



## Research paper

## Behavioral activation versus physical activity via the internet: A randomized controlled trial



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## ABSTRACT

**Background:** A major problem today is that only about fifty percent of those affected by depression seeks help. One way to reach more sufferers would be by offering easily accessible internet based treatments. The purpose of this study was to compare/evaluate four therapist supported internet administered treatments.

**Method/results:** Two hundred eighty six participants were included. The treatment period lasted twelve weeks, consisting of the following treatments: 1) physical activity without treatment rationale, 2) physical activity with treatment rationale, 3) behavioral activation without treatment rationale and 4) behavioral activation with treatment rationale. All groups (including a control-group) showed a significant decrease in depressive symptoms. When the treatment groups were pooled and compared to the control group, there were significant differences from pretest to posttest (Hedges  $g_{av}$  treatment =1.01, control group =0.47). This held true also when each of the four treatment groups was compared to the control group, with one exception: Physical activity without treatment rationale.

**Limitations:** The differences between how many modules the participants completed could indicate that there are other factors than the treatments that caused the symptom reduction, however, the dose-response analysis did not detect any significant differences on account of modules completed.

**Conclusions:** The results support the positive effects of internet administered treatments for depression, and highlights the importance of psychoeducation, which tends to affect both the treatment outcome and the probability of remaining in treatment. These aspects need to be considered when developing and conducting new treatments for depression, since they would increase the likelihood of positive treatment outcomes.

## 1. Introduction

Major depressive disorder (MDD) is one of the most common disorders and the second most common cause of disability in the world (Lopez et al., 2006). Although depression can “self-heal” (Whiteford et al., 2013), those who recover without support have an increased risk of relapse, with the time between relapses decreasing over time (Angst and Preisig, 1995). In contrast, those who have received psychological treatment run a significantly lower risk for relapses (Cuijpers et al., 2013; Steinert et al., 2014).

Depression can occur in all stages of life, but a first onset is most common in young adult years (Hengartner et al., 2016) and is often

associated with a diminished quality of life (Angst, 1995). Prolonged depression can also lead to exclusion in the labor market and weakening personal finances (Simon et al., 2002). Furthermore, depression significantly increases the risk for suicide (Angst, 1995; Moussavi et al., 2007). There is also a high comorbidity with other psychological conditions, such as anxiety disorders (Strine et al., 2015). As an example, approximately 85% of patients diagnosed with depression also suffer from anxiety, and 90% of those diagnosed with anxiety also suffered from symptoms of depression (Tiller, 2013). A future major challenge in society will therefore be to meet the escalating need for effective mental health treatments. This need becomes even clearer when considering that only about 50% of those who suffer from

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depression seek help (Angst et al., 2002). There are probably a variety of reasons why not all who suffer from depression seek help, but likely contributors are stigma and the risk for side effects from antidepressant drugs (Johansson et al., 2013). Another possible reason may be the lack of appropriately trained clinicians (e.g., Clinical Psychologists and Psychiatrists).

One way of reaching more individuals with mild to moderate symptoms of depression is to offer internet-administered psychological treatments, which in recent years have become increasingly common (Andersson, 2016). A number of meta-analyses provide strong support for the effects of various types of internet-administered treatments for depressive disorders (Andersson et al., 2014; Cuijpers et al., 2015; Jakobsen et al., 2017). Internet-administered treatments for depression also have positive side effects in terms of increased self-esteem and quality of life, similar to face-to-face interventions (Crisp et al., 2014).

Some of the most prevalent features of MDD are fatigue, inertia, and decreased desire to engage in things previously thought of as enjoyable, which in turn leads to increased withdrawal and a more inactive lifestyle. One way to reduce depressive symptoms is to break the pattern by reintroducing enjoyable activities in life (Dimidjian et al., 2011). Two different types of treatments, which have been shown to be effective in reducing depressive symptoms and target the inactivity elements of depression, are behavioral activation (BA; Cuijpers et al., 2007; Dobson et al., 2008; Mazzucchelli et al., 2009) and physical activity (PA; Blumenthal et al., 2007; Cooney et al., 2014; Dunn et al., 2005; Josefsson et al., 2014; Rethorst et al., 2009). One major difference, however, between these two treatments is that expert knowledge about psychological treatment often is regarded as a necessity when administering BA treatments. This is not considered as vital when administering PA treatments.

