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**Telephone-based Behavioral Activation with Mental Imagery for depression: a pilot randomized
clinical trial in isolated older adults during the Covid-19 pandemic**

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Abstract

Objectives

To shield vulnerable persons, particularly the elderly, during the Covid-19 pandemic governments around the world have advised to use social distancing and self-isolation. Social isolation might put older adults at an increased risk for mental health problems such as depression. There is a need for brief, easy-accessible psychological treatments for depressive symptoms that can be delivered remotely. The aim of this study was to investigate the feasibility, acceptability and preliminary efficacy of telephone-delivered Behavioral Activation with Mental Imagery for the treatment of depressive symptoms in individuals 65 years and older living in isolation during the covid-19-pandemic.

Methods

In this open-label pilot randomized clinical trial, N = 41 individuals aged 65 years or older with clinically significant symptoms of depression were randomly assigned to either a Behavioral Activation with Mental Imagery treatment condition, or an Attention-Assessment control condition delivered over the telephone over a four week period.

Results

Depressive symptoms decreased more in the treatment condition compared to the control condition. At post treatment 2 out of 16 participants in the treatment condition met diagnostic criteria for depression compared to 9 out of 13 in the control condition. Most participants in the treatment condition were satisfied with the treatment and few adverse effects were observed.

Conclusions

This pilot study suggests that behavioral activation with mental imagery delivered over the telephone is feasible, acceptable and potentially efficacious for the treatment of depressive symptoms in older individuals living in isolation. Replication in larger samples is needed.

Key words: Depression, Older adults, Social Isolation, Behavioral activation, Activity scheduling,
Mental imagery

Key points:

- The COVID-19 pandemic has exacerbated the need for brief, accessible psychological treatments for depressive symptoms that can be remotely delivered to isolated older adults.
- This pilot RCT investigated the feasibility and preliminary efficacy of telephone-based Behavioral Activation with Mental Imagery (BA-MI) for depression in this sample.
- BA-MI led to a greater decrease in depressive symptoms and increases in behavioral activation in the treatment group compared to the control group.
- BA-MI may help to alleviate depressive symptoms in isolated older adults.

Telephone-based Behavioral Activation with Mental Imagery for depression: a pilot randomized clinical trial in isolated older adults during the Covid-19 pandemic

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) causing the Coronavirus disease 2019 (COVID-19) became a pandemic in the year 2020 and into 2021. Covid-19 related mortality rates were highest in older adults particularly those aged 70 years and above. In Sweden, between April and October 2020, the government urged people 70 years and older to limit physical contact with other people and to stay at home as much as possible, a strategy called social distancing¹. While these measures are important to shield vulnerable individuals, mental health experts have raised serious concerns over deteriorating mental health during and after the pandemic², particularly amongst older adults³. Indeed, social isolation is related to an increase risk for depression and anxiety disorders among older adults⁴. Thus there is a need to develop and evaluate scalable psychological interventions for mental health problems for this patient group.

Evidence from previous epidemics and the current pandemic indicate that there is an urgent need for effective remotely-delivered psychological interventions aimed at improving mental health among older individuals⁵. Research on the SARS-epidemic in 2000 indicate that quarantine and isolation may lead to an increase in mental health conditions, such as depression⁶. Depression in older adults increases the risk of mortality and morbidity⁷, reduces quality of life⁸ and leads to functional impairments⁹. A study from Hong Kong during SARS found a nearly 32% increase in suicide rates among older individuals¹⁰. A recent review showed that social distancing has a negative impact on the mental as well as physical health of older individuals, including increased levels of depression, anxiety and sleep problems⁵. A recent study in older adults from Sweden found that half of the sample reported staying at home all of the time, and that 44.4 % of females and 25.7 % of males reported feeling depressed¹¹.

Current evidence-based treatments for depression in older adults include antidepressant medication¹², psychological interventions such as Cognitive-Behavioral Therapy (CBT)¹³, and physical

activity¹⁴. Previous studies have shown that the majority of older adults prefer psychological treatments to medication¹⁵, which poses a challenge during the COVID-19 pandemic as such treatments are often delivered face-to-face. Psychological treatments delivered via the Internet are as efficacious as face-to-face¹⁶, but only 3-4% of the individuals 65 years and above in Sweden use digital applications instead of physical healthcare visits¹⁷. Cognitive-Behavioral Therapy (CBT) has been shown to work when delivered via the telephone¹⁸ and has proven to be feasible for older adults¹⁹, and one study showed that it may even result in lower attrition compared to face-to-face psychotherapy²⁰. Due to the wide availability and accessibility of telephones, telephone-based psychological treatment could be an optimal intervention for older adults, particularly during pandemics.

Behavioral Activation (BA) is a brief psychological treatment that aims to (1) increase engagement in adaptive activities, (2) decrease engagement in activities that maintain depression or increase risk for depression, and (3) solve problems that limit access to rewarding activities or that maintain aversive control²¹. Common BA-strategies are self-monitoring of activities and mood, planning and scheduling of activities in line with the patients' needs and goals, and problem solving^{21, 22}. BA is effective in reducing depressive symptoms^{23, 24} and there is emerging evidence suggesting that BA is also an effective intervention for older adults²⁵. BA can be delivered in a brief format^{26, 27}, and has been shown to be feasible for older individuals in as few as four sessions^{28, 29}. However, depression is often characterized by low motivation and a lack of energy, which might make it more difficult for patients to initiate engagement in scheduled activities thereby reducing the efficacy of BA interventions. Thus identifying interventions that directly target these motivational difficulties could provide an additional route to promote greater behavioral engagement in scheduled reward activities. One way to facilitate motivation for planned activities might be via prospective mental imagery.

Mental imagery refers to the representation and experience of sensory information without external input^{30, 31}. By drawing upon prior knowledge and experiences, mental imagery can amplify

the anticipation of reward-related emotions^{32,33}. Anticipation of the pleasant and rewarding consequences of future behaviour, in turn, predicts reward motivation and reward-motivated behaviour³⁴⁻³⁶. Indeed, it has been shown that simulating engagement in scheduled pleasant and rewarding activities via mental imagery can increase motivation to engage in these activities³⁷⁻³⁹. Similar mental imagery interventions have successfully been used by older individuals⁴⁰.

