; graded exposure	Controlled breathing exercises	Explanation and steps on structured problem solving	Relapse Prevention plan
6	The Chilled Out	Psychoeducation about anxiety, learning to set goals. Linking thoughts and feelings.	Identifying and challenging negative and unrealistic thoughts	Graded exposure using stepladders.	Calming activities as part of coping skills	Explanation on how to implement problem-solving	Relapse Prevention plan
7	The Managing Stress and Anxiety Course	Psychoeducation on anxiety (content created to match older adult)	Identifying and challenging negative thinking	-	Breathing exercise	-	-
8	Hadjistavropoulos et al. (2015)	Psychoeducation about targeted disorder distributed across 12 sub-modules.	Identifying and challenge negative thoughts	Graded Exposure	Relaxation skills	Problem-solving skills	Strategies for managing disorders

Effectiveness of Online Intervention for Anxiety Disorder

Research shows that online intervention, especially CBT based approaches are effective in treating people with anxiety disorders (Kladnitski et al. 2018; Farrer et al 2019; Collins et al., 2018; Newby et al., 2014; Stejnerklar et al., 2018; Dear et al., 2014; Hadjistavropoulos et al. 2015).

Mindfulness-Enhanced iCBT program conducted by Kladnitski et al. (2018) assessed treatment engagement, satisfaction, and side-effects. They found a large, significant reduction in distress (Hedges g =1.55), anxiety (g= 1.39), and depression (g = 1.96), and improvements in trait mindfulness (g =0.98) and well-being (g =1.26) between baseline and post-treatment, all of which were maintained at follow-up. Treatment satisfaction was high among treatment-completers, with minimal side-effects reported, although adherence rate was lower than expected (59.1% completed). These findings show that it is feasible to integrate online mindfulness training with iCBT for the treatment of anxiety and depression, but further research is needed to improve adherence towards the treatment.

Next, the Uni Virtual (UVC) program by Farrer et al. (2019) mixed models analysis demonstrated that the use of the UVC was associated with significant reductions in social anxiety and improvements in academic self-efficacy. This program was not effective in reducing symptoms of depression, anxiety, or psychological distress compared to a control group. The majority of participants in the intervention condition engaged with the program, and most reported satisfaction with the UVC. Overall the results suggest that multi-component online interventions such as the UVC have utility in a university environment.

On the other hand, MindWise (2.0) by Collins et al. (2018), shows that at post-intervention, participants significantly reduced symptoms of anxiety but no change in depression or work/social functioning. Yet, further program development and related research appear both needed to lower the program drop-out rate.

Newby et al., (2014), ThisWayUP Clinic found that on average, patients demonstrated significant reductions on all outcome measures of depression, anxiety (including generalized anxiety, social and panic disorder severity), disability and distress. The effect sizes of the reductions in depression, and generalized anxiety between baseline and post-treatment were large (>0.9). While the adherence towards the program was modest (47.3%), thus a method to increase adherence is needed to optimize the benefits for the patients.

A Danish translated program, the Chilled Out by Stejnerklar et al. (2018) demonstrated that five of the six participants completed the program. Participants were generally satisfied with the program and the majority would recommend it to others. Preliminary clinical outcome results indicated moderate to large improvements (e.g., a standardized mean difference from pre- to post-treatment of d =1.54 on the clinical severity rating of their primary anxiety disorder). Results from this study indicate that a translated and revised version of the Chilled Out program could be a feasible psychological intervention for Danish adolescents with anxiety disorders.

The Managing Stress and Anxiety Course for older adults by Dear et al. (2019), Eighty-four percent of participants completed the iCBT course within the 8 weeks and 90% provided data at posttreatment. Significantly lower scores on measures of anxiety (Cohen's d = 1.43; 95% CI: 0.89 – 1.93) and depression

(Cohen's d = 1.79; 95% CI: 1.21 – 2.32) were found among the treatment group compared to the control group at post-treatment. These lower scores were maintained at a 3-month and 12-month follow-up and the treatment group rated the iCBT treatment as acceptable.

Lastly, an intervention program by Hadjistavropoulos et al. (2015), found that 107 participants of 112 for generalized anxiety, completed pretreatment measures, 78 completed mid-treatment measures, and 58 completed posttreatment measures. Of the 83 patients assigned to the ICBT program for depression, 80 completed pretreatment measures, 57 mid-treatment measures, and 41 posttreatment measures. It also showed that participants with higher symptom severity reported and completed more modules than vice versa.

Conclusion

Overall**,** this paper had reviewed eight studies that apply CBT based approaches on their modules construction. There are six intervention techniques that had been used commonly in all these programs. The intervention components over lapsed between programs are psychoeducation, cognitive restructuring, graded exposures, relaxation training, problem solving and relapse prevention. All eight reviewed studies showed effectiveness of programs in treating people with Anxiety Disorders.

Acknowledgment

This research was funded by MARS-JOHAN Company Limited.

We thank the Ethical Committee of Universiti Kebangsaan Malaysia for approving the study (Ethical Code: NN-2018-060)

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