



Mood management effects of brief unsupported internet interventions



Eduardo L. Bunge, Rachel E. Williamson, Monique Cano, Yan Leykin, Ricardo F. Muñoz *

Palo Alto University, United States

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ABSTRACT

Background: Most users of unsupported Internet interventions visit that site only once, therefore there is a need to create interventions that can be offered as a single brief interaction with the user.

Objective: The main goal of this study was to compare the effect of a one-session unsupported Internet intervention on participants' clinical symptoms (depressive and anxiety symptoms) and related variables (mood, confidence and motivation).

Method: A total of 765 adults residing in the United States took part in a randomized controlled trial. Participants were randomly assigned to one of five brief plain text interventions lasting 5–10 min. The interventions designed to address depressive symptoms were: thoughts (increasing helpful thoughts), activities (increasing activity level), sleep hygiene, assertiveness (increasing assertiveness awareness), Own Methods (utilizing methods that were previously successful). They were followed-up one week after consenting.

Results: A main effect of time was observed for both depression ($F(1, 563) = 234.70, p < 0.001$) and anxiety ($F(1, 551) = 170.27, p < 0.001$). In all cases, regardless of assigned condition and Major Depressive Episode status, mean scores on both positive outcomes (mood, confidence and motivation) and negative outcome scores (depression and anxiety) improved over time.

Conclusions: Brief unsupported Internet interventions can improve depressive symptoms at one-week follow-up. Further outcome data and research implications will be discussed.

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1. Introduction

Major depression is estimated to become the second largest contributor to the global burden of disease in 2020 (Murray and Lopez, 1997); with an estimated 350 million people suffering from clinical depression worldwide (World Health Organization, 2015). The economic effects of depression are estimated at \$77.4 billions lost annually in the United States. Both treatment and prevention of major depressive episodes can reduce the burden of depression (Muñoz et al., 2012). However, most people with major depression do not receive adequate treatment (Kessler et al., 2003), and of those who do receive treatment one-third do not improve (Warden et al., 2007). Thus, novel models for delivering mental health services and reducing the burden of mental disorders are needed (Kazdin and Rabbitt, 2013).

Unsupported Internet interventions represent a novel model of intervention delivery that is gaining in popularity, and there is now a growing body of evidence supporting the efficacy of Internet intervention for preventing and treating major depression. Andersson and Cuijpers (2009) conducted a meta-analysis in which they concluded that Internet treatments meet the criteria for evidence-based

treatments for depression. Other studies have shown that Internet programs are effective in preventing depressive episodes in adults (Holländare et al., 2011; Buntrock et al., 2016) and in adolescents (Calea and Christensen, 2010; Calea et al., 2009; Van Voorhees et al., 2009). Additionally, unsupported Internet interventions increase accessibility, patient autonomy, and are “non-consumable” (i.e., they could be scaled up at marginal costs without losing therapeutic power) (Leykin et al., 2014; Muñoz, 2010).

However, there are several limitations to unsupported Internet interventions for depression. Perhaps the most salient ones are the high rates of attrition (Eysenbach, 2005; Muñoz et al., 2015), lower adherence, and effect sizes that tend to be small to moderate (Andersson and Cuijpers, 2009). There is some emerging evidence that in some circumstances, Internet interventions for depression can produce negative effects (Schueller et al., 2013), but this topic has been scarcely explored in the literature (Rozenal et al., 2014). Certainly, several of these limitations are not particular to unsupported Internet interventions. Whereas several groups have found that most visitors to online interventions visit the sites only one time (Clarke et al., 2002; Leykin et al., 2014), this is in fact similar to traditional psychotherapy with live providers, in which the mean of visits to mental health services tend to be between three and five visits (Hansen et al., 2002) and the modal number of visits to mental health clinics is one (Weir et al., 2008). The critique of especially poor adherence to unsupported

* Corresponding author at: Institute for International Internet Interventions for Health (i4Health), Palo Alto University, 1791 Arastradero Rd., Palo Alto, CA 94304, United States. E-mail address: rmunoz@paloaltou.edu (R.F. Muñoz).

intervention may therefore be unwarranted, and the assumed expectation of high adherence to any psychosocial treatment, including Internet interventions, may be unjustifiably optimistic. While this limitation is clear for unsupported Internet interventions, guided Internet interventions tend to yield higher adherence rates (e.g., Andersson and Hedman, 2013; Hedman et al., 2013). That most users of unsupported Internet interventions visit a site only once speaks to the need of creating interventions that can be offered as a single brief interaction with the user. Indeed, such interaction represents a unique opportunity to take advantage of the user's current interest and availability and to offer information that could potentially improve current poor mood or prevent a future poor mood. Further, if brief unsupported Internet interventions lead the user to experience positive outcomes, the user may be tempted to return to the site or to pursue additional brief (or perhaps even longer) interventions, or to recommend this intervention to other users, which will increase the societal benefit of these interventions. Brief unsupported Internet interventions that are based on specific therapeutic tools or techniques may serve as a type of a naturalistic dismantling study, allowing us to better understand the relative utility of individual components or approaches in therapy, at least insofar as they are delivered online. Further, data gathered from such brief unsupported Internet interventions could be highly useful in the development of more extensive Internet intervention packages. After testing brief interventions, researchers could optimize and improve the best performing ones, discard those with limited utility, and combine interventions into more comprehensive packages for users who wish to take advantage of further opportunities to improve their mood.