The aim of this open-label pilot randomized clinical trial was to investigate the feasibility and preliminary efficacy of a brief telephone-delivered BA intervention, focused on activity scheduling augmented with mental imagery, for the treatment of depressive symptoms in individuals 65 years and older in isolation during the covid-19-pandemic. We hypothesized that participants randomized to the active treatment condition would show a stronger decrease in depressive symptoms (primary outcome) and improve more on secondary outcomes, compared to participants randomized to an attention-assessment control condition.

Methods

Design

The present study was an open-label pilot randomized clinical trial (N=41) with two conditions: 1) telephone-delivered Behavioral Activation with Mental Imagery (BA-MI), and 2) Attention-Assessment Control with weekly follow-up calls. This was a single-site trial, with all participants recruited from one county in Sweden and treated through the Adult Psychiatric Clinic at Västmanland County Hospital. The study received ethical approval by the Swedish Ethical Review Authority (2020-02079) and all participants provided written informed consent. The study was preregistered with ClinicalTrials.gov (NCT04508868). Note that the initial pre-registered plan was to conduct a full-scale trial, but due to changes in self-isolation restrictions for older individuals in Sweden from 22nd of October 2020, the recruitment had to be terminated early.

Participants

Participants were approached using advertisements in local newspapers that invited individuals aged 65 years or older living in the county of Västmanland to participate in a telephone-

based treatment of depressive symptoms. The inclusion criteria were 1) reporting clinically significant depressive symptoms as defined by scores above 12 on the Montgomery-Åsberg Depression Rating Self-rating Scale (MADRS-S), and/or scores above 9 on the The Patient Health Questionnaire 9-item (PHQ-9), and/or scores above 5 on the Geriatric Depression Rating Scale 15-item short form (GDS-15), and/or via structured clinical interviews 2) access to telephone, 3) fluent in written and spoken Swedish, 4) residing in the County of Västmanland, and 5) willing to participate in the trial. Exclusion criteria included severe depression defined by clinical diagnosis, elevated risk of suicide, current substance use disorder, current or previous manic/hypomanic episodes, current psychotic disorder, current diagnosis of dementia/major neurocognitive disorder, currently receiving psychological therapy, or currently undergoing pharmacological treatments that commenced less than one month ago. Participant characteristics are described in Table 1. Baseline ratings on primary and secondary outcome measures are described in Table 3.

[Insert table 1 here]

Materials

MINI. The Mini International Neuropsychiatric Interview 7.0 (MINI)⁴¹, a structured clinical interview, was used to assess the presence/absence of common psychiatric disorders at enrollment as well as assessing the presence/absence of depression post-treatment.

Primary outcome measure:

MADRS-S. The primary outcome measure was the Montgomery-Åsberg Depression Rating Self-rating Scale, which is a nine-item questionnaire used to measure severity of depression the past two weeks⁴². The score ranges from 0-54, with higher scores indicating higher depression severity.

Secondary outcome measures

GDS-15. Depressive symptoms were also measured using the Geriatric Depression Rating Scale 15-item short form ⁴³. The GDS-15 is a 15-item questionnaire used to identify depression in older individuals with scores ranging from 0-15.

PHQ-9. The Patient Health Questionnaire 9-item is nine-item questionnaire used to identify depression as well as measuring severity of depression with scores ranging from 0-27, with higher scores indicating higher depression severity ⁴⁴.

GAD-7. Anxiety symptoms were assessed with the Generalized Anxiety Disorder 7-item (GAD-7), a seven-item questionnaire used to identify generalized anxiety disorder as well as measuring severity of anxiety symptoms ⁴⁵. The score ranges from 0-21, with higher scores indicating higher anxiety severity.

BADS-SF. Changes in avoidance and activation was measured using the Behavioral Activation for Depression Scale - Short Form (BADS-SF) ⁴⁶.

WHODAS-12. Functional impairment was assessed with the WHO Disability Assessment Schedule 12-item (WHODAS-12), a self-rating scale with 12 items ⁴⁷.

Mental imagery ability

Psi-Q. Mental imagery was assessed at baseline and post-intervention using the Plymouth Sensory Imagery Questionnaire (Psi-Q)⁴⁸, translated by Johanna M. Hoppe and Emily Holmes. Psi-Q is a 35-item questionnaire assessing the vividness of mental imagery. In this study we used the visual subscale with five items, with a total score ranging from 0-50, with higher scores indicating higher imagery ability.

Iatrogenic effects

NEQ. Adverse effects were measured using the Negative Effects Scale (NEQ) – short form, a 20-item questionnaire used to assess adverse and unwanted effects of psychological treatments ⁴⁹. In the analysis, only the items rated by the participant as probably caused by the treatment were included. Adverse effects were also monitored by the therapists throughout the interventions.

Feasibility and acceptability

Feasibility was assessed by recording recruitment and drop-out rates. Time was measured for each session, in the treatment group as well as in the control group. Acceptability was measured with the question "overall, how satisfied were you with the treatment you received?", with ratings ranging from 1-5 representing "very dissatisfied" to "very satisfied", with 3 representing a neutral alternative, "neither satisfied nor dissatisfied".

Interventions

The treatment manual as well as the manual for the control group were adapted into web-based versions on the system Entermedic. The digital manuals enabled us to upload the correct session manuals for each participant, digitalize in-session ratings as well as providing a check-list for each treatment component to ensure therapists adherence to the manuals, inspired by Serfaty and colleagues⁵⁰.

Treatment group

A treatment manual was constructed, based on two interventions: a four-session brief behavioral activation treatment for primary care (BA-PC) published by Funderburk and colleagues²⁸, with the addition of a mental imagery script by Renner and colleagues³⁷ sessions two and three. The interventions and patient materials were translated into Swedish by the corresponding author, and was then reviewed by two senior clinical psychologists and a primary care physician. The BA-PC was adapted to comply with government restrictions due to covid-19. The session outline is described in Table 2.

