The role of therapist support on the efficacy of an internet-delivered stress recovery intervention for healthcare workers: A randomized control trial

Auguste Nomeikaite [a]*, Gerhard Andersson [b c], Blake F. Dear [d], Austeja Dumarkaite [a], Odeta Gelezelyte [a], Inga Truskauskaite [a], and Evaldas Kazlauskas [a]

[a]*Center for Psychotraumatology, Institute of Psychology, Vilnius University, Vilnius, Lithuania;* [b]*Department of Behavioural Sciences and Learning, Department of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden;* [c]*Department of Clinical Neuroscience, Karolinska Institute, Stockholm, Sweden;* [d]*School of Psychological Sciences, Macquarie University, Sydney, Australia.*

*Correspondence to Auguste Nomeikaite; auguste.nomeikaite@fsf.vu.lt Center for Psychotraumatology, Institute of Psychology, Vilnius University, M. K. Ciurlionio st. 29-203, LT-03100 Vilnius, Lithuania

The role of therapist support on the efficacy of an internet-based stress recovery intervention for healthcare workers: A randomized control trial

Internet-delivered CBT interventions effectively improve different aspects of mental health, although the therapist's role remains unclear. The aim of this trial was to evaluate the efficacy of a therapist-supported 6-week internet-delivered intervention in improving stress recovery among healthcare workers compared to a group with optional therapist support. A total of 196 participants were recruited and randomly allocated to regular therapists' support or optional therapists' support groups. The primary outcome measure was the Recovery Experiences Questionnaire (REQ), developed to assess four components of stress recovery: psychological detachment, relaxation, mastery, and control. Secondary outcomes measured perceived stress (PSS-10), anxiety (GAD-7), depression (PHQ-9), and psychological well-being (WHO-5). All four stress recovery skills improved significantly after participating in the intervention at a 3-month follow-up, with small to medium effects (0.27-0.65) in both groups. At follow-up, we also found a significant reduction in perceived stress, depression, and anxiety in both groups, as well as an improvement in psychological well-being. The results indicate that ICBT can be effective in improving stress recovery skills among healthcare workers with optional support from the therapist, provided at the participants' request. This RCT suggests that optional therapist support could meet participants' needs and reduce resources needed in routine care.

Keywords: internet-delivered intervention, cognitive behavior therapy, stress recovery, healthcare workers, RCT

Introduction

There is growing evidence that internet-delivered psychological therapies can efficiently reduce the burden of mental disorders (Andersson, 2018; Andersson et al., 2019; Fu et al., 2020). Research shows that internet-delivered cognitive behavior therapy (ICBT) is one of the most effective online treatments for improving different aspects of mental health (Andersson et al., 2018; Carlbring et al., 2018; Heber et al., 2017). Moreover, it

has been reported that ICBT may be as effective as face-to-face therapy for various mental health conditions (Andersson et al., 2014; Carlbring et al., 2018).

In the changing landscape of psychological treatments, which now include digital interventions, the therapist's role is changing considerably from one where the therapist provides the entire therapy to one where structured therapeutic material plays a central role. However, the impact of a therapist on the outcomes of internet-delivered interventions remains to be determined. Some research findings show that the core therapeutic factors, such as the therapeutic alliance, can be as important in internet interventions as in traditional face-to-face psychological therapies (Berger, 2017; Kaiser et al., 2021; Pihlaja et al., 2018). Furthermore, internet-delivered psychosocial programs are often considered to require at least minimal support from a therapist (Baumeister et al., 2014) in order to have positive outcomes on mental health. However, other studies have reported ambiguous findings, suggesting that for certain conditions and when delivered in certain ways, internet-delivered psychological interventions can be similarly effective in reducing symptoms whether delivered with therapist support, with optional therapist support, or even as a standalone online program without any support from a therapist but sometimes with automated reminders (Berger et al., 2011; Bisby et al., 2022; Eimontas et al., 2018; Johansson & Andersson, 2012; Rheker et al., 2015).

Healthcare professionals face highly demanding working conditions resulting in high levels of occupational stress. The COVID-19 pandemic further increased the physical and mental burden on healthcare workers (HCWs). Research shows that during the COVID-19 pandemic HCWs experienced moderate to high emotional strain or extreme stress (Mira et al., 2020), symptoms of anxiety, depression, insomnia, post-traumatic stress, complex post-traumatic stress disorder (Jovarauskaite et al., 2022; Sani et al., 2022), and many considered leaving the medical field altogether (Norkiene et al.,

2021). All of this strongly indicates that medical professionals may benefit from professional psychological interventions. However, HCWs rarely seek psychological help, often due to the prevailing stigma associated with seeking help from mental health professionals (Knaak et al., 2017; Mehta et al., 2018; Søvold et al., 2021). Internet-delivered interventions could therefore help to reduce help-seeking barriers in this specific context. Moreover, in some situations, as during the COVID-19 pandemic, internet-delivered interventions may be the only option to address mental health problems (Wind et al., 2020). Several RCTs have already shown that among HCWs, internet-delivered interventions can help develop coping skills (Morrison Wylde et al., 2017), improve resilience (Angelopoulou & Panagopoulou, 2022), reduce stress levels (Gollwitzer et al., 2018), improve psychological well-being (Smoktunowicz et al., 2021), and increase work engagement (Gollwitzer et al., 2018; Imamura et al., 2019).

A recent randomized control trial supported the efficacy of the FOREST intervention, indicating that it can effectively improve stress recovery skills, reduce stress levels, anxiety, and depression symptoms as well as increase psychological well-being among nurses (Dumarkaite et al., 2023). The "For Recovery from Stress" (FOREST) internet intervention is a brief six-week program developed based on CBT and mindfulness principles to specifically address the mental health needs of nurses amid the COVID-19 pandemic (Jovarauskaite et al., 2021). The FOREST intervention is grounded on the theoretical framework of stress recovery (Sonnentag & Fritz, 2007). Stress recovery is the process by which individual functional systems activated during a stressful experience return to pre-stress levels (Meijman & Mulder, 1998). Sonnentag and Fritz (2007) distinguished four components of stress recovery: (1) psychological detachment – a degree to which a person can detach from work responsibilities or thoughts about work during leisure time; (2) relaxation – the ability to reduce tension

and relax the body and mind; (3) mastery – sense of competence and new challenges outside work; and (4) control – being able to decide how to allocate work and leisure time and what activities to engage in.

Research shows that guided ICBT interventions for stress are more effective than unguided interventions (Heber et al., 2017). However, it is unclear whether low-intensity internet-delivered stress recovery intervention would be as effective with optional support from a therapist as compared to therapist support as usual in a non-clinical sample of HCWs. The FOREST+ is an updated version of the 6-week internet-delivered stress recovery program for nurses FOREST (Jovarauskaite et al., 2021). The current trial aimed to evaluate the role of therapist support intensity in an internet-delivered intervention FOREST+ for stress recovery in healthcare workers. A randomized controlled trial was conducted in which one group received regular therapist support while the other group received the same program with optional therapist support.

The primary objective of the trial was to evaluate the efficacy of the therapist-supported internet-delivered stress recovery intervention in improving stress recovery among healthcare workers compared to an optional therapist support group. The secondary objectives were: (1) to evaluate the efficacy of the therapist-supported stress recovery intervention in improving perceived levels of stress, anxiety, depression, and psychological well-being among healthcare workers compared to an optional support group; (2) to assess participants' engagement in the FOREST+ program in a group with regular therapist support and with optional support; (3) to evaluate the usability of the internet-delivered stress recovery program.

Methods

Study design

A two-armed randomized controlled trial was conducted, comparing healthcare workers who used the internet-delivered stress recovery program with regular therapist support and a group using the same program with optional support from a therapist, provided on request. Participants were randomly assigned to study groups (1:1 ratio) by an independent researcher using a random number generation procedure at www.random.org. Both groups started using the program immediately after randomization on 26 April 2022. To assess the efficacy of the program, three measurements were taken: pre-intervention (March 2022), post-intervention (June 2022), and 3-month follow-up (September 2022). Informed consent was obtained from study participants before the pre-intervention assessment. The self-reported data were collected using the same secure platform where the intervention was hosted – Iterapi (Vlaescu et al., 2016). The present trial was approved by Vilnius University Psychology Research Ethics Committee (Reference No. 2021-03-22/61). The trial is registered on www.clinicaltrials.gov (NCT05272774).

Procedure

Healthcare workers were invited to participate in the study through various social network groups for healthcare professionals, healthcare institutions, and through national media. Those interested in participation could register for the program at www.forestmedikams.lt, by filling out the pre-intervention questionnaire. After completing the online pre-intervention questionnaire, participants were contacted by the study administrators for a brief telephone interview to assess their eligibility for the intervention further. Eligibility criteria for participation in the present trial were: (1)

currently working in a healthcare institution; (2) aged 18 or over; (3) comprehend Lithuanian; (4) access to and ability to use a device with internet access. In addition, the exclusion criteria were as follows: (1) high suicide risk; (2) acute psychiatric crisis; (3) currently experiencing interpersonal violence. The full procedure of the trial is presented in the CONSORT flow diagram in Figure 1.