Previous studies of brief treatments were first done in the traditional face-to-face format; and in recent years a few studies have also tested the utility of brief interventions through Internet. Although there were promising outcomes, given the limited number of studies, and the wide variety of populations and intervention types, drawing firm conclusions from these studies is difficult. For instance, Ayers et al. (2015) have shown that a brief, simple online intervention can improve the mood of postnatal women by changing their negative self-beliefs; the vast majority of participants reported liking the intervention. Ahmedani et al. (2015) found in a pilot study that a brief twenty minutes intervention based on CBT and Motivational Interviewing increased treatment seeking and reduced depression scores of participants with depression and chronic pain. Christensen et al. (2006) conducted an online randomized control trial comparing different versions of a Internet CBT intervention for depression. Results indicated that a single module of intervention was not effective in reducing depression, but those who completed three modules did attain reductions of their depression scores; interestingly, longer programs were associated with higher dropout rates (Christensen et al., 2006). Finally, other studies conducted with perinatal women have demonstrated the efficacy of brief Internet interventions for substance use (Ondersma et al., 2012, 2005, 2011, 2007, 2014). Most of these studies could be included under a Low Intensity (LI) CBT paradigm which can be defined as brief interventions that seek to increase the access to efficient and effective evidenced-based treatment to individuals with mild psychological disorders who would not otherwise have access due to a lack of resources and/or time (Bennett-Levy et al., 2010). The hallmark of LI CBT is that it does not require a highly trained mental health professional (e.g., clinical psychologist) to provide treatment, making the dissemination of this form of psychotherapy more readily available (Bennett-Levy et al., 2010). Although there are several potential benefits of brief unsupported interventions, their efficacy is not yet clear. Additionally, previous studies did not examine which components of an intervention were crucial to outcomes, highlighting the need to develop short-term intervention studies specifically to understand the differential effectiveness of psychotherapeutic components (Christensen et al., 2006).

Thus, the main goal of this study was to compare the one-week impact of brief unsupported Internet interventions delivered via a

randomized clinical trial on participants' clinical symptoms (depressive and anxiety symptoms) and non-clinical variables (mood, confidence and motivation). Additionally, we examined participant-rated level of usefulness of the conditions. Participants were randomly assigned to one of five very brief unsupported interventions (lasting 5–10 min). The interventions were: increasing activity level, increasing helpful thoughts, increasing sleep hygiene, increasing assertiveness, or using their own mood managing method.

2. Method

2.1. Participants

Participants were recruited via Amazon's Mechanical Turk (Buhrmester et al., 2011). The sample consisted of 765 adults residing in the United States, aged 20 to 55 years old ($M_{\text{age}} = 35.9$, $SD_{\text{age}} = 8.7$); 69.2% were female. Participants were asked to complete a follow-up survey one week after completing the intervention to which they were randomized; 464 individuals (60.65% of the original sample) completed the follow-up survey. The only eligibility criteria for the study were that participants be at least 18 years of age, live in the U.S., and provide informed consent. The Institutional Review Board (IRB) at Palo Alto University approved this study. The trial was registered at clinicaltrials.gov, ref. number: NCT02748954.

2.2. Measures

2.2.1. Demographic questionnaire

Participants indicated their gender, age, country of residence, and postal code.

2.2.2. Depression

Depression was assessed via the Patient Health Questionnaire (PHQ-9; Kroenke & Spitzer, 2002), which is a widely used 10-item measure that screens for presence of a major depressive episode as well as assesses the severity of depressive symptomatology over a 2-week period. The measure is known to have good psychometric properties (Kroenke, Spitzer, & Williams, 2002; Martin, Rief, Klaiberg, & Braehler, 2006). The presence of a major depressive episode was determined using the criteria defined in the PHQ-9 scoring instructions (based on DSM-IV criteria for MDE). Specifically, respondents must endorse either item 1 (anhedonia) or item 2 (depressed mood) with a rating of 2 (more than half the days) or higher and endorse at least 5 items with a rating of 2 or higher (with the exception of item 9 (suicidal ideation), which requires a 1 (several days) or higher in order to meet criteria for MDE).

2.2.3. Anxiety

Anxiety was measured with the 7-item Generalized Anxiety Disorder questionnaire (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006), which is a commonly used self-report questionnaire for measuring the level of generalized anxiety symptoms over a two-week period. Just as the PHQ-9, the GAD-7 is known to have excellent psychometric properties, having been tested in a wide range of populations, settings, and manners of administration (Spitzer et al., 2006).

2.2.4. Ancillary questions

Participants were asked to answer four Likert-type questions. The first question asked, "How would you describe your mood in the last 2 weeks?" and had responses ranging from 0 = *Extremely Negative* to 9 = *Extremely Positive*. The subsequent two questions asked, (1) "How motivated are you to do something to improve your mood?" (2) "How confident are you that you are able to do something to improve your mood?" and had responses ranging from 0 = *Not at all* to 10 = *Extremely*. Finally, the last question asked, "Before you see the ideas we will be sharing with you, how likely do you think they will

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