A pilot randomized controlled trial of a group intervention via Zoom to relieve loneliness and depressive symptoms among older persons during the COVID-19 outbreak

Stav Shapira [a,b,*], Daphna Yeshua-Katz [c], Ella Cohn-Schwartz [d], Limor Aharonson-Daniel [a,b], Orly Sarid [e], A. Mark Clarfield [f,g]

[a] *School of Public Health, Faculty of Health Sciences, Ben Gurion University of the Negev, P.O. Box 653, Beer Sheva, Israel*
[b] *PREPARD Center for Emergency Response Research, Ben Gurion University of the Negev, P.O. Box 653, Beer Sheva, Israel*
[c] *Department of Communication Studies, Faculty of Humanities and Social Sciences, Ben Gurion University of the Negev, P.O. Box 653, Beer Sheva, Israel*
[d] *The Department of Public Health, Faculty of Health Sciences, Ben Gurion University of the Negev, P.O. Box 653, Beer Sheva, Israel*
[e] *The Spitzer Department of Social Work, Faculty of Humanities and Social Sciences, Ben Gurion University of the Negev, P.O. Box 653, Beer Sheva, Israel*
[f] *Medical School for International Health, Faculty of Health Sciences, Ben-Gurion University of the Negev, P.O. Box 653, Beer Sheva, Israel*
[g] *The Department of Geriatrics, McGill University, Montreal, QC, Canada*

A R T I C L E   I N F O

A B S T R A C T

While effective in reducing infections, social distancing during the COVID-19 outbreak may carry ill effects on the mental health of older adults. The present study explored the efficacy of a short-term digital group intervention aimed at providing seniors with the tools and skills necessary for improving their coping ability during these stressful times. A total of 82 community-dwelling adults aged between 65 aged 90 ($M_{age} = 72$ years, SD = 5.63) were randomized to either an intervention group ($n = 64$) or a wait-list control group ($n = 18$). The intervention comprised online guided sessions in small groups in which behavioral and cognitive techniques were learned and practiced via the ZOOM videoconferencing platform. Loneliness and depression levels were measured pre- and post-participation. The results demonstrated a significant improvement in the intervention group in terms of both loneliness and depressive symptoms, compared with the control group. Results of mixed effect models indicated a medium ameliorative effect on loneliness ($d = 0.58$), while that for depressive symptoms was only marginally significant and smaller in size ($d = 0.43$). Our intervention presents a relatively simple and effective technique that can be efficiently utilized to support older adults both during emergencies such as the COVID-19 outbreak, as well as in more routine times for older adults who live alone or reside in remote areas.

1. Background

The SARS-CoV-2 virus which has been spreading around the world, has widely affected the lives of many – especially at-risk populations including older adults. Alongside studies examining the sequelae of the disease itself, it is also important to address the possible negative consequences of measures taken, first and foremost - social distancing and home isolation (Galea et al., 2020). Although these actions may be effective in "flattening the curve" for a population, they can also lead to increased loneliness and alienation for the individual (McGinty et al., 2020), with potential ill effects on both mental and physical health (Clarfield and Jotkowitz, 2020). Loneliness and social isolation among older people are strongly and independently associated with increased depression, high blood pressure, sleep disorders, and even deterioration in cognitive function (Courtin and Knapp, 2017). Similar findings are also supported by recent evidence reporting elevated levels of depression and anxiety due to the COVID-19 pandemic, and indicating older adults as especially vulnerable in this regard (Rajkumar, 2020). Clearly, this pandemic is going to be with us for the foreseeable future. Thus, it is of utmost importance to battle the potential consequences of social distancing and to equip older adults with appropriate tools for optimal coping.

Previous studies that focused on strategies to reduce loneliness reported two main coping styles which can generally be classified into

* Corresponding author.
E-mail address: stavshap@bgu.ac.il (S. Shapira).

social- and non-social behaviors (Pettigrew and Roberts, 2008). Social behavioral strategies to alleviate loneliness include interacting with family, friends, and others; while non-social behavior involves solitary activities such as reading, gardening, or meditating (Kharicha et al., 2018). Each of these strategies (social vs. non-social) entails benefits and costs, and neither is considered to fit all (Schoenmakers et al., 2012). The COVID-19 pandemic has posed a significant challenge in this regard since the ability to implement social strategies to combat rising loneliness was greatly reduced, especially among at-risk populations such as older persons.

