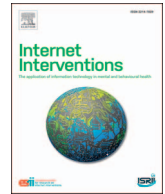




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## Internet Interventions

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# *FitMindKit*: Randomised controlled trial of an automatically tailored online program for mood, anxiety, substance use and suicidality

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## ABSTRACT

**Purpose:** Online mental health programs can be effective in reducing symptoms of depression, anxiety disorders, substance use and suicidal ideation. However, most existing e-mental health programs focus on a single domain of mental health, neglecting comorbidity. Furthermore, few programs are tailored to the symptom patterns of the individual user. *FitMindKit* was designed to overcome the gaps of existing e-mental health programs, providing tailored, transdiagnostic therapeutic content to address a range of comorbid mental health symptoms. A trial was conducted to test the program's efficacy.

**Methods:** Australian adults with elevated symptoms of depression, anxiety, suicidal ideation and/or substance use were recruited through social media, with  $n = 194$  randomised into a fully-automated trial of a 10-day brief intervention. Participants were randomly allocated to receive *FitMindKit* tailored to their symptoms, an un-tailored generic version of *FitMindKit*, or an attention control.

**Results:** Mixed model repeated measures ANOVA indicated that participants in both *FitMindKit* and the attention control had significant reductions in symptom composite scores. Effects were not significantly greater in the *FitMindKit* program relative to control, either at post-test or 3-month follow-up. No effects were detected for specific decreases in depression, generalized anxiety, social anxiety, panic, suicidal ideation or alcohol/substance use. There were no significant differences between the tailored and static versions in effectiveness or adherence. Participants in the tailored and static conditions were more satisfied than in the control condition, with some evidence favouring the tailored condition. High attrition reduced power to find effects.

**Conclusions:** *FitMindKit* provides a model for addressing comorbid mental health symptoms in an online program, using automated tailoring to symptom patterns. Modifications to the program are recommended, along with the need for larger trials to test the effects of tailoring on mental health outcomes.

## 1. Introduction

Mental and substance use disorder account for 6.6% of total disease burden and 19.0% of disability burden globally (Institute for Health Metrics and Evaluation, 2017). Unlike most other health conditions, this burden is disproportionately observed among young people. Despite the high prevalence and burden of common mental disorders, only one in three people with a mental health problem seeks help from a health professional (Burgess et al., 2009). There is a pressing need for better prevention, identification and early treatment of mental health problems in the community. Internet interventions have been shown to be effective, efficient and cost-effective in preventing and treating many common mental disorders (Andrews et al., 2010; Griffiths et al., 2010;

Batterham et al., 2015b). Online programs may also be effective in preventing the development of mental disorders, with up to a 30% reduction in the risk of developing depression (Spek et al., 2007; Cuijpers et al., 2005; Caley and Christensen, 2010). However, the implementation of internet interventions into traditional treatment services is often challenging and may not improve efficiencies (Batterham et al., 2015b; Kenter et al., 2015).

In addition, there is high comorbidity between mental health and substance use problems that is not fully addressed by existing online programs. Up to 45% of adults with a common mental disorder meet criteria for more than one disorder (Kessler et al., 2005; Slade et al., 2009). Online programs aimed at treating comorbidity have been shown to be effective, even outperforming traditional services (Kay-

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Lambkin et al., 2009). In addition, programs that target depression and anxiety more broadly using a transdiagnostic approach have been shown to significantly reduce symptoms (Titov et al., 2011). The potential of online programs to address comorbidity has not been fully realised. Although there are transdiagnostic programs available (e.g., Titov et al., 2011) and emerging programs to address comorbid mental health and substance use problems (e.g., Kay-Lambkin et al., 2011, 2009), there are no integrated programs that simultaneously target depression, anxiety disorders, substance use and suicidal ideation. Suicidality has been shown to be resistant to depression interventions (Christensen et al., 2013) although interventions focused on suicidal ideation have been shown to be effective (van Spijker et al., 2014a). The development of integrated, tailored interventions that better address comorbidity is an important next step.

Online programs are not typically targeted to individual characteristics, needs and preferences. Tailored interventions may be a way to address comorbidity. There is preliminary evidence that tailoring is an effective way to facilitate behaviour change (Lustria et al., 2013), that tailoring to individual symptom profiles by clinicians can more effectively treat depression or anxiety (Carlbring et al., 2011; Johansson et al., 2012) and that programs that account for individual preferences tend to be more acceptable (Andersson et al., 2011; Batterham and Caley, 2017). However, there is a pressing need to develop greater understanding of the factors that lead to positive outcomes in internet therapy across a range of mental health problems, to enable the development of empirical guidelines for tailoring (Lustria et al., 2013). Furthermore, there has been little exploration of automated tailoring in the context of self-help online programs. Automated tailoring may use data provided by the participant on their symptom patterns to identify specific targeted therapeutic strategies that may be most relevant to their symptoms, based on theory, research findings or clinical judgement. No existing study has developed a transdiagnostic intervention for the treatment of depression, anxiety, substance use and suicidal ideation. Tailoring is one approach to handling the complexity of such a multi-faceted intervention, to ensure that intervention materials match the needs of the user.