Control group

The control group was placed on a waiting list with weekly follow-up calls. The manual for the control group included follow-up on the patients psychological symptoms, assesment of suicide risk and answering practical questions about the study. The therapists were instructed to be supportive by

using validation techniques for thoughts and feelings, but not to engage in behavioral interventions such as activity planning or problem solving.

[Insert table 2 here]

Therapists

Five psychologists participated in the study, of which two were senior licensed psychologists and three were psychologists during their one-year clinical internship before license. All of the psychologists had at least basic training in cognitive behavioral therapy. They had a one-day training workshop which included information about and practical training in delivering the treatment manual. The therapists had a supervision session with the corresponding author every two weeks to resolve practical issues and troubleshoot difficult treatment situations.

Procedure

Interested participants contacted the research unit and received information about the study. A psychologist or research nurse screened the participants concerning age, subjective symptoms of depression, county of residence, and language comprehension. Participants who met the screening criteria were sent detailed information about the study, informed consent forms and baseline questionnaires. Upon return of signed consent forms and baseline questionnaires, the corresponding author phoned the participant and conducted a clinical interview including a structured psychiatric interview to evaluate eligibility. Participants who met all inclusion criteria and no exclusion criteria were consecutively randomized to either treatment or control, with one weekly call for four weeks. After four weeks, the control group also were offered the treatment. The participants completed depression ratings after each call week 1-3, and at week 4 (post-treatment/post-control) they completed a more comprehensive questionnaire.

Randomization and blinding

An independent statistician generated a 1:1, 6-block randomization sequence. The statistician prepared sequentially numbered opaque envelopes to conceal allocation until the moment of

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randomization. The corresponding author was responsible for evaluating eligibility and enrolling subjects in the study groups. The baseline questionnaires were scored by a research nurse and blinded to the psychologist until after the structured clinical interview. All subsequent self-ratings were performed by the participants at home and sent by mail, and were scored by a research nurse and thereby blinded to the psychologists. A structured clinical interview was performed at week 4/post-treatment by the patient's therapist.

Measures

The MADRS-S was assessed weekly. Acceptability and adverse effects were assessed at post-treatment. All other measures were assessed at baseline and post-treatment.

Analyses plan

To test the effect of the intervention condition on the primary outcome measure, a repeated-measures ANOVA was conducted with condition (BA-MI vs. Control) as the between subject factor and time (Baseline vs. post intervention) as the within subject factor. Between-groups effect sizes post-treatment on the primary outcome measure and continuous secondary outcome measures were calculated using Hedge's *g*. Hedge's *g* was chosen as it's more suitable for smaller samples as well as differences in sample size between groups. The magnitude of the effect sizes is interpreted as follows, in line with the recommendation for gerontological research⁵¹: 0.15=small, 0.40=medium, and 0.75=large. Difference in the number of participants meeting diagnostic criteria for depression post-treatment was calculated using Fisher's exact test.

Results

Recruitment took place between August and October 2020. 41 participants were randomized to the intervention ($N=20$) or the control condition ($N=21$). Participant flow is described in the CONSORT Diagram in Figure 1.

[Insert figure 1 here]

Feasibility and acceptability

Of 65 screened individuals, 41 (63 %) were found eligible for the study and subsequently randomized.

Of the 41 randomized participants, two dropped out and one was excluded during the trial, all in the control group, making the overall drop-out rate 7.3 %.

Mean time per session in the treatment group was 43.55 minutes session 1, 43.35 minutes session 2, 32,10 minutes session 3, and 29,05 minutes session 4. Time per session in the control group was 16.06 minutes session 1, 12.61 minutes session 2, 12.89 minutes session 3, and 16.67 minutes session 4. All participants received the treatment or control condition in line with the manual.

18 out of 20 participants in the treatment group rated treatment satisfaction. Five rated themselves as very satisfied with the treatment, seven as somewhat satisfied, five as neither satisfied nor dissatisfied, none as somewhat dissatisfied, and one as very dissatisfied with the treatment.

Primary outcome measure

The means and 95% confidence interval for each group on MADRS-S across the different time points are shown in Figure 2.

[Insert figure 2 here]

In the repeated measures ANOVA, Mauchly's test indicated that the assumption of sphericity had been violated ($\chi^2(9) = 37.44, p = < .001$), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = 0.58$). The results of the repeated measures ANOVA

revealed that there was a significant Condition×Time interaction for the primary outcome measure, ($F(2.30, 73.64) = 3.71, p = .024, \eta^2 = 0.10$), indicating a stronger decrease in depressive symptoms in the treatment group compared to the control group.

Means, standard deviations and between-group effect size post-treatment on the primary outcome measure are shown in Table 3.

[Insert table 3 here]

Secondary outcome measures

Means, standard deviations, and effect sizes of secondary outcome measures at baseline and post-intervention are presented in Table 3. Post-intervention, 2 out of 16 participants in the treatment group still met depression criteria according to the MINI, which is lower than the control group, where 9 out of 13 participants still met criteria, but not statistically significant according to Fisher's exact test (2-tail) $p = .073$.

Iatrogenic effects

19 participants in the treatment group completed the NEQ and four (21 %) reported adverse effects that they attributed to the treatment. The most frequent adverse effects were increased anxiety, more unpleasant feelings, that unpleasant memories resurfaced, that they didn't always understand their treatments, that the treatment didn't produce positive results, and that became afraid that other people would find out about their ongoing treatment. No serious adverse effects or serious deterioration were reported by the therapists during the interventions.

Discussion

This pilot study is, to our knowledge, the first to test the feasibility and preliminary efficacy of telephone-based Behavioral Activation with Mental Imagery (BA-MI) aimed at reducing depressive symptoms in older adults during a pandemic. The treatment and study design were found to be feasible, and results indicated that a four-week BA-MI intervention reduced depression

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symptoms (MADRS-S) and increased behavioral activation (BADSF) relative to an attention-
assessment control condition.