[Figure 1 near here]

Participants

In total, 237 healthcare workers registered for the 6-week internet-delivered stress recovery intervention. Of these, 220 completed the pre-intervention measurements, met the inclusion criteria, and were invited to participate in the intervention. After randomization 110 participants were assigned to the regular therapist support group (RS) and 110 to the optional therapist support group (OS). Of these, 21 participants did not sign in to the program and were therefor excluded and not included in the data analysis. In the regular support group, two participants, and in the optional support group one participant declined to participate in the study during the course of the intervention. The final sample included in the data analysis comprised 196 participants, 100 in regular support and 96 in optional support groups.

The included healthcare workers ($N = 196$) were aged 22-73 years ($M = 40.96$, $SD = 12.14$), and 94.4% were women. Comparisons of sociodemographic and work-related characteristics for regular support and optional support groups at baseline (pre-intervention assessment) are presented in Table 1. Groups significantly differed only in terms of previous self-help apps used ($\chi^2(1) = 4.32$, $p = .038$), with the regular support group having used more self-help apps ($n = 24/100$), than the optional support group ($n = 12/96$). At baseline, groups did not differ significantly in terms of primary (stress

recovery) and secondary (stress, anxiety, depression, and psychological well-being) outcome measures (see Figure 3 and Figure 4).

[Table 1 near here]

Intervention

FOREST+ program is a 6-week internet-delivered intervention based on the principles of Cognitive Behavioral Therapy (CBT) and mindfulness and comprises six modules (unlocked weekly by a schedule): (1) "Introduction" – introduction to intervention, psychoeducation about stress, burnout, and stress recovery; (2) "Psychological detachment" – psychoeducation about body relaxation, and improving the quality of sleep; (3) "Distancing" – psychoeducation about intrusive thoughts and distancing from work during leisure time (both physically and mentally); (4) "Mastery" – psychoeducation about skillfulness, challenging activities, and physical exercise; (5) "Control" – psychoeducation about feeling in control of one's life, and the importance of self-care; and (6) Keeping the change alive – a brief summary of the program, and psychoeducation of the importance of further practice (see Figure 2). Each module includes psychoeducational texts on all four stress recovery skills, videos, audio recordings, and several exercises (e.g., identifying stressors and symptoms of burnout; evaluating tension before and after body scan relaxation). After the FOREST efficacy study by Dumarkaite et al. (2023), the content of the FOREST+ intervention has been updated to suit a wider sample of healthcare workers and to strengthen the control component of the stress recovery experience, which returned to their baseline level after 3 months follow-up in the original FOREST program.

[Figure 2 near here]

All participants had access to psychological support online via the program website. In the therapist support group, participants were randomly assigned to one of 9 therapists (4 experienced psychologists and 5 master's students in clinical psychology). In addition to being able to write a message to the therapists, the regular therapist support group received written feedback from a therapist on each of the completed module worksheets. If participants did not complete the tasks, they did not receive feedback from the therapist. Meanwhile, the optional therapist support group did not receive any feedback from the therapists, but could write a message to a psychologist, and one of the two therapists (both experienced psychologists) would respond. All psychologists were trained, had to follow guidelines on how to write responses to participants, had weekly supervision and/or intervision groups and were able to contact more experienced therapists by phone if needed.

All participants received scheduled weekly email reminders sent manually by the study administrators about a newly unlocked module and incentives to complete worksheets. In addition, before, in the middle (at week 4), and after the intervention, the study administrators contacted each participant for a brief telephone interview to address any technical questions about using the program.

Measures

Demographic questionnaire

In a pre-intervention assessment, participants were asked to provide answers to questions about their socio-demographics: age, gender, education, relationship status, current psychological treatment experience, as well as usage of mental health medication and other self-help programs. In addition, they were asked to answer questions on work-related aspects: work and management position, work status, type of

services provided, work experience, and service provision to victims of the war in Ukraine and COVID-19 patients.

Recovery from stress

The Recovery Experiences Questionnaire (REQ; (Sonnentag & Fritz, 2007) was used to measure stress recovery. The REQ comprises 16 items assessing four components of stress recovery: (1) psychological detachment ($n = 4$; e.g., "*I don't think about work at all*"), (2) relaxation ($n = 4$; e.g., "*I take time for leisure*"), (3) mastery ($n = 4$; e.g., "*I do things that challenge me*"), and (4) control ($n = 4$; e.g., "*I decide my own schedule*"). Participants were asked to rate how strongly they agree with each statement on a 5-point Likert scale ranging from 1 – "*Totally disagree*" to 5 – "*Totally agree*". The REQ subscales scoring is obtained by calculating the sum of the responses to the four items comprising the subscale. Higher scores of the REQ indicate a more pronounced stress recovery experience component. Previous studies have shown adequate psychometric properties of the REQ (Almén et al., 2018; Sonnentag & Fritz, 2007). The Lithuanian version of REQ was used in previous studies (Dumarkaite et al., 2023). In the present trial, Cronbach's alphas for the REQ subscales at the pre-intervention assessment were good: psychological detachment ($\alpha = .87$), relaxation ($\alpha = .85$), mastery ($\alpha = .84$), control ($\alpha = .85$).

Perceived stress

The Perceived Stress Scale (PSS-10; Cohen et al., 1983) was used to measure stress levels. The PSS-10 comprises 10 items (e.g., "*In the last month, how often have you felt nervous and "stressed"?*"), which are scored on a 5-point Likert scale from 0 – "*Never*" to 4 – "*Very often*". A total score of the PSS-10 is a sum of responses to all items (reverse coded items 4, 5, 7, and 8), with higher scores indicating higher levels of

perceived stress. Previous studies have shown good psychometric properties of the PSS-10 (Roberti et al., 2006). In the present study, Cronbach's alpha for the total PSS-10 scale was good ($\alpha = .83$).

Depression

The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) was used to measure probable symptoms of depression. Participants were asked to rate how often the mentioned experiences (e.g., "*Little interest or pleasure in doing things*") bothered them in the last 2 weeks. Items were rated on a 4-point Likert scale, from 0 -"*Not at all*" to 3 - "*Nearly every day*". The PHQ-9 score is a sum of responses to all 9 items. Higher scores of the PHQ-9 indicate higher severity of depression symptoms and can range from 0 to 27. Previous studies have shown good psychometric properties of the Lithuanian PHQ-9 version (Pranckeviciene et al., 2022). In the current trial, Cronbach's alpha for the total PHQ-9 scale was good ($\alpha = .85$).

Anxiety

The Generalized Anxiety Disorder 7-item (GAD-7; (Spitzer et al., 2006) scale was used to measure probable anxiety symptoms. Participants were asked to rate how often the listed experiences (e.g., "*Feeling nervous, anxious, or on edge*") bothered them in the last 2 weeks. All 7 items were rated on a 4-point Likert scale, from 0 - "*Not at all*" to 3 - "*Nearly every da*y". The GAD-7 scores were obtained by summing up responses to each item. Higher scores of the GAD-7 indicate higher severity of anxiety symptoms and can range from 0 to 21. Previous studies have shown good psychometric properties of the Lithuanian GAD-7 version (Pranckeviciene et al., 2022). Cronbach's alpha for the GAD-7 scale was excellent in this study ($\alpha = .91$).

Psychological well-being

The World Health Organization Well-being Index (WHO-5; Bech, 2004) scale was used to measure psychological well-being. The WHO-5 comprises 5 items (e.g. "*I have felt calm and relaxed*") measuring how often the respondent has felt in a certain way during the last two weeks. Items were scored on a 6-point Likert scale, from 0 – "*At no time*" to 5 – "*All of the time*". The raw WHO-5 score is calculated by summing up the responses of all 5 items and can range from 0 to 25. Percentage scores were used in the current study, which can be attained by multiplying the raw score by 4 (ranging from 0 to 100). Higher WHO-5 scores indicate better psychological well-being. Previous studies have shown good psychometric properties of the WHO-5 (Topp et al., 2015). The Lithuanian version of WHO-5 has been used in previous studies (Norkiene et al., 2021). Cronbach's alpha for the WHO-5 was good in the present study ($\alpha = .87$).

Intervention evaluation

At post-intervention assessment, participants were asked to evaluate the FOREST+ program by indicating its usefulness (from 1 – "*Not useful at all*" to 5 – "*Very useful*"), likability (from 1 - "*I did not like it at all*" to 5 - "*I liked it a lot*"), and ease of use (from 1 - "*It was not easy at all*" to 5 – "*It was very easy*"). Furthermore, participants were asked to indicate how their psychological well-being and physical health have changed (from 1 - "*Worsened a lot*" to 5 - "*Improved a lot*") and whether they would recommend the program to other healthcare workers (from 1 - "*Not at all*" to 5 - "*Definitely would recommend*").