New information and communication technology (ICT) (e.g., WhatsApp, Zoom, etc.) offers a convenient solution in this regard (Wind et al., 2020). During the COVID-19 outbreak, ICT can enable the remote maintenance of social connections (Anderson and Perrin, 2017; Baym, 2015). Furthermore, it also allows the conveyance of digital interventions (whether in a group or individual setting) over which therapeutic techniques and skills can be learned and practiced by older adults to promote effective coping, as well as alleviate loneliness, distress, and other mental health conditions (Andersson, 2018; Andersson et al., 2019; Mahlo and Windsor, 2020). Thus, internet-based interventions can allow individuals to adopt social, non-social, or even integrated coping strategies - according to their preference. Therapeutic approaches that were found effective in decreasing loneliness as well as depression among older adults include, among others, Cognitive Behavioral Therapy (CBT) (Smith et al., 2020; Vanderweele et al., 2011). This type of intervention targets cognitive biases as well as behaviors that comprise some of the underlying mechanisms that maintain loneliness and associated depression (Hawkley and Cacioppo, 2010). Empirical evidence also suggests that CBT techniques are also effective for reducing loneliness (Käll et al., 2020a; Vanderweele et al., 2011) and depressive symptoms (Dear et al., 2015; Smith et al., 2017). Applying CBT for loneliness and for depression is not new (Cacioppo et al., 2015; Kooistra et al., 2016; Watts et al., 2013), and is based on the notion that people that experience loneliness may have negative beliefs and appraisals, and that these may even perpetuate loneliness.

CBT techniques and skills in this specific context focus on identifying non-adaptive cognitive schemes and using cognitive restructuring to promote better coping (Beck, 1979). Interventions that combine CBT techniques for maladaptive cognitions were reported to be more effective in treating loneliness than interventions that focused solely on increasing social interactions and activities (Masi et al., 2011). Recent evidence suggests that internet-based CBT interventions are useful in alleviating loneliness (Käll et al., 2020a; Käll et al., 2020b). Unfortunately, very few digital interventions have been developed and validated to address these issues among older adults, and even fewer are directly related to coping with the current challenges posed by the global pandemic (Zubatsky et al., 2020).

This study reports a pilot randomized control trial (RCT) aimed at assessing the provision of CBT tools and skills necessary for improving older persons' coping abilities, alleviating loneliness and decreasing depressive symptoms during the COVID-19 outbreak. The trial was implemented through a short-term digital group intervention via Zoom. We hypothesized that older persons who participated in a special COVID-19 focused program, which provided relevant CBT training aimed at promoting better coping with the stressful situation created as a result of the pandemic and is also known to successfully reduce the effects of negative beliefs and appraisals, would demonstrate a decrease in levels of depressive symptoms and loneliness compared to a wait-list control group.

2. Methods

A pilot-RCT study with a wait-list control group among community-dwelling older (65+) adults in Israel.

2.1. Participants

Participants were recruited via an advertisement to WhatsApp groups of older persons established by a local NGO responsible for promoting digital literacy among older adults. Eligible participants were community-dwelling adults aged 65 and older who are proficient in Hebrew and could provide informed consent. Additional inclusion criteria were having an active internet connection, possessing at least one device that enables online communication, and having a minimal ability to operate this device (i.e., turning it on and off).

2.2. Procedure

The study took place over three months between April–June 2020. Following approval by the Institutional Review Board, an invitation to participate was circulated among prospective participants. All applicants ($n = 124$) were screened for eligibility within the recruitment process (Fig. 1). In the first step, 37 applicants were excluded due to: age (<65) (21) or non-response (16). In addition, one participant withdrew from the study for personal reasons, leaving 86 eligible (rate of eligibility: $86/124 = 69\%$). All provided informed consent and were randomized via a 4:1 ratio into either intervention or control group (comprising a waitlist for the intervention). The randomization process was conducted independently by a research coordinator who was not involved in any further aspects of the intervention and data collection, using a table of random numbers with no further constraints. The rationale for the 4:1 randomization ratio (vs. an even ratio which is the classic ratio in RCTs) was mainly ethical – that is, to provide treatment as quickly as possible to as many people that were, at the time, isolated at their home for an unknown period due to the viral outbreak, with reports indicating high rates of adverse mental health effects among older persons in particular (Armitage and Nellums, 2020; Tyrrell and Williams, 2020).