The current study reports on the development and randomised controlled trial (RCT) of a low-intensity internet-based therapy program, called *FitMindKit*, that uses automated tailoring to address comorbid depression, anxiety disorders, substance use and/or suicidal ideation. The intervention was developed by adapting and abridging therapeutic techniques from existing evidence-based online programs, on the basis that brief, targeted interventions may achieve better engagement (Christensen et al., 2009). Evidence suggests that the adaptation of the face-to-face therapeutic model (multiple 50 min consultations) may not be necessary for effectively reducing symptoms of mental health problems online (Christensen et al., 2006). Rather, a new model of intervention focused on the core components of psychosocial therapies that encourage overlearning of key concepts (Scott, 1992) may be sufficient for effective outcomes and promote greater adherence. Briefer intervention components also facilitate tailoring to individual needs by decreasing the amount of content required to present a comprehensive, multifaceted program. The intervention selected and combined evidence-based therapeutic elements (e.g., behavioural activation, cognitive reframing, problem solving, exposure, motivational interviewing, mindfulness, relaxation) based on individual symptom profiles. The program was aimed at adolescents and young adults, although with relevance to the broader adult population.

The three-arm randomised controlled trial reported in this paper aimed to test: (1) whether the *FitMindKit* program (tailored or un-tailored) was effective in reducing overall symptom burden in an online population-based sample with elevated symptoms of one or more common mental disorders, relative to an attention control program, and (2) whether tailoring of the program to individual symptom profiles increased intervention effectiveness, adherence or satisfaction.

## 2. Method

### 2.1. *FitMindKit* intervention – static and tailored

The *FitMindKit* intervention was developed by using a narrative approach to introduce the core strategies of relevant behavioural therapies. A total of 18 modules were developed: ten core transdiagnostic modules, along with two domain-specific modules each for symptoms of distress/mood disorders (major depressive disorder, MDD, and generalized anxiety disorder, GAD), fear disorders (social anxiety disorder, SAD, and panic disorder, PD), substance disorders (substance use disorder, SUD, and alcohol use disorder, AUD) and suicidal ideation. Specifically, the ten core modules were: psychoeducation, sources of help for mental health problems, introduction to cognitive reframing, problem solving strategies, introduction to mindfulness, managing relationships/conflict resolution, exercise and diet, sleep hygiene, introduction to values and committed action, and the role of stigma. The two mood/distress modules introduced behavioural activation (for MDD) and worry time (for GAD); the two fear modules introduced exposure (for PD) and interpreting social cues (for SAD); the two substance use modules provided a normative comparison and introduced motivational interviewing/identifying triggers; and the two suicidal ideation modules introduced distress tolerance/self-soothing and emotion regulation strategies.

Each module was scripted as being presented by one of five characters, of whom four described having personal experience of one or more mental health problems (the fifth acted as an “expert” narrator). The approach of having material presented by individuals with personal experience of a mental health problem was intended to make the material more relatable and to provide examples of modeling specific strategies or behaviours. The modules were then developed into brief (2–6 min) videos. The videos were developed using professionally-designed cartoon characters in various poses and engaging backgrounds and animated with Microsoft PowerPoint. Appropriate graphics illustrated key concepts and the videos were overlaid with character voice-overs. The video within each module was accompanied by a relevant “homework” activity, comprising a worksheet that was designed to facilitate practice of the strategy presented.

The RCT compared a static version of *FitMindKit* (comprising the ten core modules) to a tailored version (comprising a mixture of core and specific modules based on symptom profiles) and an attention control condition. The scheme for tailoring is provided in Figs. 1 and 2. Eleven versions of *FitMindKit* are defined in the Fig. 1 Venn diagram, on the basis of comorbid mental health problems, suicidal ideation and/or substance use. The modules delivered to participants who received each version of the intervention are shown in Fig. 2. In this RCT, all eligible participants met criteria (detailed in the measures Section 2.5 below) for at least one of the targeted domains. Participants meeting criteria for a single domain received the two specific modules for that domain, sandwiched within a selection of an additional eight non-specific modules (Fig. 2). Participants meeting criteria for any two domains received the four specific modules from those two domains, sandwiched within a selection of an additional six non-specific modules (Fig. 2). Where criteria were met for 3–4 domains, a hierarchy was used to select the most pressing areas of need, detailed in Fig. 1. The static version of the intervention is labelled as “version 1” in Figs. 1 and 2.

### 2.2. Attention control condition

Participants in the attention control condition received the online HealthWatch program, which has no specific mental health or sleep-related content and is not associated with therapeutic reductions in depression (Glozier et al., 2013). Modules were fully text-based and contained information about bone health, sun exposure, food hygiene, use of vitamins and supplements, kidney health, microbes, household burns, respiratory viruses, heart health, and allergens.

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