Data analysis

Data analysis was carried out using IBM SPSS 28 and Mplus 8.8 (Muthén & Muthén, 1998). Chi-square and Student-t tests, or Mann-Whitney test for non-parametric data,

were used to compare the demographic/work-related characteristics and program evaluation of the group with regular therapist support and the group with optional therapist support. To estimate the internet-delivered stress recovery intervention effects on primary outcomes (psychological detachment, relaxation, mastery, and control) and secondary outcomes (perceived stress, anxiety, depression, and psychological well-being) a Latent Change Modeling approach was used (Duncan et al., 2013). To estimate the within-group effects in the regular support and optional support groups, a series of multi-group latent change models were performed, reporting changes in the outcome variables from pre-intervention to post-intervention and from pre-intervention to follow-up in each group separately. To calculate the between-group effects, we ran the series of conditional latent change models in a full sample by regressing the intervention condition (0 = regular therapists support group; 1 = optional therapists support group) on changes in outcome variables and baseline scores. A Maximum Likelihood with Robust standard errors (MLR) estimator was used in latent change analyses. The Full Information Maximum Likelihood (FIML) algorithm was used for handling the missing data. Moreover, between-group and within-group effect sizes were calculated according to the correct effect size calculation recommendations in latent change models (Feingold, 2009). Effect sizes were interpreted according to Cohen's (1988) guidelines, that is, 0.20 = small effect, 0.50 = medium effect, and 0.80 = large effect.

Results

Participant engagement and therapist support

There were no statistically significant differences ($t(164) = -1.26$, $p = .209$) in the number of opened intervention modules between the regular support ($M = 4.64$; $SD = 1.78$) and optional support ($M = 4.31$; $SD = 1.86$) groups. Participants logged in to the

FOREST+ program between 1 and 40 times (*M* = 7.38, *SD* = 5.95). Mann-Whitney test

showed that participants in the regular support group (*M* = 8.58, *SD* = 6.53) had logged

in statistically significantly more times than the optional support group (*M* = 6.13, *SD* =

5.02; *p* = .003). The number of opened modules during the intervention is presented in

Table 2. In terms of self-reported time spent on the program by participants who

completed the post-intervention assessment (*N* = 163), there were no differences

between the regular support and optional support groups ($\chi2(1) = 1.72, p = .423$). In

total, 42.9% (*n* = 70) of participants spent less than 15 minutes, 39.3% (*n* = 64) spent

between 30 and 60 minutes, and 17.8% (*n* = 29) spent more than an hour per week on

the internet-delivered stress recovery program.

[Table 2 near here]

In the regular support group (*n* = 100), which received therapist feedback on

completed worksheets, 340 messages were sent by the therapists, and 50 were received

from the participants. All 9 psychologists involved in the intervention reported spending

a total of 5829 minutes (per message: *M* = 17.14, *SD* = 79.46; range: 3-60 min.)

providing feedback to participants. Meanwhile, in the optional support group (*n* = 96),

12 messages were received from the participants, and 11 messages were sent by the

therapists. In this group, 2 psychologists spent a total of 190 minutes (per message: *M* =

17.27, *SD* = 4.67; range: 10-25 min.) on writing answers for the participants. Overall,

on average, one therapist spent 547 minutes on responses during the program in both

groups (in regular support group (*n* = 9): *M* = 647.66, *SD* = 289.13; in optional support

group (*n* = 2): *M* = 95, *SD* = 0).

Intervention outcomes

The results of latent change analyses are presented in Figure 3, Figure 4, and

Supplementary Table S1. The effect sizes of the within-group and between-group

intervention effects are presented in Table 3. At post-intervention, both groups showed significant improvements in psychological detachment, relaxation, and mastery ($p <$ .05), with small to medium effects. Control improved significantly after the intervention in the regular support group ($d = 0.31$ (C.I. 95% [0.03; 0.59]), $p = .003$), but not in the optional therapist support group ($d = 0.13$ (C.I. 95% [-0.16; 0.41]), $p = .205$). However, at follow-up, a significant improvement in all four components of stress recovery ($p <$ .01) was observed in both groups compared to pre-intervention levels. The within-group effect sizes from pre-intervention to follow-up indicated medium intervention effects on the increase of psychological detachment and mastery, and small effects on the increase of relaxation and control (See Table 3).

The conditional latent change analyses indicated significant but small between-group effects on the increase of two stress recovery experiences at post-intervention: psychological detachment ($\beta_{pre-post} = 0.21$, $p = .004$) and relaxation ($\beta_{pre-post} = 0.16$, $p =$ .047), with higher mean changes in the group with regular support. However, these between-group effects were not significant at follow-up, nor were the effect on mastery and control.

[Figure 3 near here]

A significant reduction in stress, depression, and anxiety symptoms and an increase in psychological well-being in both regular support and optional therapist support groups was found post-intervention ($p < .01$), with medium to large effects. These changes remained significant for both groups at three-month follow-up compared to baseline ($p < .001$), with the largest effects on the decrease of perceived stress ($d_{RS} =$ -0.70 (C.I. 95% [-0.99; -0.42]); $d_{OS} =$ -0.75 (C.I. 95% [-1.04; -0.45])). No significant between-group effects on change or baseline were found regarding stress, anxiety, depression, and psychological well-being.

14

[Figure 4 near here]

[Table 3 near here]

Pre-intervention, post-intervention, and follow-up perceived stress levels in the total sample were significantly negatively correlated with all components of stress recovery (psychological detachment, relaxation, mastery, and control) in all three measurements (r ranges from -0.16 to -0.55; $p < .50$), with the exception of an insignificant correlation of perceived stress at follow-up with pre-intervention psychological detachment ($r = -0.15$, $p = .530$). At pre-intervention, post-intervention, and follow-up, perceived stress significantly positively correlated with symptoms of depression (r ranges from 0.47 to 0.78; $p < .001$) and anxiety (r ranges from 0.49 to 0.78; $p < .001$), and negatively correlated with psychological well-being (r range from -0.36 to - 0.70; $p < .001$) (see Supplementary Table S2).

Usability

Overall, 76.7% ($n = 125$) of participants found the program to be useful, 85.3% ($n = 139$) liked it, and 91.4% ($n = 149$) thought that it was easy to use it. There were no differences between the regular support and optional support groups in the reported intervention usefulness ($\chi^2(2) = 0.62$, $p = .734$), likability ($\chi^2(2) = 1.53$, $p = .466$), and ease of use ($\chi^2(2) = 1.38$, $p = .501$) at post-intervention ($n = 163$). A total of 66.5% ($n = 109$) of respondents reported that the program had improved their psychological well-being, and 36.8% ($n = 60$) reported that the program improved their physical health. There were no statistically significant differences between the regular support and optional support groups in terms of self-reported change in psychological well-being ($\chi^2(2) = 1.05$, $p = .593$) and physical health ($\chi^2(2) = 1.33$, $p = .249$) at post-intervention.

Finally, 82.8% ($n = 135$) of participants indicated that they would recommend the FOREST+ program to other healthcare workers.

Discussion

The present trial aimed to evaluate the role of therapist support in FOREST+, a 6-week online stress recovery intervention program for healthcare workers based on principles of CBT and mindfulness. The primary analysis showed that, regardless of therapist support provided on a regular basis or on request, all four stress recovery components (psychological detachment, relaxation, mastery, and control) increased significantly after participating in the intervention. Furthermore, the secondary analysis showed that the stress recovery intervention was also effective in reducing symptoms of perceived stress, depression, and anxiety as well as improving psychological well-being regardless of the intervention group. Moreover, the intensity of the therapist's support did not affect the participants' engagement, as they spent a similar amount of time in the program, regardless of group. Finally, regardless of group, participants had a generally positive attitude towards the FOREST+ program, and eight out of ten participants would recommend it to other healthcare professionals. In combination, these findings support the potential of internet-delivered interventions for supporting stress management skills and the mental health of a broad range of healthcare workers, and suggest that several approaches to providing therapist support may be equally effective.

In both regular and optional therapists' support groups, small to medium effects were found in the present trial in the improvement of all stress recovery skills three months after the program. Similar small to medium effects of the FOREST intervention on stress recovery skills among nurses were found in Dumarkaite et al. (2023) study. Furthermore, a significant but small between-group effect size was found in the current study for the increase in psychological detachment and relaxation skills after using the

program, with higher changes in the group with regular support. However, three months

after the intervention, differences between groups were not significant. We hypothesize

that regular support from the therapist may have led to a slightly more rapid learning of

some stress recovery skills, but in the long term, this was not associated with the level

of skills acquired. This finding is consistent with theories that suggest that rapid

improvement is only consolidated and leads to better treatment outcomes after

interactions with therapists (Aderka & Shalom, 2021). However, our study shows that,

in the long run, internet-delivered stress recovery intervention can be just as effective

with optional therapist support.

