Moderators of change in an Internet-based intervention for eating disorders with different levels of therapist support: What works for whom?

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ABSTRACT

This study investigated moderators of intervention response in a fully automated Internet-based monitoring and feedback intervention ('Feedback') with different levels of therapist support for individuals with eating disorder (ED) symptoms. This study was part of a randomized controlled trial comparing four conditions: 1) Feedback, 2) Feedback with low-intensity (weekly) therapist support, 3) Feedback with high-intensity (three times a week) therapist support, and 4) a waiting list. A total of 273 participants completed baseline and post-intervention assessments. The outcome measure was ED psychopathology. Model-based recursive partitioning was applied. Baseline levels of ED psychopathology were found to moderate intervention response. Specifically, in terms of improvement in symptoms of anorexia nervosa, participants with higher baseline levels of anorectic psychopathology showed better outcomes in the waiting list condition and the Feedback conditions with low- and high-intensity therapist support in comparison with Feedback without therapist support. In terms of improvement in symptoms of bulimia nervosa, participants with mild to moderate bulimic symptoms had better outcomes in the Feedback conditions compared with the waiting list. Thus, the fully automated Internet-based intervention with and without therapist support may be particularly suitable in improving mild to moderate bulimic psychopathology, whereas the intervention without therapist support may be less effective in improving severe anorectic psychopathology. Further investigating differential intervention responses is important, as this could help to optimize the delivery and dissemination of E-health interventions and therapist support, which in turn could help moving toward personalized (E-)care.

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1. Introduction

Numerous studies have demonstrated that Internet-based interventions can reduce eating disorder (ED) psychopathology (e.g. Aardoom, Dingemans, Spinhoven, & van Furth, 2013; Beintner, Jacobi, & Taylor, 2011; Melioli et al., 2016). However, investigating the average impact of Internet-based interventions could mask individual differences in responses to such interventions. Little is known about patient characteristics that may be relevant for predicting who will benefit from such interventions and who will not. It is possible that certain subgroups of participants respond better to particular Internet-based interventions than others. In addition, there may be differences in the way specific subgroups of patients respond to therapist contact. Moderator analyses can be used to investigate such individual differences in intervention response (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004; Kraemer, Wilson, Fairburn, & Agras, 2002), specifying for whom and under what conditions an intervention is effective. Moderators are baseline variables that are associated with intervention outcome, where the magnitude or direction of the effect differs across interventions (e.g. if women do better in intervention X, whereas men do better in intervention Y). General predictor variables differ from moderator variables in that the association of the...
The current study focused on detecting moderators of intervention response which could be highly informative for clinical practice. Identifying who will do best with which kind of intervention could optimize the delivery and dissemination of an intervention by tailoring the type and intensity of the intervention to individual patient characteristics. It is a first step toward the development of personalized patient care. Personalized care is becoming increasingly important and is preferable to a ‘one-size-fits-all’ approach. Indeed, for adults with anorexia nervosa, there is no single superior treatment approach (National Institute for Clinical Excellence, 2004), and for individuals with bulimia nervosa and binge-eating disorder, the treatment of choice (i.e. cognitive behavioral therapy) still fails to help a substantial proportion of patients (Wilson, Grilo, & Vitousek, 2007).

Numerous studies have identified general predictors of outcome for individuals with ED in naturalistic settings, face-to-face treatments, and E-health interventions (Berkman, 2007; Fichter, Quadflieg, & Hedlund, 2006; Grilo, Masheb, & Crosby, 2012; Keel & Brown, 2010; Wagner et al., 2015). Higher motivation to change and drive for thinness, and lower levels of binge eating and body dissatisfaction, were found to be associated with better outcomes (Wagner et al., 2015). With respect to body mass index (BMI) as predictor of outcome, results have demonstrated mixed results: one study found an Internet-based intervention to be more beneficial for participants with an elevated baseline BMI (Taylor et al., 2006), whereas two other studies demonstrated greater effects for participants with a lower baseline BMI (Hogdahl, Birgegard, & Bjorck, 2013). The type of eating disorder symptoms have also been found to predict participants’ outcome in Internet-based interventions. More specifically, Ljotsson et al. (2007) found that participants with binge eating disorder improved to a greater extent than participants with bulimia nervosa, and a study by Jacobi, Völker, Trockel, and Taylor (2011) showed better outcomes for participants who demonstrated binge eating episodes and compensatory behaviors as compared to those with restrictive eating as their sole symptom of disordered eating. Finally, one study (Carrard et al., 2011) evaluated an online guided self-help program across several European countries and demonstrated that better psychological health and less comorbid psychopathology predicted greater improvements in symptoms of bulimia nervosa. Keel and Brown (2010) reviewed the literature with respect to prognostic factors for ED course and outcome. Factors related to the severity and duration of the illness were identified as negative predictors of outcome for individuals with anorexia nervosa. For individuals with bulimia nervosa, greater psychiatric comorbidity was found to predict poorer outcomes, whereas for binge-eating disorder and eating disorder not otherwise specified, few prognostic factors could be reliably identified.