Behavioral Activation treatment aims to increase engagement in rewarding everyday
activities via activity scheduling⁵². Numerous randomized controlled trials⁵³⁻⁵⁵ and meta analyses^{23, 24}
have shown the efficacy of BA. The evidence of BA for older adults is limited. The findings of our
pilot study are in line with previous research indicating that BA might be an effective intervention for
older adults²⁵, and shows promise in as few as four sessions as previously demonstrated²⁸. In
addition to these previous findings, we could show that BA can be delivered remotely over the
telephone and thereby reach individuals in isolation. This is crucial given that, independent of the
pandemic situation, older individuals might not have access to online therapy resources.

The results of this study support the idea that mental imagery simulations of daily
activities could be used to facilitate Behavioral Activation treatment for depression. In this study a
behavioral activation with mental imagery intervention led to a stronger increase in behavioral
activation compared to an attention control condition. This is in line with previous research
demonstrating a positive impact of mental imagery on behavioral activation in individuals with
depression³⁸. Given the emotion amplifying properties of mental imagery, it has been argued that
mental imagery might have motivational properties that facilitate engagement in planned activities.
However, previous studies have not specifically combined BA procedures (activity scheduling) with
mental imagery practice in a clinical sample. While our results support this idea, it should be noted
that given the lack of a BA control condition without mental imagery we can not draw any
conclusions about the added value of mental imagery in this study.

In general, the results of this study should be interpreted with caution, given the small
sample size which may lead to inflated effect sizes⁵⁶. The number of individuals fulfilling depression
criteria according to MINI decreased from 16 to two in the treatment group, and from 13 to 9 in the
control group, which is promising given the brevity of the intervention.

Although the majority of participants (67 %) in the treatment group reported being "very satisfied" or "somewhat satisfied" with the treatment, five participants reported being "neither satisfied nor dissatisfied", and one was "very dissatisfied" with the treatment. Four participants reported adverse effects on the NEQ that they attributed to the treatment, which include experiences of anxiety, unpleasant memories, that they didn't always understand their treatment, lack of positive results, and that concerns about stigma if other people would find out about their treatment. However, no serious adverse effects or serious deterioration in symptoms were observed by the therapists during the interventions. Future studies should focus on understanding individual differences in the acceptability of telephone-based behavioral activation treatment with mental imagery in this population. Further, many participants found the NEQ-scale difficult to perform, and it would be of interest to further test the validity of this scale in a population of older adults.

Since this treatment is designed to be an accessible first-line treatment, the inclusion criteria were broad and resulted in a heterogenous sample ranging from subclinical depressive symptoms to moderate depressive disorder. Baseline characteristics showed that the randomization produced fairly equal groups, with the exception of ongoing antidepressant treatment, which only occurred in the control group, although there was a higher frequency of depression diagnoses in the treatment group. All patients receiving medication were on stable doses, but it is possible that this affected the results. We note that although the majority of the present study's participants (80% in the BA-MI group, 70% in the Control group) met criteria for major depression, they were recruited from the community rather than through clinics. Thus, further research is required to evaluate the feasibility and effectiveness of the BA-MI intervention in more severe clinical populations and those recruited via routine clinical practice.

The findings of this study, if replicated, have potential implications for the treatment of depression in older individuals in isolation. Brief telephone-based behavioral activation could potentially be used to support older individuals to increase engagement in adaptive activities with positive effects on mood. These effects might further be facilitated by the motivation enhancing

properties of mental imagery. Our findings from this initial study need replication in larger sample and future studies should include a behavioral activation without mental imagery control condition to determine the added value of mental imagery. It will be particularly pertinent for future research to evaluate the added impact of mental imagery on mood, behaviour as well as treatment acceptance. Future research should also investigate additional factors that may enhance the effectiveness of remotely delivered BA-MI interventions. One such factor may be the addition of live face-to-face interaction via video link delivery. Although we are not aware of studies that have assessed the impact of adding video-link to telephone-based interventions, it is possible that both voice and face-to-face interaction with the therapist, via video link, may deliver added benefits compared to telephone voice interaction alone. However, it is also possible that video link may not be more effective than telephone delivery in older adult populations living in isolation due to technological and skills barriers.

Limitations of this study include, (1) time per session differed between the treatment group and control group. Since this was a new combination of intervention manuals, it was difficult to predict time consumption, and therefore a minimal attention-assessment control was used. Second, the trial was open-labeled, which might have influenced the results, for example by making participants in the control group frustrated when waiting to start their treatment. However, in light of the pandemic, we thought it would be unethical not to disclose this to the participants or to use a sham-condition. Third, when recommendations regarding self-isolation restrictions changed, half of the participants were ongoing in the trial. This might have influenced the results, but since participants were included and randomized consecutively, both groups were equally influenced. Fourth, the MINI-interviews were conducted by the patients' therapists, which may have contributed to bias, however, the ratings were blinded to the therapists and researchers. Finally, this paper only reports the results post-treatment. Future studies are needed to investigate long-term effects.

To summarize, the covid-19 pandemic has highlighted the need for brief, easy-accessible psychological treatments for depressive symptoms that can be delivered by remote,

particularly for older individuals. The investigated BA-MI treatment seems feasible, acceptable and potentially efficacious for the treatment of depressive symptoms in older individuals in isolation during the covid-19-pandemic. Further studies with larger samples are needed to replicate these findings.

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Data access

Data available on request from the authors.

Declaration of interests

The authors declare no conflicts of interest.