The primary outcomes of the trial are in line with other studies, which found that

internet-delivered interventions can be effective regardless of the intensity of the

support from the therapist. Hadjistavropoulos et al. (2019) study showed that when

given an opportunity, the vast majority (78%) of participants would select standard

therapist support, with 22% selecting support on request. However, in previous studies,

no differences were found in treatment outcomes between groups with regular therapist

support and optional support in internet-delivered interventions for the treatment of

social phobia (Berger et al., 2011), adjustment disorder (Eimontas et al., 2018), or

anxiety (Dahlin et al., 2022) and depression (Andersson et al., 2023; Hadjistavropoulos

et al., 2017). Nevertheless, it is important to note that the intensity of therapeutic

support required is likely to depend on the mental health problem targeted (Andersson,

2014) and the amount of therapist support used is likely to depend on patient

preferences (e.g., Hadjistvaropoulos et al., 2019). In summary, internet-delivered

psychological support can be effective with the support of a therapist on request for

different mental health aspects. To our knowledge, the present trial is the first to

compare the therapist-supported internet-delivered intervention for stress recovery with

a group of participants using the same program with the support of the therapist on request.

In the present trial, three months after the program, medium to large effects were found in both groups, with regular or optional support from a therapist, in terms of improvement in stress, anxiety, depression, and psychological well-being. Previous studies also showed that internet-delivered CBT interventions could be effective in reducing symptoms in targeted samples suffering from elevated levels of stress, anxiety and depression (Heber et al., 2017; Svärdman et al., 2022). It has also been demonstrated that among HCWs, internet-delivered interventions can help improve psychological well-being (Smoktunowicz et al., 2021). Moreover, in this trial, no significant difference was found between the secondary outcomes in the group with regular therapist support and the group with optional support. This is in line with the results of Hadjistavropoulos et al. (2017) study, which did not find that regular support from a therapist in ICBT would be more effective than optional support in reducing anxiety and depression symptoms. Therefore, promising results have been obtained in the present trial that an internet-delivered stress recovery program can effectively help improve other aspects of mental health – reduce stress, anxiety, depression, and improve psychological well-being.

The results of this trial should be seen in the context of the FOREST+ program itself. In addition to support from a therapist, participants in both RCT arms also received regular scheduled reminders from study administrators by emails or brief telephone interviews. The use of persuasive technologies can have an impact on adherence and thus on the efficacy of the internet-delivered program (Kelders et al., 2012). The FOREST+ program also included video and audio recordings of psychologists, psychoeducational texts, and various worksheets. Research on internet-

delivered interventions for stress shows that they are more effective when there is interpersonal contact, even if it is just email reminders (Heber et al., 2017). Moreover, research shows that ICBT can be just as effective when support is provided by a clinician or technician (Titov et al., 2009, 2010). However, there is a lack of research evaluating the impact of intervention elements on program effectiveness (Garrido et al., 2019; Mukhiya et al., 2020). Future research should take this into account when assessing the efficacy of internet-delivered interventions.

       In summary, the current trial showed that internet-delivered psychological support for stress recovery could significantly improve stress recovery skills of HCWs and reduce their stress, anxiety, and depression symptoms, as well as improve their psychological well-being. Research shows that internet-delivered psychosocial interventions can be a more cost-effective solution than traditional face-to-face therapies (Donker et al., 2015). Moreover, a study by Dear et al. (2021) confirmed the cost-effectiveness of the optional support format in internet-delivered intervention for pain management. The results of our trial show that stress recovery program with optional therapist support required up to four times fewer therapists and almost seven times less time from the therapist, who over the course of 6 weeks spent an average of 2 minutes per participant. Although internet-delivered interventions require fewer therapist resources, it is important to consider the financial cost of setting up and assessing internet-delivered interventions, as well as training and supervising the therapists. To conclude, internet-delivered interventions for stress recovery with optional therapist support could bring significant economic benefits and make psychological help more accessible. Which is particularly important in a sample of healthcare workers where psychological support is hardly available.

Limitations

The results obtained should be carefully considered in the context of the several limitations of the study. First of all, the present trial only assessed the impact of the intensity of the therapist support; it would be important to assess what other components have an impact on the efficacy of the internet-delivered stress recovery program (reminders from study administrators, worksheets, psychoeducational texts, video, audio recordings, etc.). Secondly, the findings of the trial cannot be generalized to other professions, as only healthcare workers participated in the present study. Future studies should assess the suitability of the program in other samples, including other professions associated with occupational stress such as first responders and emergency service workers. Thirdly, the three-month follow-up used in the current trial is a short period of time, and future studies should consider longer follow-up periods in order to investigate the longevity of the results obtained. Fourthly, only half of the participants took part in the full 6-week program. For this reason, the results of the study should be interpreted with caution, as it implies that the engagement of the participants in the study was limited and that the results may have been influenced by natural remission instead of changes due to the received intervention. Finally, future research should also try to assess the efficacy of the internet-delivered stress recovery intervention in the context of other psychological support options. Nevertheless, despite the limitations of the study, the results provide new insights into internet-delivered CBT interventions for stress recovery among healthcare workers.

Conclusion

In conclusion, the present RCT has shown that the internet-delivered CBT intervention with optional therapists' support can effectively improve stress recovery skills –

psychological detachment, relaxation, mastery, and control – as well as reduce stress, anxiety, and depression and increase psychological well-being in healthcare professionals. Furthermore, regardless of the intensity of the support received from a therapist, participants found the FOREST+ intervention easy to use and useful. In the face of stressful occupational conditions for healthcare workers and barriers to seeking or receiving psychological support, an internet-delivered CBT intervention for stress recovery may be a useful option to improve the mental health of healthcare workers.

ORCID

Auguste Nomeikaite https://orcid.org/0000-0002-5040-1721

Gerhard Andersson https://orcid.org/0000-0003-4753-6745

Blake F. Dear https://orcid.org/0000-0001-9324-3092

Austeja Dumarkaite https://orcid.org/0000-0001-6608-8437

Odeta Gelezelyte https://orcid.org/0000-0001-8501-3502

Inga Truskauskaite https://orcid.org/0000-0001-6699-6638

Evaldas Kazlauskas https://orcid.org/0000-0002-6654-6220

References

Aderka, I. M., & Shalom, J. G. (2021). A Revised Theory of Sudden Gains in Psychological Treatments. *Behaviour Research and Therapy*, *139*. https://doi.org/10.1016/j.brat.2021.103830

Almén, N., Lundberg, H., Sundin, Ö., & Jansson, B. (2018). The reliability and factorial validity of the Swedish version of the Recovery Experience Questionnaire. *Nordic Psychology*, *70*(4), 324–333. https://doi.org/10.1080/19012276.2018.1443280

Andersson, G. (2018). Internet interventions: Past, present and future. *Internet Interventions*, *12*, 181–188. https://doi.org/10.1016/j.invent.2018.03.008

Andersson, G., Carlbring, P., Titov, N., & Lindefors, N. (2019). Internet Interventions for Adults with Anxiety and Mood Disorders: A Narrative Umbrella Review of Recent Meta-Analyses. In *Canadian Journal of Psychiatry* (Vol. 64, Issue 7, pp. 465–470). SAGE Publications Inc. https://doi.org/10.1177/0706743719839381

Andersson, G., Cuijpers, P., Carlbring, P., Riper, H., & Hedman, E. (2014). Guided Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: A systematic review and meta-analysis. *World Psychiatry*, *13*(3), 288–295. https://doi.org/10.1002/wps.20151

Andersson, G., Käll, A., Juhlin, S., Wahlström, C., de Fine Licht, E., Färdeman, S., Franck, A., Tholcke, A., Nachtweij, K., Fransson, E., Vernmark, K., Ludvigsson, M., & Berg, M. (2023). Free choice of treatment content, support on demand and supervision in internet-delivered CBT for adults with depression: A randomized factorial design trial. *Behaviour Research and Therapy*, *162*. https://doi.org/10.1016/j.brat.2023.104265

Andersson, G., Rozental, A., Shafran, R., & Carlbring, P. (2018). Long-term effects of internet-supported cognitive behaviour therapy. In *Expert Review of*

Neurotherapeutics (Vol. 18, Issue 1, pp. 21–28). Taylor and Francis Ltd. https://doi.org/10.1080/14737175.2018.1400381

Angelopoulou, P., & Panagopoulou, E. (2022). Resilience interventions in physicians: A systematic review and meta-analysis. *Applied Psychology: Health and Well-Being*, *14*(1), 3–25. https://doi.org/10.1111/aphw.12287

Baumeister, H., Reichler, L., Munzinger, M., & Lin, J. (2014). The impact of guidance on Internet-based mental health interventions - A systematic review. In *Internet Interventions* (Vol. 1, Issue 4, pp. 205–215). Elsevier. https://doi.org/10.1016/j.invent.2014.08.003

Berger, T. (2017). The therapeutic alliance in internet interventions: A narrative review and suggestions for future research. *Psychotherapy Research*, *27*(5), 511–524. https://doi.org/10.1080/10503307.2015.1119908

Berger, T., Caspar, F., Richardson, R., Kneubühler, B., Sutter, D., & Andersson, G. (2011). Internet-based treatment of social phobia: A randomized controlled trial comparing unguided with two types of guided self-help. *Behaviour Research and Therapy*, *49*(3), 158–169. https://doi.org/10.1016/j.brat.2010.12.007

Bisby, M. A., Scott, A. J., Hathway, T., Dudeney, J., Fisher, A., Gandy, M., Heriseanu, A. I., Karin, E., Titov, N., & Dear, B. F. (2022). Sudden gains in therapist-guided versus self-guided online treatments for anxiety or depression. *Journal of Consulting and Clinical Psychology*, *90*(11), 861–871. https://doi.org/10.1037/ccp0000771

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., & Hedman-Lagerlöf, E. (2018). Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. In *Cognitive*

Behaviour Therapy (Vol. 47, Issue 1, pp. 1–18). Routledge.

https://doi.org/10.1080/16506073.2017.1401115

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences Second Edition*.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A Global Measure of Perceived Stress. In *Journal of Health and Social Behavior* (Vol. 24, Issue 4).