After randomization, participants filled in pre-participation questionnaires (T0), and we ensured that the Zoom platform was installed on their computer or smartphone, and that their skill level of operating it was satisfactory. If necessary, remote assistance (via telephone) was provided in downloading, installing and independently using the app. At this point, intervention participants were assigned to small groups of up to seven participants. Thirteen participants withdrew from the intervention group ($n = 68$) during the program for health reasons (5), due to technical difficulties operating Zoom (3) or out of lack of interest (5). In the control group ($n = 18$) only nine participants commenced the intervention following the end of the waiting period. The others withdrew due to lack of interest (6) or non-response (3) (adherence rate 13/ $[68 + 9] = 83\%$). The final sample consisted of 82 participants ($n = 64$ intervention; and n = 18 controls). A total of eleven groups were conducted, with 5–7 participants in each.

2.3. Intervention

The intervention included seven twice-weekly online guided group sessions via Zoom. The moderators were clinical social workers who underwent designated training by a senior clinical social worker from the research team. The purpose of the intervention was twofold: a) to provide a "place" for social interaction that was dramatically reduced at the time and to enable participants to share their hardships within a supportive atmosphere - emerging care needs as a result of the pandemic eruption (Steinman et al., 2020); and b) to create a safe virtual learning space to acquire cognitive and behavioral skills related to coping with the pandemic with attendant social isolation and to mitigate the potential mental health effects - i.e., loneliness and associated depression. Each session lasted between 60 and 90 min, and consisted of a) a guided group discussion (lasted 20–30 min), and b) learning and practicing cognitive-behavioral techniques and skills (CB intervention) such as relaxation, guided imagery of a 'safe place', identifying non-adaptive
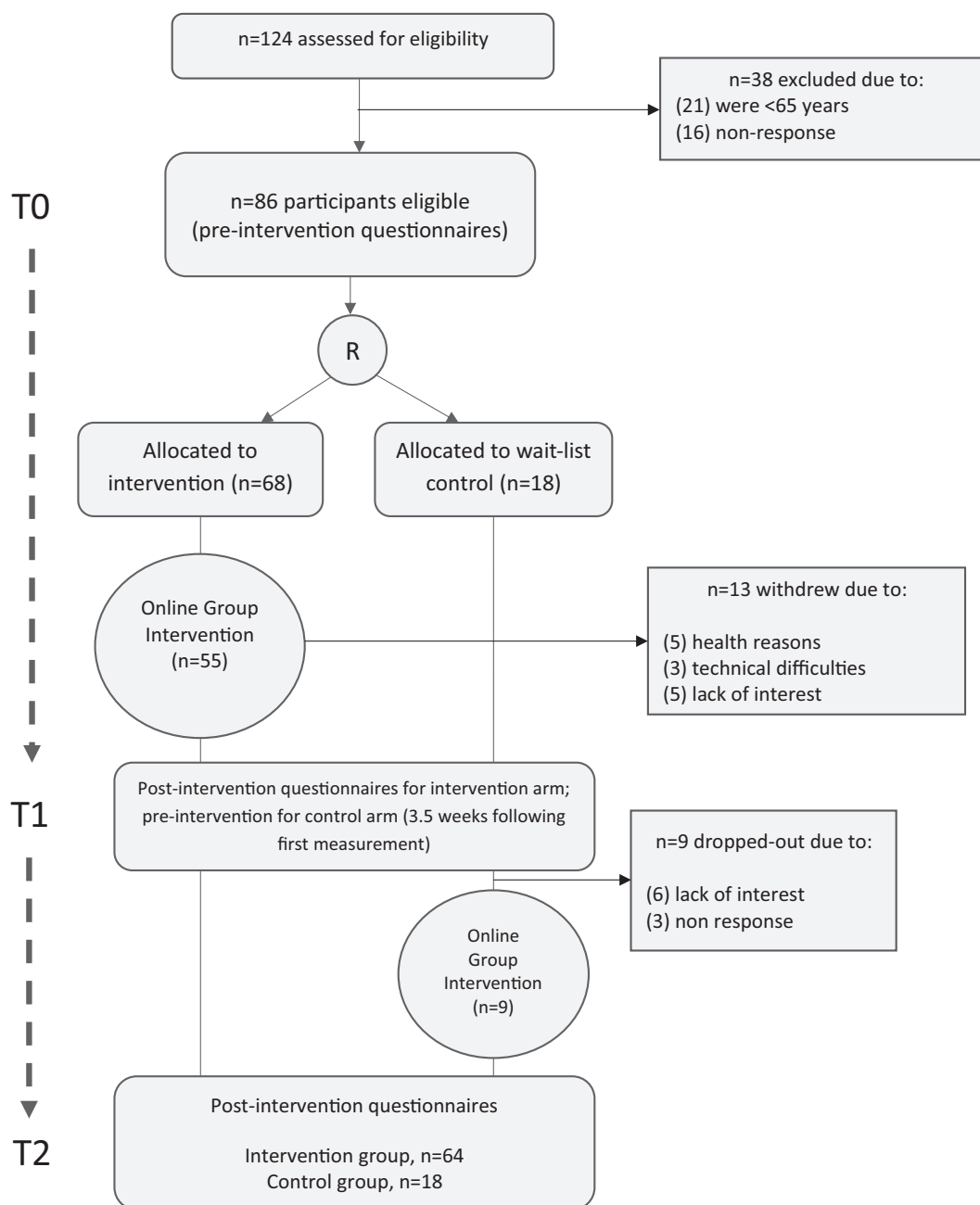
Fig. 1. Study flow chart and timeline.