Research into moderators of intervention response within face-to-face or E-health settings is scarce. To date, two studies have compared face-to-face prevention programs for ED with an educational brochure or assessment-only control condition, respectively. Stronger intervention effects were found for those with elevated baseline levels of ED symptoms (Stice, Rohde, Shaw, & Marti, 2012; Stice, Rohde, Shaw, & Marti, 2013), and higher levels of body image distress, bulimic symptoms, and thin-ideal internalization (Stice, Marti, Shaw, & O’Neil, 2008). Taylor et al. (2006) investigated moderators of outcome in randomized controlled trials comparing an Internet-based prevention program with a waiting list control condition. Participants with an elevated baseline BMI of >25 and a higher baseline frequency of compensatory behaviors achieved significantly better outcomes in the intervention condition compared with the waiting list condition. Finally, a study by Völker, Jacobi, Trockel, and Taylor (2014) identified several moderators of response in a similar Internet-based prevention program. They found that reductions in binge-eating were stronger for participants with a lower BMI and a higher frequency of purging at baseline. In terms of moderators of outcome as defined by general levels of ED psychopathology, those who restricted their caloric intake and showed lower levels of purging at baseline had a better outcome (Völker et al., 2014). In sum, there is only limited and conflicting evidence regarding moderators of intervention outcomes for individuals with ED symptoms.

The role of therapist support within E-health interventions is an important factor to consider when studying the effectiveness of an intervention and moderators of intervention response. In the field of depression and anxiety, two meta-analyses have found that Internet-based interventions with therapist support were more effective than those without or those with only minimal therapeutic contact (Andersson & Cuijpers, 2009; Spek et al., 2007). However, direct comparisons of E-health interventions with and without therapist support in randomized controlled trials are scarce, and studies investigating the optimal intensity of therapist support are rare (Baumeister, Reichler, Munzinger, & Lin, 2015). The question of whether a particular Internet-based intervention with therapist support is more effective in comparison to the same intervention without therapist support, and exploring for whom (i.e., which subgroups of participants) this is true, warrants further investigation. For example, one might hypothesize that adding therapist support could be more effective for individuals with a longer illness duration or higher symptom severity, given that these patients are in higher need of specialized support.

The aim of this explorative study was to examine moderators of outcome in a fully automated Internet-based monitoring and feedback intervention (‘Feedback’), supplemented with different intensities of therapist support (i.e. none, once a week, and three times a week) for individuals with ED symptoms. This could help to identify patients who are likely to benefit from Feedback and additional therapist support, and patients who are not. A selection of potential moderators of change in ED psychopathology was tested based on theory and previous research in the field of E-health programs targeting ED psychopathology, as well as in the field of ED more generally. The selection of moderators included socio-demographical characteristics (age (Berkman, 2007) and education level (Wilson, Wiffley, Agras, & Bryson, 2010)), clinical characteristics (baseline levels of ED psychopathology (Fernandez-Aranda et al., 2009; Hilbert & Tuschen-Caffier, 2007; Volker et al., 2014; Wagner et al., 2013; Wilson et al., 2010) and body mass index (Hogdahl et al., 2013; Taylor et al., 2006; Volker et al., 2014), comorbid symptoms of anxiety and depression (Berkman, 2007; Carrard et al., 2011; Fichter, Quadflieg, & Hedlund, 2008; Keel and Brown, 2010)), levels of perseverative thinking (Warmerdam, van, Jongmsa, Twisk, & Cuijpers, 2010), treatment status (Keel & Brown, 2010), the duration of ED psychopathology (Keel & Brown, 2010), and ED subtype (Jacobi et al., 2011; Ljotsson et al., 2007; Volker et al., 2014), as well as motivational variables (i.e. perceived importance, readiness, and ability to change) (Dingemans et al., 2014; Steele, Bergin, & Wade, 2011; Wade, Frayne, Edwards, Robertson, & Gilchrist, 2009; Wagner et al., 2015; Wolk & Devlin, 2001).

2. Method

2.1. Study design and participants

This study was conducted as part of a randomized controlled trial (Aardoom, Dingemans, Spinhoven, Ruijen, & van Furth, 2013).
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