Dahlin, M., Johansson, A., Romare, H., Carlbring, P., & Andersson, G. (2022). Worry-specific versus self-tailored internet-based treatments for generalized anxiety disorder, with scheduled support or support on demand: A pilot factorial design trial. *Internet Interventions*, *28*. https://doi.org/10.1016/j.invent.2022.100531

Dear, B. F., Karin, E., Fogliati, R., Dudeney, J., Nielssen, O., Scott, A. J., Gandy, M., Bisby, M. A., Heriseanu, A. I., Hathway, T., Staples, L., Titov, N., & Schroeder, L. (2021). A Cost-effectiveness Analysis of an Internet-delivered Pain Management Program Delivered With Different Levels of Clinician Support: Results From a Randomised Controlled Trial. *The Journal of Pain*, *22*(3), 344–358. https://doi.org/https://doi.org/10.1016/j.jpain.2020.11.003

Donker, T., Blankers, M., Hedman, E., Ljotsson, B., Petrie, K., & Christensen, H. (2015). Economic evaluations of Internet interventions for mental health: A systematic review. In *Psychological Medicine* (Vol. 45, Issue 16, pp. 3357–3376). Cambridge University Press. https://doi.org/10.1017/S0033291715001427

Dumarkaite, A., Truskauskaite, I., Andersson, G., Jovarauskaite, L., Jovaisiene, I., Nomeikaite, A., & Kazlauskas, E. (2023). The efficacy of the internet-based stress recovery intervention FOREST for nurses amid the COVID-19 pandemic: A randomized controlled trial. *International Journal of Nursing Studies*, *138*. https://doi.org/10.1016/j.ijnurstu.2022.104408

Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2013). An introduction to latent variable growth curve modeling: Concepts, issues, and applications. In *An Introduction to Latent Variable Growth Curve Modeling: Concepts, Issues, and Application, Second Edition*. Taylor and Francis Inc. https://doi.org/10.4324/9780203879962

Eimontas, J., Gegieckaite, G., Dovydaitiene, M., Mazulyte, E., Rimsaite, Z., Skruibis, P., Zelviene, P., & Kazlauskas, E. (2018). The role of therapist support on effectiveness of an internet-based modular self-help intervention for adjustment disorder: a randomized controlled trial. *Anxiety, Stress and Coping*, *31*(2), 146–158. https://doi.org/10.1080/10615806.2017.1385065

Feingold, A. (2009). Effect Sizes for Growth-Modeling Analysis for Controlled Clinical Trials in the Same Metric as for Classical Analysis. *Psychological Methods*, *14*(1), 43–53. https://doi.org/10.1037/a0014699

Fu, Z., Burger, H., Arjadi, R., & Bockting, C. L. H. (2020). Effectiveness of digital psychological interventions for mental health problems in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Psychiatry*, *7*, 851–864. www.thelancet.com/psychiatry

Garrido, S., Millington, C., Cheers, D., Boydell, K., Schubert, E., Meade, T., & Nguyen, Q. V. (2019). What Works and What Doesn't Work? A Systematic Review of Digital Mental Health Interventions for Depression and Anxiety in Young People. In *Frontiers in Psychiatry* (Vol. 10). Frontiers Media S.A. https://doi.org/10.3389/fpsyt.2019.00759

Gollwitzer, P. M., Mayer, D., Frick, C., & Oettingen, G. (2018). Promoting the self-regulation of stress in health care providers: An internet-based intervention. *Frontiers in Psychology*, *9*(JUN). https://doi.org/10.3389/fpsyg.2018.00838

Hadjistavropoulos, H. D., Schneider, L. H., Edmonds, M., Karin, E., Nugent, M. N.,

    Dirkse, D., Dear, B. F., & Titov, N. (2017). Randomized controlled trial of

    internet-delivered cognitive behaviour therapy comparing standard weekly versus

    optional weekly therapist support. *Journal of Anxiety Disorders*, *52*, 15–24.

    https://doi.org/10.1016/j.janxdis.2017.09.006

Hadjistavropoulos, H. D., Schneider, L. H., Mehta, S., Karin, E., Dear, B. F., & Titov,

    N. (2019). Preference trial of internet-delivered cognitive behaviour therapy

    comparing standard weekly versus optional weekly therapist support. *Journal of*

    Anxiety Disorders, *63*, 51–60. https://doi.org/10.1016/j.janxdis.2019.02.002

Heber, E., Ebert, D. D., Lehr, D., Cuijpers, P., Berking, M., Nobis, S., & Riper, H.

    (2017). The benefit of web- and computer-based interventions for stress: A

    systematic review and meta-analysis. In *Journal of Medical Internet Research*

    (Vol. 19, Issue 2). JMIR Publications Inc. https://doi.org/10.2196/jmir.5774

Imamura, K., Tran, T. T. T., Nguyen, H. T., Kuribayashi, K., Sakuraya, A., Nguyen, A.

    Q., Bui, T. M., Nguyen, Q. T., Nguyen, K. T., Nguyen, G. T. H., Tran, X. T. N.,

    Truong, T. Q., Zhang, M. W. B., Minas, H., Sekiya, Y., Sasaki, N., Tsutsumi, A.,

    & Kawakami, N. (2019). Effects of two types of smartphone-based stress

    management programmes on depressive and anxiety symptoms among hospital

    nurses in Vietnam: A protocol for three-arm randomised controlled trial. *BMJ*

    Open, *9*(4). https://doi.org/10.1136/bmjopen-2018-025138

Johansson, R., & Andersson, G. (2012). Internet-based psychological treatments for

    depression. In *Expert Review of Neurotherapeutics* (Vol. 12, Issue 7, pp. 861–870).

    https://doi.org/10.1586/ern.12.63

Jovarauskaite, L., Dumarkaite, A., Truskauskaite-Kuneviciene, I., Jovaisiene, I.,

    Andersson, G., & Kazlauskas, E. (2021). Internet-based stress recovery

intervention FOREST for healthcare staff amid COVID-19 pandemic: study

protocol for a randomized controlled trial. *Trials*, *22*(1).

https://doi.org/10.1186/s13063-021-05512-1

Jovarauskaite, L., Murphy, D., Truskauskaite-Kuneviciene, I., Dumarkaite, A.,

Andersson, G., & Kazlauskas, E. (2022). Associations between moral injury and

ICD-11 post-traumatic stress disorder (PTSD) and complex PTSD among help-

seeking nurses: a cross-sectional study. *BMJ Open*, *12*(5), e056289.

https://doi.org/10.1136/bmjopen-2021-056289

Kaiser, J., Hanschmidt, F., & Kersting, A. (2021). The association between therapeutic

alliance and outcome in internet-based psychological interventions: A meta-

analysis. *Computers in Human Behavior*, *114*.

https://doi.org/10.1016/j.chb.2020.106512

Kelders, S. M., Kok, R. N., Ossebaard, H. C., & Van Gemert-Pijnen, J. E. (2012).

Persuasive system design does matter: a systematic review of adherence to web-

based interventions. Journal of medical Internet research, 14(6), e152.

https://doi.org/10.2196/jmir.2104

Knaak, S., Mantler, E., & Szeto, A. (2017). Mental illness-related stigma in healthcare:

Barriers to access and care and evidence-based solutions. In *Healthcare*

Management Forum (Vol. 30, Issue 2, pp. 111–116). SAGE Publications Inc.

https://doi.org/10.1177/0840470416679413

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). *The PHQ-9 Validity of a Brief*

Depression Severity Measure. https://doi.org/10.1046/j.1525-

1497.2001.016009606.x

Mehta, S. S., Matthew, B. A., & Edwards, L. (2018). Suffering in Silence: Mental Health Stigma and Physicians' Licensing Fears. In *The American Journal of Psychiatry Residents' Journal*. https://afsp.org/our-work/education/

Mira, J. J., Carrillo, I., Guilabert, M., Mula, A., Martin-Delgado, J., Pérez-Jover, M. V., Vicente, M. A., & Fernández, C. (2020). Acute stress of the healthcare workforce during the COVID-19 pandemic evolution: A cross-sectional study in Spain. *BMJ Open*, *10*(11). https://doi.org/10.1136/bmjopen-2020-042555

Morrison Wylde, C., Mahrer, N. E., Meyer, R. M. L., & Gold, J. I. (2017). Mindfulness for Novice Pediatric Nurses: Smartphone Application Versus Traditional Intervention. *Journal of Pediatric Nursing*, *36*, 205–212. https://doi.org/10.1016/j.pedn.2017.06.008