cognitive schemas, cognitive restructuring, and constructing positive self-talk (lasted 40–60 min) (Satre et al., 2006; Tatrow and Montgomery, 2006). Mindfulness techniques were taught as well, as part of distancing strategies. Table 1 depicts a description of the intervention structure and the content delivered in each session.

All participants filled out online questionnaires twice: at pre- (T0) and immediately post-participation (T1). The waitlist control group participants were assessed twice before entering the intervention group (the two measurements took place about three weeks apart), completing a total of three measurements (compared with two measurements in the intervention group) (see Fig. 1). The link to the online questionnaire (web-based survey, https://www.qualtrics.com) was distributed by the groups' moderators to the participants' mobile phone or email, according to their preference, near the beginning and end of the intervention: that is, no more than 48 h pre- or post-participation.

2.4. Measures

2.4.1. Loneliness

A validated three-item version of the UCLA Loneliness Scale (Hughes et al., 2004) was used to examine perceptions related to lack of companionship, social exclusion, and social isolation. The response categories were coded as 1 (*hardly ever*), 2 (*some of the time*), and 3 (*often*). The responses were summed, with a range of 3–9. Higher scores indicated greater loneliness.

2.4.2. Depressive symptoms

Depression and severity of relevant symptoms were assessed using a 9-item depression severity measure. This measure is part of the Patient Health Questionnaire (PHQ-9), and it is used as a diagnostic instrument for common mental disorders (Kroenke et al., 2001). The PHQ-9 scores each of the DSM-V criteria as 0 (*not at all*) to 3 (*nearly every day*). The

Table 1

Digital group intervention: general structure and sessional content, techniques and skills.

Session	Part A – group discussion	Part B – learning and practicing skills and techniques
1	Introduction: Moderator introduces him/herself and details the program outline and the group's aims. Group members introduce themselves by turn. Each member is invited to share their current hardships and points of strength. A discussion is held and rules are established regarding proper group conduct and ways of communication.	
2	Group members are invited to share both a pleasant and an unpleasant experience they had in the past week.	Positive mantras & relaxation
3	Group members are invited to share a memory of a place (domestic or abroad) they enjoyed visiting.	Guided imagery of a "safe place"
4	Group members are invited to share a memory of a past experience with which they felt they coped well, a brave act they performed or of how they managed to get out of trouble.	Guided imagery of a "safe place", followed by introduction to non-adaptive cognitive patterns of thinking[a] and negative self-talk
5	Group members are invited to share an experience in which their own thoughts had failed them.	Practice the use of positive mantras and guided imagery to change negative self-talk and thinking patterns.
6	Group members are invited to share their current stress relief and coping techniques (e.g. self-acceptance; relying on significant other(s); finding comfort in food; self-distraction etc.).	Cognitive reconstruction and constructing positive self talk. Mindfulness techniques for distancing thoughts and sensations
7	Conclusion: Review of what was learned and practiced during the past sessions. Participants are invited to provide their feedback. Discussion on ways to keep in touch and of how to continue practicing.	

[a] Based on the work of Albert Ellis [Ellis, A. Overcoming destructive beliefs, feelings, and behaviors: New directions for rational emotive behavior therapy. Prometheus Books; 2010].

responses were summed, with a range of 0–27.