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References

1. *Du som är 70 år eller äldre (om covid-19) [Elektronisk resurs]*. Folkhälsomyndigheten; 2020.
2. Holmes EA, O'Connor RC, Perry VH, et al. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *The Lancet Psychiatry*. 2020;7(6):547-560. doi:10.1016/S2215-0366(20)30168-1
3. Skoog I. COVID-19 and mental health among older people in Sweden. *International Psychogeriatrics*. 2020:1-3. doi:10.1017/S104161022000143X
4. Santini ZI, Jose PE, York Cornwell E, et al. Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. *The Lancet Public Health*. 2020;5(1):e62-e70. doi:10.1016/S2468-2667(19)30230-0
5. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, et al. Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. *The Journal of Nutrition, Health & Aging*. 2020:1-10. doi:10.1007/s12603-020-1469-2
6. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. *Emerging infectious diseases*. 2004;10(7):1206-1212. doi:10.3201/eid1007.030703
7. Schulz R, Beach SR, Ives DG, Martire LM, Ariyo AA, Kop WJ. Association between depression and mortality in older adults: the Cardiovascular Health Study. *Archives of internal medicine*. Jun 26 2000;160(12):1761-8.
8. Pyne JM, Patterson TL, Kaplan RM, Gillin JC, Koch WL, Grant I. Assessment of the quality of life of patients with major depression. *Psychiatric services (Washington, DC)*. Feb 1997;48(2):224-30. doi:10.1176/ps.48.2.224

9. Stuck AE, Walthert JM, Nikolaus T, Bula CJ, Hohmann C, Beck JC. Risk factors for functional status decline in community-living elderly people: a systematic literature review. *Social science & medicine (1982)*. Feb 1999;48(4):445-69.
10. Yip PS, Cheung YT, Chau PH, Law YW. The impact of epidemic outbreak: the case of severe acute respiratory syndrome (SARS) and suicide among older adults in Hong Kong. *Crisis*. 2010;31(2):86-92. doi:10.1027/0227-5910/a000015
11. Gustavsson J, Beckman L. Compliance to Recommendations and Mental Health Consequences among Elderly in Sweden during the Initial Phase of the COVID-19 Pandemic-A Cross Sectional Online Survey. *Int J Environ Res Public Health*. Jul 26 2020;17(15)doi:10.3390/ijerph17155380
12. Thorlund K, Druyts E, Wu P, Balijepalli C, Keohane D, Mills E. Comparative Efficacy and Safety of Selective Serotonin Reuptake Inhibitors and Serotonin-Norepinephrine Reuptake Inhibitors in Older Adults: A Network Meta-Analysis. *Journal of the American Geriatrics Society (JAGS)*. 2015;63(5):1002-1009. doi:10.1111/jgs.13395
13. Huang AX, Delucchi K, Dunn LB, Nelson JC. A systematic review and meta-analysis of psychotherapy for late-life depression. *Am J Geriatr Psychiatry*. Mar 2015;23(3):261-73. doi:10.1016/j.jagp.2014.04.003
14. Catalan-Matamoros D, Gomez-Conesa A, Stubbs B, Vancampfort D. Exercise improves depressive symptoms in older adults: An umbrella review of systematic reviews and meta-analyses. *Psychiatry Res*. Oct 30 2016;244:202-9. doi:10.1016/j.psychres.2016.07.028
15. Gum AM, Areán PA, Hunkeler E, et al. Depression Treatment Preferences in Older Primary Care Patients. *The Gerontologist*. 2006;46(1):14-22. doi:10.1093/geront/46.1.14
16. Andrews G, Basu A, Cuijpers P, et al. Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: An updated meta-analysis. *Journal of Anxiety Disorders*. 2018/04/01/ 2018;55:70-78. doi:<https://doi.org/10.1016/j.janxdis.2018.01.001>

17. Andersson J. *Svenskarna och internet 2019 : undersökning om svenskarnas internetvanor*. Internetstiftelsen; 2019.
18. Tutty S, Spangler DL, Poppleton LE, Ludman EJ, Simon GE. Evaluating the Effectiveness of Cognitive-Behavioral Teletherapy in Depressed Adults. *Behavior Therapy*. 2010/06/01/2010;41(2):229-236. doi:<https://doi.org/10.1016/j.beth.2009.03.002>
19. Barrera TL, Cummings JP, Armento M, et al. Telephone-Delivered Cognitive-Behavioral Therapy for Older, Rural Veterans with Depression and Anxiety in Home-Based Primary Care. *Clinical Gerontologist*. 2017/03/15 2017;40(2):114-123. doi:10.1080/07317115.2016.1254133
20. Mohr DC, Ho J, Duffecy J, et al. Effect of Telephone-Administered vs Face-to-face Cognitive Behavioral Therapy on Adherence to Therapy and Depression Outcomes Among Primary Care Patients: A Randomized Trial. *JAMA*. 2012;307(21):2278-2285. doi:10.1001/jama.2012.5588
21. Dimidjian S, Barrera JM, Martell C, Muñoz RF, Lewinsohn PM. The origins and current status of behavioral activation treatments for depression. *Annual review of clinical psychology*. 2011;7(1):1-38. doi:10.1146/annurev-clinpsy-032210-104535
22. Kanter JW, Manos RC, Bowe WM, Baruch DE, Busch AM, Rusch LC. What is behavioral activation?: A review of the empirical literature. *Clinical Psychology Review*. 2010/08/01/2010;30(6):608-620. doi:<https://doi.org/10.1016/j.cpr.2010.04.001>
23. Ekers D, Richards D, Gilbody S. A meta-analysis of randomized trials of behavioural treatment of depression. *Psychol Med*. May 2008;38(5):611-23. doi:10.1017/s0033291707001614
24. Cuijpers P, van Straten A, Warmerdam L. Behavioral activation treatments of depression: a meta-analysis. *Clin Psychol Rev*. Apr 2007;27(3):318-26. doi:10.1016/j.cpr.2006.11.001
25. Orgeta V, Brede J, Livingston G. Behavioural activation for depression in older people: systematic review and meta-analysis. *Br J Psychiatry*. Nov 2017;211(5):274-279. doi:10.1192/bjp.bp.117.205021