PA is defined as any type of muscle movement that increases energy consumption; it includes everything from regular exercise to gardening and other domestic chores (Garber et al., 2011). Low PA increases the risk of developing depressive symptoms as well as a variety of physiological disorders such as cardiovascular diseases (Barengo et al., 2004) and diabetes (Carnethon et al., 2007). Low PA can also prolong a current depressive state (aan het Rot et al., 2009). A growing body of research has emerged over the last decade showing positive effects of psychological interventions aimed at increasing PA (Barbour et al., 2007; Cooney et al., 2014; Josefsson et al., 2014; Rethorst et al., 2009). The effect of PA on depression is comparable with cognitive behavior therapy (CBT) and/or anti-depressants (Blumenthal et al., 2007; Hallgren et al., 2015; Kvam et al., 2016; Rethorst et al., 2009; Rimer et al., 2012). A recent meta-analysis has even suggested that previous studies and meta-analysis may have underestimated the effects of PA on account of publication bias (Schuch et al., 2016). The exact antidepressant mechanism of PA is still unclear. Research, however, indicates that PA is associated with a number of positive psychological effects such as increased self-esteem, sense of control, feeling of success, increased sense of independence, and also the sense of belonging (Knapen et al., 2015). Researchers have not, however, reached consensus regarding the duration, frequency, and intensity of PA that has the best effect in reducing depressive symptoms. Both low and high frequency PA have shown an antidepressant effect and there is growing support for the importance of individualized PA (Nyström et al., 2015).

Another way to activate a person, but without the physical component is BA, aiming to break the vicious circle and reintroduce positive reinforcers in daily life (Dimidjian et al., 2011). BA has over the years become a well-established treatment for depression and its effects have been found to be comparable to various types of CBT and anti-depressants (Cuijpers et al., 2007; Dobson et al., 2008; Mazzucchelli et al., 2009). An additional benefit seems to be that the effect of treatment with BA lasts longer than treatment with antidepressants (Dobson et al., 2008).

BA is, however, not a unitary concept; two of the most acknowl-

edged and used models are Lewinsohn's (1974) and Martell's (2010). In Lewinsohn's model, the focus is on identifying pleasant events and then increasing the frequency of these, resulting in a positive change in mood (Lewinsohn, 1974). In Martell's model, a greater emphasis is placed on understanding one's behavioral patterns and strategies, in order to be able to test new and more effective strategies to enhance one's own mood (Martell et al., 2010). Differences in efficacy, in reducing depressive symptoms between these two versions of BA have not yet, to our knowledge, been investigated.

Both PA and BA are based on concrete and observable behavior and are therefore relatively easy to administer and require less experienced therapists than other methods (Richards et al., 2016). Research further indicates that these treatments are time-efficient (Cuijpers et al., 2007). These methods thereby have the potential to be administered over the internet (Dimidjian et al., 2011), which has also been confirmed in several studies (O'Mahen et al., 2013; Rosenbaum et al., 2015).

Even though both BA and PA have been shown to be effective in both face-to-face and internet-administered treatments separately, they have not yet been directly compared. Our primary aim with this study was therefore to evaluate and compare four different internet-administered treatments for depression: PA without rationale, PA with rationale, BA without rationale, and BA with rationale (see Method and Procedure). We hypothesize that there will be a difference in antidepressant effect between participants randomized to any of the four treatment groups and those randomized to the control group. In addition we aim to investigate if there are any differences in effect between the various treatments. Since previous research has revealed high comorbidity between depression and anxiety (Strine et al., 2015; Tiller, 2013), a secondary aim was to investigate if the change in anxiety symptoms follow the same path as the proposed change in depressive symptoms, which is our hypothesis.

## 2. Method

### 2.1. Participants

Participants from Sweden were recruited between January 2013 and May 2014 through advertisements in newspapers, on various websites and through social media (e.g., Facebook and Twitter). All registration to participate was made on the study's website. To be included in the study the participant had to meet the criteria for mild to moderate depression according to DSM-IV-TR (American Psychiatric Association, 2000), score between 15 and 35 on the Montgomery-Åsberg Depression Rating Scale – self-rated version (MADRS-S; Svanborg and Åsberg, 1994), be aged  $\geq 18$  years, have a computer with access to the internet, be a resident in Sweden, and be able to read and write in Swedish. Individuals were excluded if they were regarded as suicidal or severely depressed (according to MADRS-S), presently participating in any other psychological treatment, had made changes in their anti-depressant medications (or other medications that may affect mood) during the last three months, were active exercisers (exercised more than once a week) or met criteria for another primary psychiatric diagnosis. In total, 1179 people registered interest in the study and filled out a number of questionnaires on the study website. People who met the inclusion criteria were then contacted for a semi-structured diagnostic interview and further assessments. Of the 1179 who responded, 312 were considered suitable for participation and were then block randomized independently of the research team (by the project administrator), using a specially designed computer program, into one of the five groups (four treatment groups and one control group). Of these, 286 completed at least one weekly measure or posttreatment and hence could be included in the analyses. For a description of the participants see Table 1. Those who were randomized to the control group were after 12 weeks (equivalent to the treatment period) re-randomized to one of the four treatment groups, and thus everyone who was included in the study was offered treatment

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