2.4.3. Socio-demographic data

Age, gender, educational level, and household composition (dichotomized: live alone vs. live with other[s]).

2.5. Statistical analysis

Statistical pre-post analyses were conducted with repeated-measures mixed ANOVA. Additionally, we calculated effect sizes (=Hedges' g - used for groups with different sample size) for the between-group differences in the primary outcome, reported and interpreted according to Cohen's *d* (Cohen, 1988). Participants who did not complete any questionnaire or never received the allocated intervention were excluded from the analysis. All statistical analyses were conducted using SPSS (version 26, SPSS Inc., Chicago, IL, USA).

3. Results

3.1. Participants' characteristics

Table 2 presents the demographic characteristics of the participants and baseline scores of study measures, by intervention and control group. The study and control groups were largely similar.

Out of the 77 participants who provided pre-intervention data, thirteen dropped out during the intervention period (17% withdrawal rate). No significant differences were found between those participants who completed the intervention (*n* = 64) and those who dropped out

Table 2

Baseline comparisons between the intervention group and wait-list control group.

	Intervention group (*n* = 64)	Control group (*n* = 18)	*p*-Value
Sociodemographic characteristics			
Gender	52 (81%)	14 (78%)	0.743
Age[a]	72.1 (5.3)	71.7 (6.8)	0.799
Household composition - Living alone	24 (37.5%)	6 (35%)	0.867
Tertiary education	48 (76%)	10 (59%)	0.155
Study measures			
Depression (PHQ-9)	6.6 (5.2)	6.3 (4.9)	0.852
Loneliness	5.43 (2)	6.11 (1.9)	0.209

[a] Participants were aged between 65 and 90 years.

early - either in demographics or in baseline scores of study measures; see Table S1 in Appendix 1.

3.2. Efficacy analysis

We observed a positive change between pre- and post-intervention loneliness and depressive symptoms (Fig. 2). Loneliness (score range is 3–9) decreased within the intervention group from a mean (SD) of 5.4 (2.0) to 4.8 (1.7), which corresponded to a pre-post effect size of $d = 0.32$. Conversely, the wait-list control group loneliness score increased from 6.1 (1.9) to 6.4 (1.7), (pre-post effect size $d = -0.166$). Repeated-measures mixed ANOVA revealed a significant main effect of time*group interaction ($F(1,78) = 5.59$, $p = 0.02$, $\eta2 = 0.07$, 95% CI [0.00, 0.16]). The significant interaction indicated that the groups differed in loneliness scores post-intervention. The main effect of time did not reach statistical significance ($F(1,78) = 0.57$, $p = 0.45$, $\eta2 = 0.001$, 95% CI [0, 0.06]). The calculated effect size for the between-group difference in loneliness scores was based on the mixed-model estimates and corresponded to $d = 0.58$, indicating a medium effect size of the intervention.

The depressive symptoms score (ranging between 0 and 27) decreased within the intervention group from a mean (SD) of 6.3 (5.3) to 5.2 (4.7), which corresponded to a pre-post effect size of $d = 0.21$. Conversely, the wait-list control group depressive symptoms score increased from 6.3 (5) to 7.1 (6.1), (pre-post effect size $d = -0.13$). Repeated-measures mixed ANOVA revealed a marginally significant main effect of time*group interaction ($F(1,79) = 3.82$, $p = 0.05$, $\eta2 = 0.05$, 95% CI [0, 0.14]), indicating a marginally significant difference between the groups post-intervention. The main effect of time ($F(1,79) = 0.35$, $p = 0.55$, $\eta2 = 0.00$, 95% CI [0, 0.05]) did not reach statistical significance. The calculated effect size for the between-group difference in depressive symptoms was based on the mixed-model estimates and corresponded to $d = 0.45$, indicating a small effect size.