26. Lejuez CW, Hopko DR, LePage JP, Hopko SD, McNeil DW. A brief behavioral activation treatment for depression. *Cognitive and behavioral practice*. 2001;8(2):164-175. doi:10.1016/s1077-7229(01)80022-5
27. Lejuez CW, Hopko DR, Acierno R, Daughters SB, Pagoto SL. Ten Year Revision of the Brief Behavioral Activation Treatment for Depression: Revised Treatment Manual. *Behavior modification*. 2011;35(2):111-161. doi:10.1177/0145445510390929
28. Funderburk JS, Pigeon WR, Shepardson RL, Maisto SA. Brief behavioral activation intervention for depressive symptoms: Patient satisfaction, acceptability, engagement, and treatment response. *Psychological services*. Feb 4 2019;doi:10.1037/ser0000328
29. Funderburk JS, Pigeon WR, Shepardson RL, et al. Treating depressive symptoms among veterans in primary care: A multi-site RCT of brief behavioral activation. *Journal of affective disorders*. 2021;283:11-19. doi:10.1016/j.jad.2021.01.033
30. Kosslyn SM, Ganis G, Thompson WL. Neural foundations of imagery. *Nat Rev Neurosci*. Sep 2001;2(9):635-42. doi:10.1038/35090055
31. Pearson J, Naselaris T, Holmes EA, Kosslyn SM. Mental Imagery: Functional Mechanisms and Clinical Applications. *Trends Cogn Sci*. Oct 2015;19(10):590-602. doi:10.1016/j.tics.2015.08.003
32. Moulton ST, Kosslyn SM. Imagining predictions: mental imagery as mental emulation. *Philos Trans R Soc Lond B Biol Sci*. May 12 2009;364(1521):1273-80. doi:10.1098/rstb.2008.0314
33. Schacter DL, Addis DR, Buckner RL. Episodic simulation of future events: concepts, data, and applications. *Ann N Y Acad Sci*. Mar 2008;1124:39-60. doi:10.1196/annals.1440.001
34. Hallford DJ, Sharma MK. Anticipatory pleasure for future experiences in schizophrenia spectrum disorders and major depression: A systematic review and meta-analysis. <https://doi.org/10.1111/bjc.12218>. *British Journal of Clinical Psychology*. 2019/11/01 2019;58(4):357-383. doi:<https://doi.org/10.1111/bjc.12218>

35. Mellers BA, McGraw AP. Anticipated Emotions as Guides to Choice. *Current Directions in Psychological Science*. 2001/12/01 2001;10(6):210-214. doi:10.1111/1467-8721.00151
36. Sherdell L, Waugh CE, Gotlib IH. Anticipatory pleasure predicts motivation for reward in major depression. *J Abnorm Psychol*. Feb 2012;121(1):51-60. doi:10.1037/a0024945
37. Renner F, Murphy FC, Ji JL, Manly T, Holmes EA. Mental imagery as a “motivational amplifier” to promote activities. *Behaviour Research and Therapy*. 2019/03/01/ 2019;114:51-59. doi:<https://doi.org/10.1016/j.brat.2019.02.002>
38. Renner F, Ji JL, Pictet A, Holmes EA, Blackwell SE. Effects of Engaging in Repeated Mental Imagery of Future Positive Events on Behavioural Activation in Individuals with Major Depressive Disorder. *Cognitive Therapy and Research*. 2017/06/01 2017;41(3):369-380. doi:10.1007/s10608-016-9776-y
39. Ji JL, Geiles D, Saulsman LM. Mental imagery-based episodic simulation amplifies motivation and behavioural engagement in planned reward activities. *Behaviour Research and Therapy*. 2021/08/15/ 2021:103947. doi:<https://doi.org/10.1016/j.brat.2021.103947>
40. Murphy SE, Clare O'Donoghue M, Drazich EH, Blackwell SE, Christina Nobre A, Holmes EA. Imagining a brighter future: the effect of positive imagery training on mood, prospective mental imagery and emotional bias in older adults. *Psychiatry Res*. Nov 30 2015;230(1):36-43. doi:10.1016/j.psychres.2015.07.059
41. Sheehan DV, Lecrubier Y, Sheehan KH, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998;59 Suppl 20:22-33;quiz 34-57.
42. Svanborg P, Asberg M. A new self-rating scale for depression and anxiety states based on the Comprehensive Psychopathological Rating Scale. *Acta Psychiatr Scand*. Jan 1994;89(1):21-8. doi:10.1111/j.1600-0447.1994.tb01480.x
43. Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version. doi:10.1300/J018v05n01_09. Haworth Press; 1986.

44. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*. 2001;16(9):606-613. doi:10.1046/j.1525-1497.2001.016009606.x
45. Spitzer RL, Kroenke K, Williams JB, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. May 22 2006;166(10):1092-7. doi:10.1001/archinte.166.10.1092
46. Manos RC, Kanter JW, Luo W. The behavioral activation for depression scale-short form: development and validation. *Behav Ther*. Dec 2011;42(4):726-39. doi:10.1016/j.beth.2011.04.004
47. *Mätning av hälsa och funktionshinder : manual till WHO:s formulär för bedömning av funktionshinder WHO Disability Assessment Schedule WHODAS 2.0*. Socialstyrelsen; 2015.
48. Andrade J, May J, Deeptose C, Baugh S-J, Ganis G. Assessing vividness of mental imagery: The Plymouth Sensory Imagery Questionnaire. *British Journal of Psychology*. 2014/11/01 2014;105(4):547-563. doi:10.1111/bjop.12050
49. Rozental A, Kottorp A, Forsstrom D, Mansson K, Boettcher J. The Negative Effects Questionnaire: psychometric properties of an instrument for assessing negative effects in psychological treatments. Sep 2019;47(5):559-572. doi:10.1017/s1352465819000018
50. Serfaty M, Shafran R, Vickerstaff V, Aspden T. A pragmatic approach to measuring adherence in treatment delivery in psychotherapy. *Cognitive Behaviour Therapy*. 2020:1-14. doi:10.1080/16506073.2020.1717594
51. Brydges CR. Effect Size Guidelines, Sample Size Calculations, and Statistical Power in Gerontology. *Innovation in aging*. 2019;3(4):igz036-igz036. doi:10.1093/geroni/igz036
52. Behavioral activation for depression: A clinician's guide. Guilford Press; 2010.
53. Dimidjian S, Hollon SD, Dobson KS, et al. Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the acute treatment of adults with major depression. *J Consult Clin Psychol*. Aug 2006;74(4):658-70. doi:10.1037/0022-006x.74.4.658