Mukhiya, S. K., Wake, J. D., Inal, Y., Pun, K. I., & Lamo, Y. (2020). Adaptive elements in internet-delivered psychological treatment systems: Systematic review. In *Journal of Medical Internet Research* (Vol. 22, Issue 11). JMIR Publications Inc. https://doi.org/10.2196/21066

Muthén, L. K., & Muthén, B. O. (1998). *Statistical Analysis With Latent Variables User's Guide*. www.StatModel.com

Norkiene, I., Jovarauskaite, L., Kvedaraite, M., Uppal, E., Phull, M. K., Chander, H., Halford, K., & Kazlauskas, E. (2021). 'Should I Stay, or Should I Go?' Psychological Distress Predicts Career Change Ideation Among Intensive Care Staff in Lithuania and the UK Amid COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *18*(5), 1–9. https://doi.org/10.3390/ijerph18052660

Pihlaja, S., Stenberg, J. H., Joutsenniemi, K., Mehik, H., Ritola, V., & Joffe, G. (2018). Therapeutic alliance in guided internet therapy programs for depression and

anxiety disorders – A systematic review. In *Internet Interventions* (Vol. 11, pp. 1–10). Elsevier B.V. https://doi.org/10.1016/j.invent.2017.11.005

Pranckeviciene, A., Saudargiene, A., Gecaite-Stonciene, J., Liaugaudaite, V., Griskova-Bulanova, I., Simkute, D., Naginiene, R., Dainauskas, L. L., Ceidaite, G., & Burkauskas, J. (2022). Validation of the patient health questionnaire- 9 and the generalized anxiety disorder-7 in Lithuanian student sample. *PLoS ONE*, *17*(1 January). https://doi.org/10.1371/journal.pone.0263027

Rheker, J., Andersson, G., & Weise, C. (2015). The role of "on demand" therapist guidance vs. no support in the treatment of tinnitus via the internet: A randomized controlled trial. *Internet Interventions*, *2*(2), 189–199. https://doi.org/10.1016/j.invent.2015.03.007

Roberti, J. W., Harrington, L. N., & Storch, E. A. (2006). Further Psychometric Support for the 10-Item Version of the Perceived Stress Scale. *Journal of College Counseling*, *9*(2), 135–147. https://doi.org/10.1002/j.2161-1882.2006.tb00100.x

Sani, G., Janiri, D., Moccia, L., Albert, U., Carrà, G., Carmassi, C., Cirulli, F., Dell'Osso, B., Menculini, G., Nanni, M. G., Pompili, M., Volpe, U., & Fiorillo, A. (2022). Psychopathological burden and coping strategies among frontline and second-line Italian healthcare workers facing the COVID-19 emergency: Findings from the COMET collaborative network. *Journal of Affective Disorders*, *311*, 78–83. https://doi.org/10.1016/j.jad.2022.05.006

Smoktunowicz, E., Lesnierowska, M., Carlbring, P., Andersson, G., & Cieslak Roman. (2021). Resource-Based Internet Intervention (Med-Stress) to ImproveWell-Being Among Medical Professionals: Randomized Controlled Trial. *JOURNAL OF MEDICAL INTERNET RESEARCH*, *23*(1). https://doi.org/10.2196/21445

Sonnentag, S., & Fritz, C. (2007). The Recovery Experience Questionnaire: Development and Validation of a Measure for Assessing Recuperation and Unwinding From Work. *Journal of Occupational Health Psychology*, *12*(3), 204–221. https://doi.org/10.1037/1076-8998.12.3.204

Søvold, L. E., Naslund, J. A., Kousoulis, A. A., Saxena, S., Qoronfleh, M. W., Grobler, C., & Münter, L. (2021). Prioritizing the Mental Health and Well-Being of Healthcare Workers: An Urgent Global Public Health Priority. *Frontiers in Public Health*, *9*. https://doi.org/10.3389/fpubh.2021.679397

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). *A Brief Measure for Assessing Generalized Anxiety Disorder The GAD-7*. http://archinte.jamanetwork.com/

Svärdman, F., Sjöwall, D., & Lindsäter, E. (2022). Internet-delivered cognitive behavioral interventions to reduce elevated stress: A systematic review and meta-analysis. *Internet Interventions*, *29*, 100553. https://doi.org/10.17605/OSF.IO/BQAZ3

Titov, N., Andrews, G., Davies, M., Mcintyre, K., Robinson, E., & Solley, K. (2010). Internet treatment for depression: A randomized controlled trial comparing clinician vs. technician assistance. *PLoS ONE*, *5*(6). https://doi.org/10.1371/journal.pone.0010939

Titov, N., Andrews, G., Schwencke, G., Solley, K., Johnston, L., & Robinson, E. (2009). An RCT comparing effect of two types of support on severity of symptoms for people completing Internet-based cognitive behaviour therapy for social phobia. *Australian and New Zealand Journal of Psychiatry*, *43*(10), 920–926. https://doi.org/10.1080/00048670903179228

Topp, C. W., Østergaard, S. D., Søndergaard, S., & Bech, P. (2015). The WHO-5 well-being index: A systematic review of the literature. *Psychotherapy and Psychosomatics*, *84*(3), 167–176. https://doi.org/10.1159/000376585

Vlaescu, G., Alasjö, A., Miloff, A., Carlbring, P., & Andersson, G. (2016). Features and functionality of the Iterapi platform for internet-based psychological treatment. *Internet Interventions*, *6*, 107–114. https://doi.org/10.1016/j.invent.2016.09.006

Wind, T. R., Rijkeboer, M., Andersson, G., & Riper, H. (2020). The COVID-19 pandemic: The 'black swan' for mental health care and a turning point for e-health. In *Internet Interventions* (Vol. 20). Elsevier B.V. https://doi.org/10.1016/j.invent.2020.100317

Table 1. Characteristics of the sample at baseline.

Variable	Regular support group (*n* = 100)	Optional support group (*n* = 96)	Significance statistics
Gender			
Female	95 (95.0%)	90 (93.8%)	$\chi^2(1) = 0.14$, $p = .704$
Male	5 (5.0%)	6 (6.3%)	
Age			
M (*SD*)	39.78 (11.83%)	42.19 (12.39%)	$t(194) = 1.39$, $p = .166$
Range	22-73		
Education			
Secondary or lower	3 (3.0%)	3 (3.1%)	$\chi^2(2) = 0.06$, $p = .970$
Post-secondary or vocational	18 (18.0%)	16 (16.7%)	
Higher education	79 (79.0%)	77 (80.2%)	
Long-term relationship			
No	23 (23.0%)	23 (24.0%)	$\chi^2(1) = 0.03$, $p = .874$
Yes	77 (77.0%)	73 (76.0%)	
Position*			
Doctor	31 (31.0%)	38 (39.6%)	$\chi^2(1) = 1.85$, $p = .208$
Resident doctor	11 (11.0%)	13 (13.5%)	$\chi^2(1) = 0.29$, $p = .587$
Nurse	26 (26.0%)	21 (21.9%)	$\chi^2(1) = 0.46$, $p = .499$
Other	22 (22.0%)	21 (21.9%)	$\chi^2(1) = 0.00$, $p = .983$
Management position			
No	81 (81.0%)	78 (81.3%)	$\chi^2(2) = 0.00$, $p = .964$
Yes	19 (19.0%)	18 (18.8%)	
Work status			
Part-time	9 (9.0%)	8 (9.3%)	$\chi^2(2) = 0.10$, $p = .953$
Full-time	39 (39.0%)	36 (37.5%)	
> Full-time	52 (52.0%)	52 (54.2%)	
Type of services*			
Outpatient	63 (63.0%)	52 (54.2%)	$\chi^2(1) = 1.58$, $p = .209$
Inpatient	36 (36.0%)	37 (38.5%)	$\chi^2(1) = 0.14$, $p = .713$
Rehabilitation	7 (7.0%)	11 (11.5%)	$\chi^2(1) = 1.17$, $p = .280$
Nursing	6 (6.0%)	7 (7.3%)	$\chi^2(1) = 0.13$, $p = .716$
Paramedics	13 (13.0%)	7 (7.3%)	$\chi^2(1) = 1.74$, $p = .187$
Intensive care	4 (4.0%)	11 (11.5%)	$\chi^2(1) = 3.86$, $p = .050$
Work experience			
< 2 years	23 (23.0%)	19 (19.8%)	$\chi^2(3) = 4.48$, $p = .215$
2-5 years	16 (16.0%)	7 (7.3%)	
6-10 years	13 (13.0%)	14 (14.6%)	
> 10 years	48 (48.0%)	56 (58.3%)	
Provided services to Ukrainian refugees			
No	63 (63.0%)	69 (71.9%)	$\chi^2(1) = 1.75$, $p = .185$
Yes	37 (37.0%)	27 (28.1%)	
Provided services to COVID-19 patients			
No	39 (39.0%)	30 (31.3%)	$\chi^2(1) = 1.29$, $p = .256$
Yes	61 (61.0%)	66 (68.8%)	

In psychological treatment			
No	87 (87.0%)	89 (92.7%)	$\chi^2(1) = 1.74, p = .187$
Yes	13 (13.0%)	7 (7.3%)	
Taking medication due to mental health difficulties			
No	93 (93.0%)	89 (92.7%)	$\chi^2(1) = 0.01, p = .937$
Yes	7 (7.0%)	7 (7.3%)	
Recent use of other self-help apps			
No	76 (76.0%)	84 (87.5%)	**$\chi^2(1) = 4.32, p = .038$**
Yes	24 (24.0%)	12 (12.5%)	

* Participants could choose more than one answer from the list.

