Behaviour Research and Therapy 51 (2013) 106–112

Contents lists available at SciVerse ScienceDirect

Behaviour Research and Therapy

journal homepage: www.elsevier.com/locate/brat

A randomized controlled trial of a self-guided, multimedia, stress management and resilience training program

Raphael D. Rose [a,*], Jay C. Buckey Jr. [b], Tomislav D. Zbozinek [a], Sarosh J. Motivala [c], Daniel E. Glenn [a], James A. Cartreine [d], Michelle G. Craske [a,e]

[a] University of California, Los Angeles, Department of Psychology, Los Angeles, CA, USA
[b] Geisel School of Medicine at Dartmouth, Lebanon, NH, USA
[c] University of California, Los Angeles, Semel Institute for Neuroscience, Los Angeles, CA, USA
[d] Harvard Medical School, Department of Psychiatry, Brigham and Women's Hospital, Boston, MA, USA
[e] University of California, Los Angeles, Department of Psychiatry and Biobehavioral Sciences, Los Angeles, CA, USA

ARTICLE INFO

Article history:
Received 18 August 2012
Received in revised form
6 November 2012
Accepted 7 November 2012

Keywords:
Computer-based interventions
Stress
Stress management
Resilience
Cognitive-behavioral therapy

ABSTRACT

Background: Stress is a common and costly behavioral health issue. Technology-based behavioral health programs (e.g., computer or web-based programs) are effective for treating anxiety or depression. These programs increase availability of evidence-based interventions to individuals who are not able or willing to receive such in-person treatments. Stress management training has empirical support, but little data exists on its efficacy with stressed but healthy individuals, and there are no prior studies employing a self-guided, multimedia intervention. We conducted a randomized controlled trial of a self-guided, multimedia stress management and resilience training program (SMART-OP) with a stressed but healthy sample.

Methods: Participants ($N = 66$) were randomized to SMART-OP or an attention control (AC) group that received marketed videos and published material on stress management. Participants were evaluated on self-report measures and Trier Social Stress Test (TSST) performance. Analyses were based on study completers ($N = 59$).

Results: SMART-OP group reported significantly less stress, more perceived control over stress, and rated SMART-OP as significantly more useful than AC. During the TSST, the data suggests the SMART-OP group showed greater within-task α-amylase recovery at post-assessment.

Conclusions: SMART-OP is highly usable and is a more effective and useful stress management training program than an educational comparison.

Technology can significantly improve the delivery of evidence-based behavioral healthcare (e.g., cognitive-behavioral therapy; CBT). The use of computers, the Internet, tablets, or smartphones can provide secure and confidential treatment to individuals at a place and time of their choosing. These programs can also address barriers to care, such as the limited availability of clinicians trained in evidence-based interventions (Weissman et al., 2006) or patient reluctance to attend clinical settings due to stigma (Corrigan, 2004).

Efficacy of technology-based behavioral healthcare

A growing body of literature supports the efficacy of technology-based (i.e., computer/Internet) interventions for anxiety and depression (e.g., Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Proudfoot et al., 2003). To date, studies have not targeted stressed but otherwise healthy populations. Typically, technology-based programs developed for and tested with clinical samples are as efficacious as face-to-face therapy or better than treatment as usual (Proudfoot et al., 2003; Titov, Sachdev, & Andrews, 2010), though dropout rates are high (35–45%; Van Den Berg, Shapiro, Bickerstaffe, & Cavanagh, 2004). In technology-based effectiveness trials, dropout rates are even worse, with fewer than 25% of participants completing treatment (Eysenbach, 2005).

* Corresponding author. UCLA, Dept. of Psychology, Box 951563, 1285 Franz Hall, Los Angeles, CA 90095-1563, USA. Tel./fax: +1 310 825 9048.
E-mail addresses: rose@psych.ucla.edu (R.D. Rose), jay.buckey@dartmouth.edu (J.C. Buckey), tzbozinek@ucla.edu (T.D. Zbozinek), smotivala@mednet.ucla.edu (S.J. Motivala), danielerikglenn@gmail.com (D.E. Glenn), jcartreine@gmail.com (J.A. Cartreine), craske@psych.ucla.edu (M.G. Craske).

0005-7967/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.brat.2012.11.003

Stress and resilience

Stress has various definitions that converge upon the notion of "strain" (Webster's Online Dictionary, 2012) or "the nonspecific response of the body to any demand placed upon it" (Selye, 1956). Resilience is "the ability of individuals to adapt successfully in the face of acute stress, trauma, or chronic adversity, maintaining or rapidly regaining psychological well-being and physiological homeostasis" (Charney, 2004).

In the short-term, the body's response to stress can be helpful and adaptive (McEwen, 1998; Sapolsky, 2004). But, the allostatic load associated with repeated or long-term activation of the stress response (i.e., hypothalamic-pituitary adrenal axis; HPA axis) can damage the body over time (McEwen & Stellar, 1993; Seeman, Singer, Rowe, Horwitz, & McEwen, 1997), and the long-term effects of chronic stress are common and costly (e.g., Madhu, 2002). Chronic stress is associated with cardiac disease, lowered immune functioning, inflammation, impaired memory, and premature aging of genes (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; McEwen, 2006; O'Donovan et al., 2012; Sapolsky, 2003). Also, stress contributes to the onset of many psychiatric disorders, such as anxiety and depression (e.g., Zuckerman, 1999). These effects highlight the importance of successfully managing stress or improving recovery from stress (i.e., resilience).