54. Richards DA, Ekers D, McMillan D, et al. Cost and Outcome of Behavioural Activation versus Cognitive Behavioural Therapy for Depression (COBRA): a randomised, controlled, non-inferiority trial. *The Lancet*. 2016;388(10047):871-880. doi:10.1016/S0140-6736(16)31140-0
55. Moradveisi L, Huibers MJ, Renner F, Arasteh M, Arntz A. Behavioural activation v. antidepressant medication for treating depression in Iran: randomised trial. *Br J Psychiatry*. Mar 2013;202(3):204-11. doi:10.1192/bjp.bp.112.113696
56. Button KS, Ioannidis JPA, Mokrysz C, et al. Power failure: why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*. 2013/05/01 2013;14(5):365-376. doi:10.1038/nrn3475

Table 1*Baseline demographic and clinical characteristics*

Baseline characteristic	Treatment group (N = 20)	Control group (N = 20)
Age, mean (SD)	75.95 (8.16)	75.15 (6.20)
Women, n (%)	16 (80)	17 (85)
Partner/cohabiting, n (%)	9 (45)	7 (35)
Psychotropic medication		
Antidepressant medication, n (%)	0 (0)	5 (25)
Anxiolytic medication, n (%)	2 (10)	2 (10)
Sleep medication, n (%)	5 (25)	3 (15)
Psychiatric diagnoses according to MINI[†]		
Major depression	16 (80)	14 (70)
Panic disorder	1 (5)	0 (0)
Posttraumatic stress disorder	2 (10)	0 (0)
Generalized anxiety disorder	0 (0)	1 (5)

Note. SD = Standard deviation, MINI = Mini International Neuropsychiatric Interview 7.0.

†=No current diagnoses of bipolar disorder, psychotic syndromes, or alcohol-/substance use disorder since these were exclusion criteria.

Table 2*Session components in the treatment group*

Session no	Session components
1	Assess mood and suicide risk Provide psychoeducation about depression Provide treatment rationale for Behavioral Activation (BA) Provide rationale and instructions for activity log If highly motivated for change, plan activity for coming week
2	Follow-up on mood and suicide risk Review activity log Discuss life goals and values Plan activities aligned with life goals and values for coming week Provide rationale for Mental Imagery (MI) Go through MI-exercise for one of the planned activities
3	Follow-up on mood and suicide risk Review activity log Troubleshoot any problems carrying out activities Plan activities aligned with life goals and values for coming week Go through MI-exercise for one of the planned activities.
4	Follow-up on mood and suicide risk Review activity log Troubleshoot any problems carrying out activities Review treatment Stress the importance of continuing to engage in activities aligned with life goals and values Referral to additional service/s if necessary

Table 3

Means (M), standard deviations (SD) and effect sizes of primary and secondary outcome measures at baseline and post-intervention

	Treatment group						Control group						Effect size (g)
	N = 20			N = 18			N = 18			N = 18			
	Baseline		Post-intervention	Baseline		Post-intervention	Baseline		Post-intervention	Baseline		Post-intervention	
	M	SD	n	M	SD	n	M	SD	n	M	SD	n	
Primary outcome													
MADRS-S	17.30	6.88	20	12.45	7.21	20	18.20	5.36	20	19.33	8.96	18	.85
Secondary outcomes													
GDS-15	8.45	2.76	20	6.10	3.84	20	8.05	2.14	20	8.39	2.62	18	.69
PHQ-9	9.65	5.06	20	6.95	5.49	19	9.75	5.59	20	10.72	7.51	18	.58
GAD-7	7.05	5.04	20	5.30	5.17	20	7.60	4.24	20	8.50	4.94	18	.63
BADS-SF	22.10	6.59	20	33.40	10.02	20	21.90	6.16	20	23.67	7.81	18	1.08
Psi-Q	44.47	8.44	20	45.65	7.89	20	34.56	12.36	20	38.06	10.78	18	.81
WHODAS-12	14.35	10.41	20	10.90	8.07	20	12.50	9.03	20	13.56	10.88	16	.28

Note. MADRS-S = Montgomery-Åsberg Depression Rating Self-rating Scale, GDS-15 = Geriatric Depression Rating Scale 15-item short form, PHQ-9 = Patient Health Questionnaire 9, GAD-7 = Generalized Anxiety Disorder 7-item, BADS-SF = Behavioral Activation for Depression Scale - Short Form, WHODAS-12 = WHO Disability Assessment Schedule 12-item, Psi-Q = Plymouth Sensory Imagery Questionnaire.

