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Research paper

Effects of web-based stress and depression literacy intervention on improving symptoms and knowledge of depression among workers: A randomized controlled trial

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ABSTRACT

Background: The present randomized controlled trial aimed to examine whether a newly developed psychoeducational information website on stress and depression was effective in improving depressive symptoms at one- and four-month follow-ups among workers in Japan.
Methods: Participants were recruited from registered members of a web survey site in Japan. Participants who fulfilled the eligibility criteria were randomly allocated to intervention or control groups. Immediately after the baseline survey, the intervention group was invited to access a psychoeducational website named the *"UTSMed"* within 4 months after the baseline survey. Depressive symptoms (Beck Depression Inventory II; BDI-II) were assessed as a primary outcome, at baseline, and one- and four-month follow-ups for both intervention and control groups. The analyses were conducted separately by the three subgroups (high-risk, moderate-risk, and low-risk).
Results: A total of 1236 workers completed the baseline survey. Participants were randomly allocated to an intervention or control group (N=618 for each), with the subgroups of high-risk (7–8%), moderate-risk (47%) and low-risk (45–46%) in each group. A significant intervention effect on improving depressive symptoms (t=−2.35, P =0.02, d=−0.57) was observed at 1-month follow-up only in the high-risk subgroup.
Limitations: The present study did not use a stratified permuted-block randomization.
Conclusions: A web-based psychoeducation approach may not be effective enough in improving depressive symptoms in a general population of workers, while it may be effective for workers who had recently sought help for mental health.

1. Introduction

Depressive disorder is one of the most prevalent psyc`hiatric disorders, affecting around 340 million people worldwide (Hosman et al., 2004). It is associated with a substantial deterioration in quality of life and economic loss in the community and workplace (Kessler, 2012; Saarni et al., 2007). Thus, to provide people who are suffering from depressive disorder with effective treatment and primary prevention of depressive disorder is an important strategy for global mental health.

As less expensive, more easily administered, and potentially more accessible interventions than conventional pharmacological and psychological interventions, psychoeducational interventions have received attention in recent years. A previous meta-analysis reported a small effect size (Cohen's d=0.20) of psychoeducational interventions on improving depression or psychological distress (Donker et al., 2009). An effective way to deliver psychoeducational information widely is via an internet website. One of the most well-known websites for psychoeducation of depression is *BluePages* (http://bluepages.anu.edu.au), developed by a group of researchers from Australian National University (Christensen et al., 2004). In randomized controlled trials (RCT), BluePages has been shown to be effective in reducing depressive mood at 6-week (Christensen et al., 2004) and 12-month follow-ups among community residents with high levels of depression (Mackinnon et al., 2008). In these studies, BluePages was found to be effective in

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improving depressive symptoms similar to an internet-based cognitive behavioral therapy (iCBT) program (Christensen et al., 2004; Mackinnon et al., 2008). Demonstrating the effectiveness of information dissemination through a website would greatly benefit the prevention of depression.

Primary prevention interventions can be classified into three categories: indicated, selective, and universal (Cuijpers et al., 2008; van Zoonen et al., 2014). Indicated prevention targets individuals who have some symptoms of a mental disorder but do not meet diagnostic criteria. Selective prevention focuses on individuals who are in a high risk group but have not yet developed a mental disorder. Universal prevention targets the general population, regardless of whether they have a higher risk of developing a disorder. In the aforementioned RCTs, researchers confirmed that the BluePages website might be effective in improving depressive symptoms among a selective population with high levels of depression (Christensen et al., 2004; Mackinnon et al., 2008). It is not clear whether a psychoeducational information website is effective in reducing depression in a universal or indicated population (for instance, all workers in a company or workers who consult a medical doctor about his/her problems, respectively).

While an iCBT program has been shown to be effective in reducing depression in a general working population (Imamura et al., 2014), only a few RCTs have been conducted to examine the effectiveness of web based dissemination of information on stress and depression. For instance, a previous RCT reported that an information website about mental health in general was similarly effective for improving depression compared to an iCBT program (i.e., Mood GYM) among workers with subthreshold depression (Phillips et al., 2014). However, another RCT reported that a multimedia information website for mental health failed to show a significant intervention effect for improving depression among workers (Billings et al., 2008). A further large-scale RCT should be conducted to examine the effect of a psychoeducational information website in a sample of workers, considering their levels of depression.