Table 2. Number of the opened intervention modules ($N = 196$).

Number of opened modules	Total n (%)	RS n (%)	OS n (%)
No modules	1 (0.5)	0 (0.0)	1 (1.0)
1 module	18 (9.2)	9 (9.0)	9 (9.4)
2 modules	20 (10.2)	8 (17.0)	12 (12.5)
3 modules	23 (11.7)	12 (12.0)	11 (11.5)
4 modules	17 (8.7)	7 (7.0)	10 (10.4)
5 modules	19 (9.7)	9 (9.0)	10 (10.4)
6 modules	98 (50.0)	55 (55.0)	43 (44.8)

RS – regular support group; OS – optional support group.

Table 3. Intervention effect sizes.

Variable	Group	Within-group effect size		Between-group effect size	
		Pre-post	Pre-follow-up	Pre-post	Pre-follow-up
		d [95% C.I.]	d [95% C.I.]	d [95% C.I.]	d [95% C.I.]
Psychological detachment	RS	0.72 [0.43; 1.00]	0.65 [0.36; 0.93]	0.37 [0.09; 0.65]	0.19 [-0.09; 0.47]
	OS	0.31 [0.02; 0.59]	0.42 [0.13; 0.70]		
Relaxation	RS	0.52 [0.23; 0.80]	0.40 [0.12; 0.68]	0.32 [0.04; 0.60]	0.04 [-0.24; 0.32]
	OS	0.21 [-0.07; 0.49]	0.36 [0.07; 0.64]		
Mastery	RS	0.44 [0.16; 0.72]	0.45 [0.17; 0.73]	0.15 [-0.13; 0.43]	-0.01 [-0.29; 0.27]
	OS	0.30 [0.01; 0.58]	0.45 [0.16; 0.74]		
Control	RS	0.31 [0.03; 0.59]	0.36 [0.08; 0.64]	0.21 [-0.07; 0.49]	0.12 [-0.16; 0.40]
	OS	0.13 [-0.16; 0.41]	0.27 [-0.01; 0.56]		
Perceived stress	RS	-0.73 [-1.01; -0.44]	-0.70 [-0.99; -0.42]	-0.19 [-0.47; 0.09]	-0.08 [-0.36; 0.20]
	OS	-0.61 [-0.90; -0.32]	-0.75 [-1.04; -0.45]		
Depression	RS	-0.57 [-0.86; -0.29]	-0.57 [-0.85; -0.29]	-0.04 [-0.32; 0.24]	-0.04 [-0.32; 0.24]
	OS	-0.56 [-0.85; -0.28]	-0.61 [-0.90; -0.32]		
Anxiety	RS	-0.55 [-0.83; -0.27]	-0.49 [-0.77; -0.21]	-0.07 [-0.35; 0.21]	0.06 [-0.22; 0.34]
	OS	-0.51 [-0.79; -0.22]	-0.64 [-0.93; -0.35]		
Psychological well-being	RS	0.54 [0.26; 0.82]	0.58 [0.30; 0.68]	0.21 [-0.07; 0.49]	-0.05 [-0.33; 0.23]
	OS	0.35 [0.06; 0.63]	0.67 [0.38; 0.96]		

RS – regular support group; OS – optional support group.
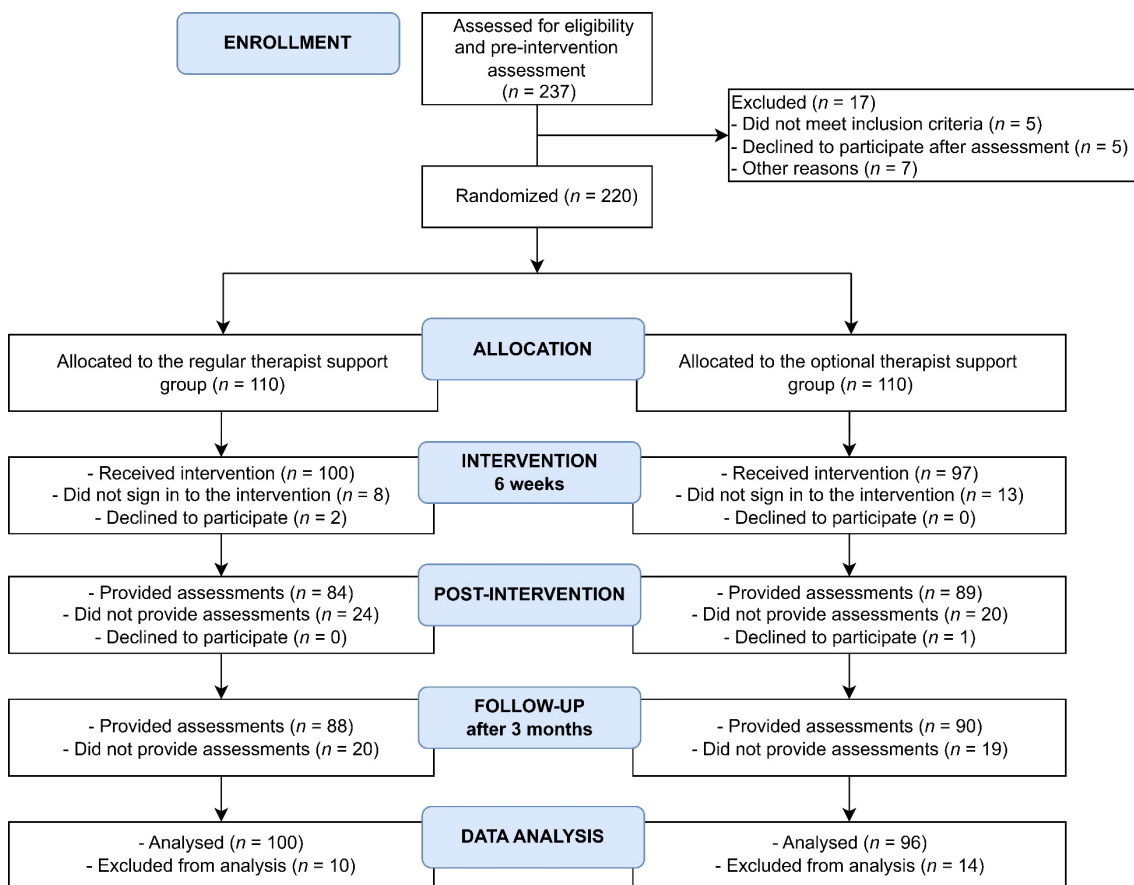
Figure 1. The CONSORT flow diagram for the present trial.
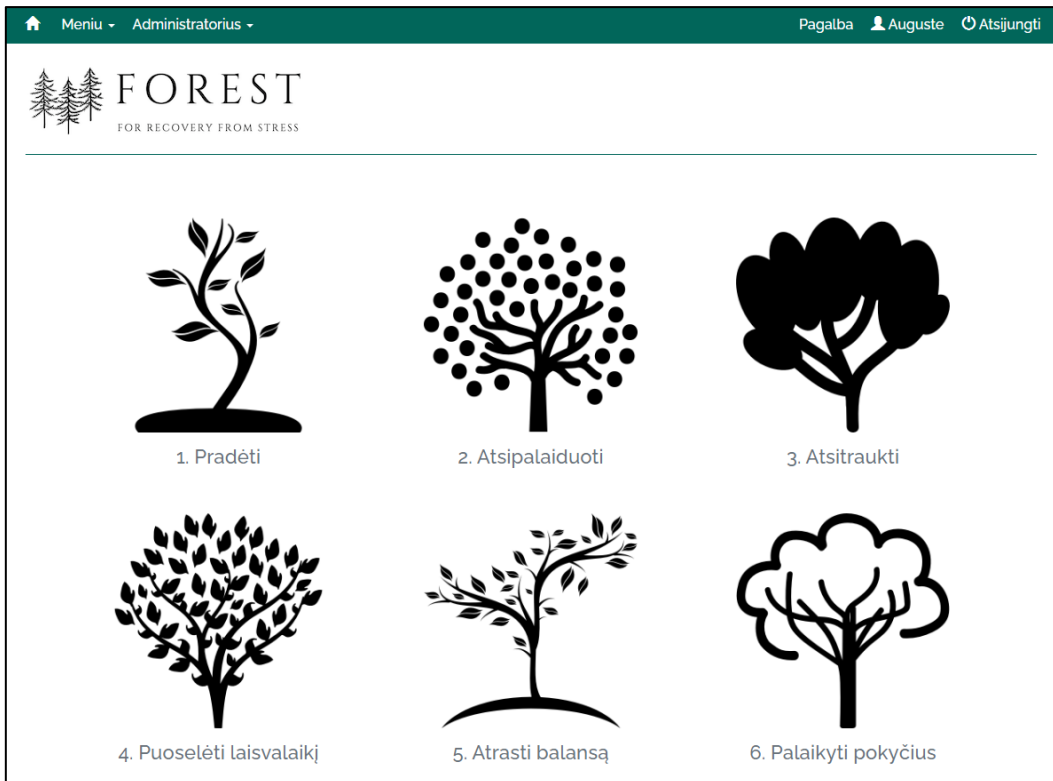
Figure 2. Interface of the FOREST+ intervention.
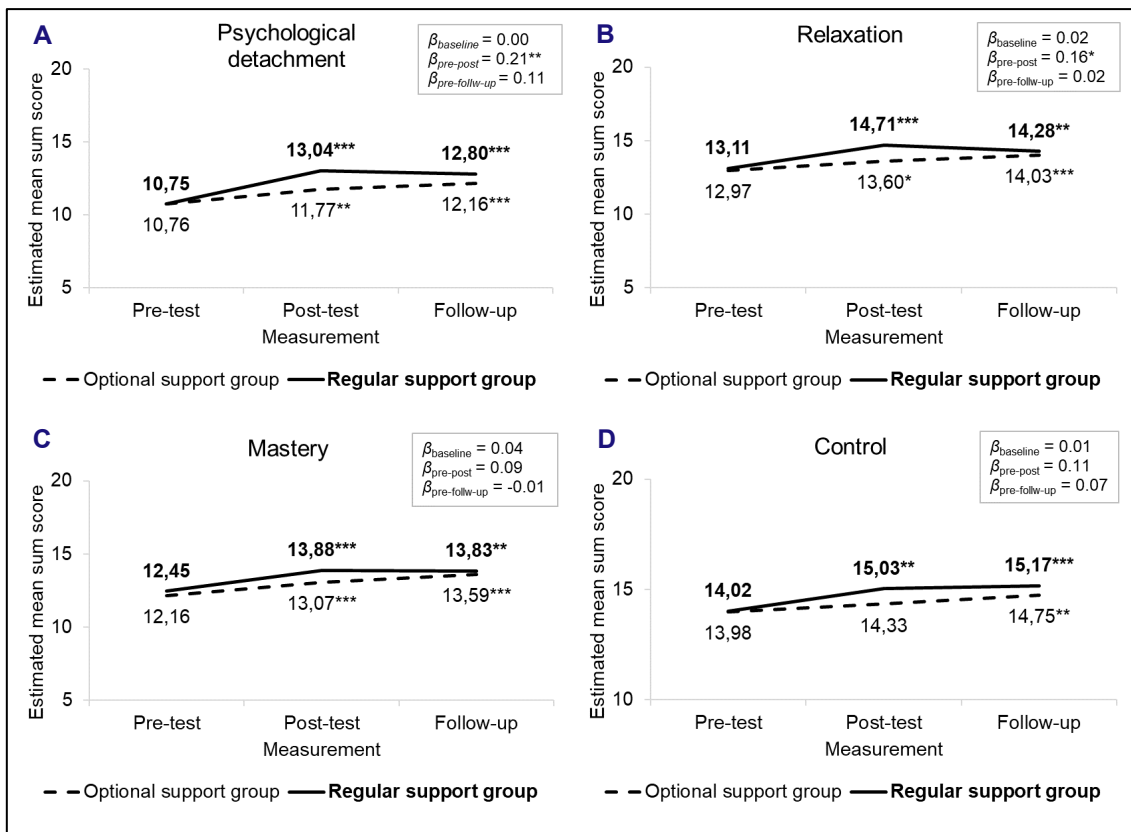
Figure 3. Trajectories of change in four components of stress recovery in the regular support (n = 100) and optional support (n = 96) groups.