Stress management training (SMT), also referred to as Stress Inoculation Training, is an empirically supported intervention (Meichenbaum, 2007). SMT is comprised of CBT approaches (e.g., cognitive restructuring, relaxation techniques, and behavioral skills) and is commonly applied in clinical samples, such as medically ill (e.g., HIV patients; Brown & Vanable, 2008) or anxious populations (e.g., test/performance; Hussian & Lawrence, 1978). There is sparse data on the effects of SMT with "healthy" (i.e., non-medically ill and non-psychiatrically ill) but stressed samples. One study (Gaab et al., 2003) reported that group SMT improved perceived control over stress and attenuated cortisol responses in healthy individuals in comparison to a control group. Given the long-term deleterious effects of chronic stress on health and functioning, establishing the positive effects of SMT in healthy but stressed samples is essential.

In the present study, we report on the development and evaluation of a self-guided, multimedia, CBT-based stress management and resilience training program called SMART-OP (Stress Management and Resilience Training for Optimal Performance). SMART-OP is designed for individuals who work in stressful or challenging environments with a focus on building resilience and optimizing performance. While SMART-OP was developed for ultimate use by the National Aeronautics and Space Administration (NASA), this phase 1 randomized controlled trial (RCT) was conducted with stressed but otherwise healthy graduate students to assess its efficacy, usefulness, and usability. We compared SMART-OP to an attention control (AC) group that received videos and reading material on stress management.

We hypothesized that participants in the SMART-OP group would report lower levels of perceived stress and higher levels of perceived control over stress than the AC group from pre- to post-assessment and that SMART-OP participants would rate the activities in the program as more useful than the AC group. Also, we expected the SMART-OP group would show improvements in cardiovascular and autonomic reactivity and recovery from a psychologically stressful task, the Trier Social Stress Test (TSST), from pre- to post-assessment.

Methods

All study procedures were approved by the UCLA Office of Human Research Protection Program.

Participants

Participants were recruited through email, flyers, and in-person presentations from schools of management, law, and other graduate programs at UCLA, with the offer of $315-340 remuneration. Graduate students with no psychiatric or chronic medical conditions who scored $\geq$16 out of 40 on the Perceived Stress Scale-10 (PSS-10; see Measures section) were eligible to participate. A score of 16 on the PSS-10 is half a standard deviation above a community mean (Cohen & Williamson, 1988).

Potential participants were screened by telephone, during which they completed the Mini International Neuropsychiatric Interview Version 5.0.0 (MINI; Sheehan et al., 1998) – a fully structured diagnostic interview that assesses for major Axis I disorders. The MINI was administered by research assistants, who were trained to established reliability criteria. Any participant who met diagnostic criteria for a DSM-IV-TR Axis I diagnosis was excluded from the study. Eligible and interested participants were then scheduled for their pre-assessment, conducted within three weeks of completing the eligibility screener.

Two hundred twenty-seven individuals inquired about the study, 66 were randomized to SMART-OP or AC, and 59 participants completed all stress management training sessions and pre- and post-assessments (see Fig. 1 for patient flow from eligibility screening to completion). Of the 66 randomized participants, 50% were male, mean age was 27.32 years (SD = 3.53), 44 were School of Management students, 15 School of Law students, two were in both schools, and five were in other UCLA graduate programs. The sample was diverse: 52% were Caucasian, 32% Asian or Asian American, 9% Hispanic or Latino, and 7% other (see Table 1).

Procedures

At pre-assessment, participants gave written informed consent and then completed self-report questionnaires (see Measures Section), followed by the TSST (e.g., Kirschbaum, Pirke, & Hellhammer, 1993), which was modified to include two tasks relevant to optimal performance in stressful situations. These were the Wechsler Adult Intelligence Scale (WAIS-IV) Block Design Subtest and the Wechsler Memory Scale (WMS-IV) Logical Memory I and II Subtests, which include Immediate Recall, Delayed Recall, and Delayed Recognition. Then, participants were randomized to either SMART-OP or AC, both of which included six weekly sessions. Afterward, the TSST and questionnaires were repeated at post-assessment.

Measures

Pre- and post-assessment self-report measures

Perceived Stress Scale-10 (PSS-10; Cohen & Williamson, 1988) The PSS-10 has 10 items that assess the degree to which experiences during the previous month are perceived as stressful. Cronbach's alpha is .85, and test–retest reliability is .55 (six-week interval; Cohen, Kamarck, & Mermelstein, 1983). The questionnaire was modified to ask about the prior two weeks.

Stress and Perception of Control Scale (SPOCS; unpublished instrument[1]): This scale was developed for this study to assess participants' perceptions of control and ability to cope with stress (e.g., I could handle various stressful situations). Cronbach's alpha for this sample is .71.

[1] The scale is available upon request from the first author.