The present RCT aimed to examine whether a newly developed psychoeducational information website on stress and depression is effective in improving depressive symptoms and relevant knowledge at 1- and 4-month follow-ups, particularly for three subgroups of workers in Japan: (a) those who consulted a specialist for a mental health problem (high-risk group), (b) those who had high levels of depression (moderate-risk group), and (c) those who do not have depression (low-risk group).

2. Methods

2.1. Trial design

The study was a randomized controlled trial. The allocation ratio of the intervention group to the control group was 1:1. The Research Ethics Review Board of Graduate School of Medicine/Faculty of Medicine, the University of Tokyo approved the study procedures (no. 3083-[1]). This manuscript was reported according to the CONSORT guideline checklist.

2.2. Participants

Participants were recruited from registered members of a web survey site in Japan. Over one million members were registered in this site. All members living in Japan were approached to participate in the survey by this company via an internet, with their unique e-mail addresses, agreeing with the standard corporate governance policy and terms of conditions for the use of collected information. At the recruitment, it was announced that the study was scientific research about knowledge of stress and depression among workers. The site provides participants with 30 tokens (equivalent to 30 Japanese yen) for completing a web-based questionnaire on each occasion. In the present study, the inclusion criteria at the baseline survey were: (1) aged 20–60 years at the study entry, and (2) currently employed. There are no exclusion criteria in the present study. The aims and procedures of the study were fully explained on a webpage and the consent from a respondent was obtained when he/her completed a baseline questionnaire.

2.3. Interventions

An information website for stress and depression named *The University of Tokyo website for Stress Management and Education on Depression; UTSMed* (http://mental.m.u-tokyo.ac.jp/utsmed/) was newly developed by reference to BluePages, which was an effective psychoeducational website for depression (Christensen et al., 2004). The UTSMed site contained psychoeducational information and cognitive behavioral techniques for depression. All content of the UTSMed was originally developed by the authors. The content was composed of text and illustrations; no video or audio narration was used. The website consisted of about 90 pages, with around 800 Japanese characters per page. The language level was easy, in order to be accessible for most workers, and did not presume prior knowledge on depression. The psychoeducational components of the website included information about depression (e.g., symptoms, diagnosis, treatment, and mechanisms of depression) and information about stress (e.g., learning about stress, and daily tips for coping with stress) (Lazarus, 1991). The CBT components of the program included self-monitoring skills (Padesky and Greenberger, 1995), cognitive restructuring skills (Beck, 1967, 1979), assertiveness (Alberti, 1977; Alberti and Emmons, 2001; Bower and Bower, 2004), problem-solving skills (Bell and D'Zurilla, 2009; D'Zurilla and Goldfried, 1971), and relaxation skills. A self-help worksheet to practice each CBT skill was provided on the website. While the website consisted of different components for psychoeducation of depression and stress management, users could decide whether to complete all of the components at once, or one for each access. A 10-item quiz for reinforcing the lessons was also prepared. This website could be used anywhere the Internet is available. After its implementation, the UTSMed was submitted for a beta test by specialists on occupational mental health and graduate school students majoring in occupational mental health. Their feedback was used to improve the UTSMed further.

2.4. Intervention group

Immediately after the baseline survey, the intervention group was invited to access to UTSMed. They were allowed to access the UTSMed site within 4 months after the baseline survey. At 3 months after the baseline, they were reminded to look at the UTSMed site by e-mail.

2.5. Control group

Participants in the control group were asked to complete the baseline and follow-up surveys. They were not invited to the UTSMed site or sent a 3-month reminder. However they were allowed to access any other website on stress and depression.

2.6. Outcomes

All outcomes were measured using a web-based self-report questionnaire at baseline, 1-month follow-up, and 4-month follow-up.