β – regression coefficient for between-group analyses.

Mean values are presented for within-group analysis for pre- to post-intervention and from pre-intervention to follow-up. *p < .05, **p < .01; ***p < .001

A Perceived stress (PSS-10)

$\beta_{baseline} = 0.05$
$\beta_{pre\text{-}post} = -0.10$
$\beta_{pre\text{-}follw\text{-}up} = -0.04$

Estimated mean sum score

40
30
20
10
0

22,75
22,16
18,64***
19,09***
18,60***
18,46***

Pre-test   Post-test   Follow-up
Measurement

– – Optional support group   —— **Regular support group**

B Depression (PHQ-9)

$\beta_{baseline} = -0.01$
$\beta_{pre\text{-}post} = -0.03$
$\beta_{pre\text{-}follw\text{-}up} = 0.02$

Estimated mean sum score

24
18
12
6
0

10,88
10,97
8,04***
8,35***
8,02***
7,92***

Pre-test   Post-test   Follow-up
Measurement

– – Optional support group   —— **Regular support group**

C Anxiety (GAD-7)

$\beta_{baseline} = -0.03$
$\beta_{pre\text{-}post} = -0.38$
$\beta_{pre\text{-}follw\text{-}up} = -0.33$

Estimated mean sum score

20
15
10
5
0

9,27
9,30
6,63***
7,04***
6,78***
6,50***

Pre-test   Post-test   Follow-up
Measurement

– – Optional support group   —— **Regular support group**

D Well-being (WHO-5)

$\beta_{baseline} = 0.00$
$\beta_{pre\text{-}post} = 0.10$
$\beta_{pre\text{-}follw\text{-}up} = -0.03$

Estimated mean sum score

100
75
50
25
0

35,40
35,38
45,04***
41,43**
45,74***
46,55***

Pre-test   Post-test   Follow-up
Measurement

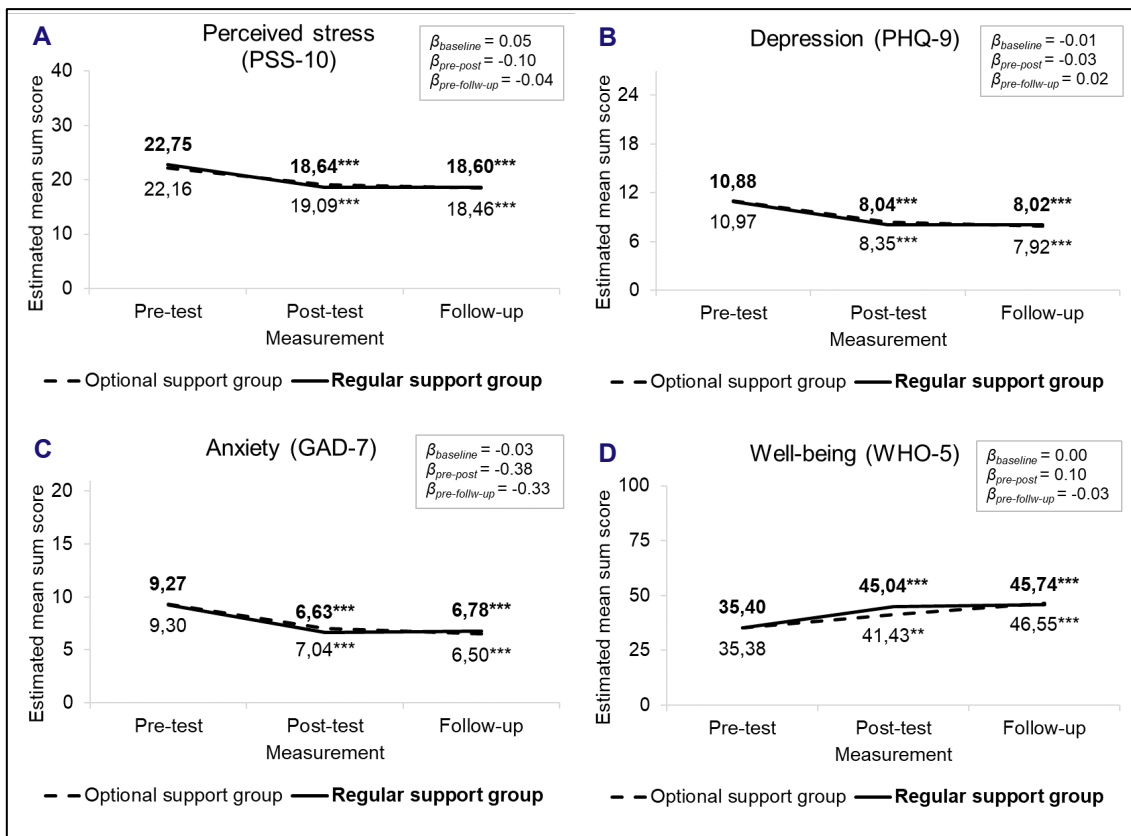– – Optional support group   —— **Regular support group**

Figure 4. Trajectories of change in psychological distress and psychological well-being outcome measures in the regular support ($n = 100$) and optional support ($n = 96$) groups. β – regression coefficient for between-group analyses.

Mean values are presented for within-group analysis for pre- to post-intervention and from pre-intervention to follow-up. *$p < .05$, **$p < .01$; ***$p < .001$