Figure 1

Participant flow through the trial

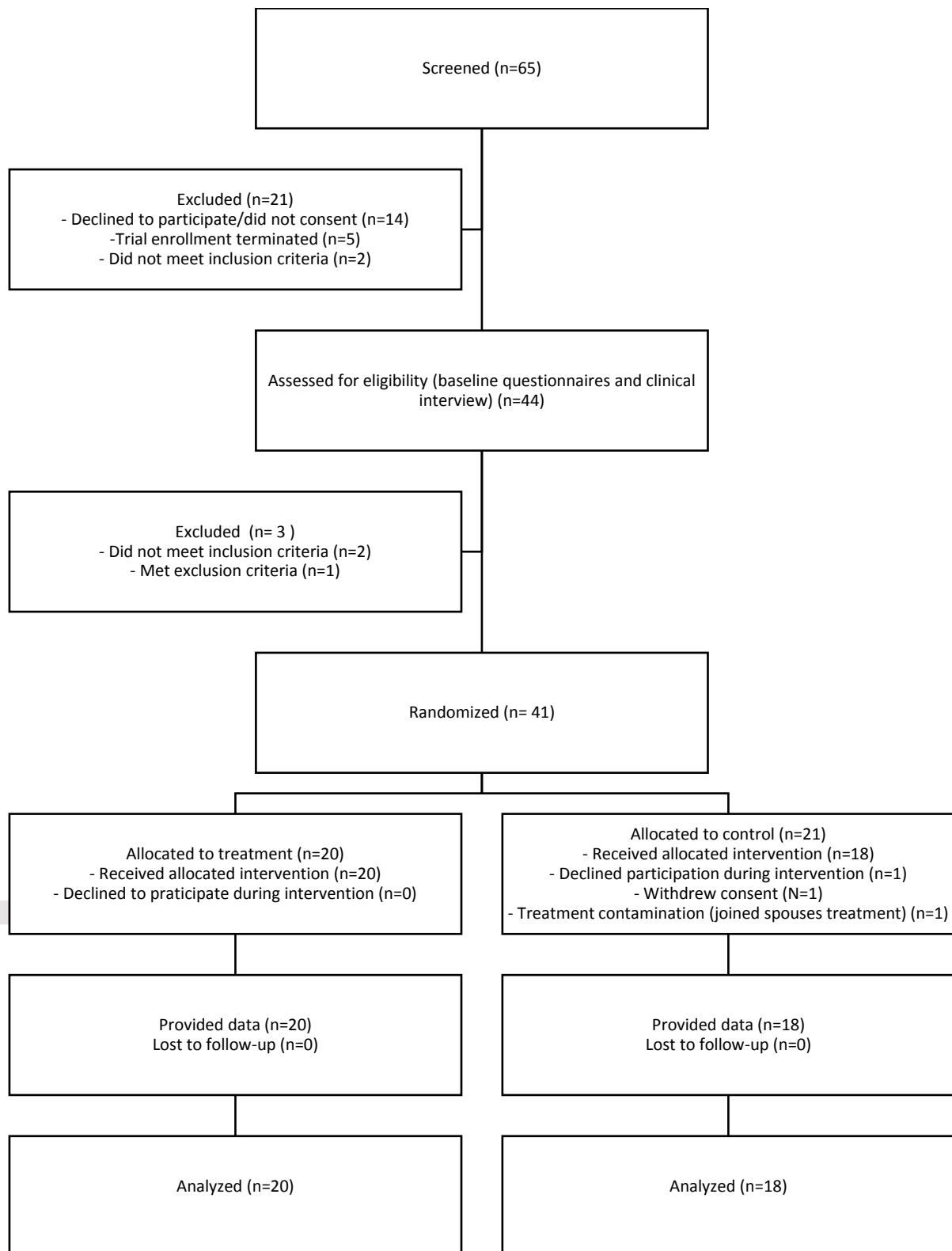
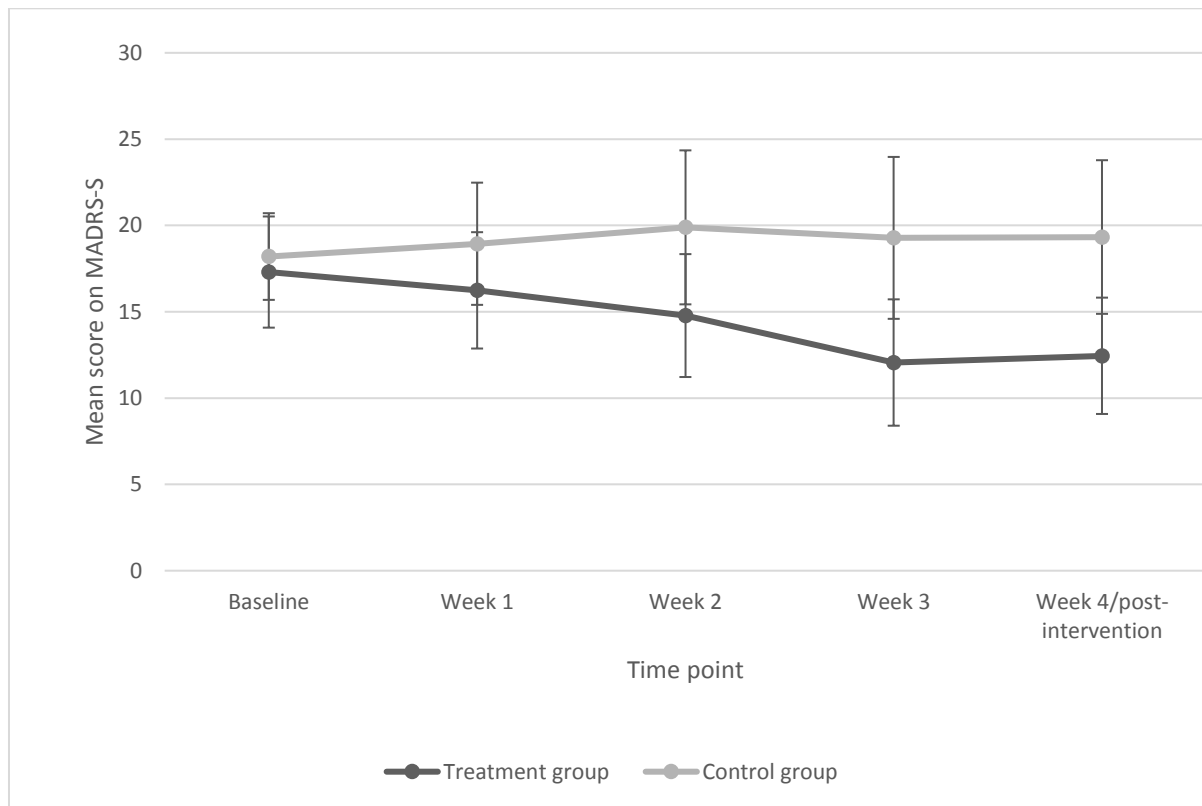


Figure 2

Mean depression severity over the different time points



Note. Error bars are 95 % confidence intervals. MADRS-S = Montgomery-Åsberg Depression Rating Self-rating Scale.