4. Discussion

In this study we presented a pilot RCT of an intervention aimed at helping community-dwelling older adults cope with the consequences of social distancing resulting from the COVID-19 outbreak. The surge of interest in and acceptance of digital tools among both health and social care providers as well as users that has been prompted by the global crisis (Torous et al., 2020) offers a unique and important opportunity to explore the effectiveness and potential of various digital initiatives that offer support and mental health care (Zhou et al., 2020). The current intervention model combines various coping-related cognitive-behavioral strategies in an online group setting, thus addressing some of the negative effects of COVID-19 while complying with social distancing guidelines. The results indicate that the study intervention resulted in positive outcomes in terms of both loneliness and depressive symptoms among the intervention group and indicated that such techniques can be successfully applied in online group settings. Furthermore, the social
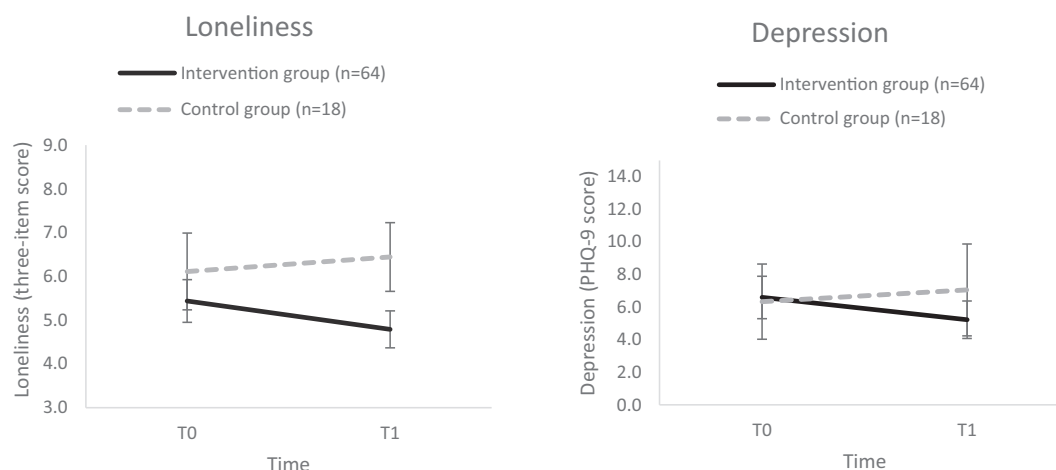
Fig. 2. Analysis of the three-item loneliness score and depression symptoms severity score (PHQ) from baseline measurement (T0) to end of program (T1) in intervention group and wait-list control group. The graphic presents mean values and 95% confidence interval.

aspect and group discussions, which were designed to provide a safe space for sharing hardships, may have helped the participants to feel that they were not alone; and thus, may have contributed to the decrease in loneliness and depressive symptoms. However, this could not be firmly determined in the current study and remains the goal for future research.

Our intervention presents a relatively simple measure that can be implemented for older community dwelling adults who feel isolated and distressed, while at the same time maintaining relevant social distance guidelines. The structured format of the intervention makes it simple for practitioners to implement, as indicated by the fact that in this study it was guided by social workers who underwent brief training. The availability of various components allows group instructors to emphasize different aspects based on the group's needs. Thus, community organizations working with older people can adopt similar interventions to help them in the times of a pandemic. This intervention will be especially relevant to those older adults who live alone, live in remote areas or are homebound (Chen and Schulz, 2016) and not just during a pandemic – as loneliness and social isolation have constituted public health concerns for older adults also during routine daily life (Cudjoe and Kotwal, 2020).

In this regard, there are several challenges for future implementation of such interventions. First, the time, logistic and financial resources required to provide this guided group intervention were substantial and exceed those of common self-help unguided interventions: these necessary resources included recruiting qualified moderators, providing protocol-specific training, and of course paying for their time. Although we believe that the benefits of the program detailed above outweigh the costs of the intervention, we see much importance in investing more research to reduce costs and make the program more sustainable when implemented on a large-scale (Lin et al., 2015). A potential path to reduce costs can be related to guidance intensity, which is considered a prominent cost factor of internet-based interventions (Weisel et al., 2019); recent evidence suggests that high level of therapist-support is not essential when treating loneliness (Käll et al., 2020b). Thus, taking an integrated approach that includes partial guidance or guidance upon request can be helpful in cases of scarce resources. This can be performed through, for example, using a combination of guided synchronous sessions and online self-help treatment modules (Etzelmueller et al., 2018). Another challenge relates to the recruitment procedure. Using online platforms as a primary source for recruitment may lead to the exclusion of ICT non-users, people of low socioeconomic status, and other marginalized groups who may well be those most in need of such interventions. It is thus necessary to establish a more generalizable approach to participant enrollment through national or local health and

social care institutions to allow for a comprehensive mapping of older individuals in order to locate people who live alone, and/or have background illnesses (i.e., those who constitute the most at-risk sub-group in the current pandemic context). In the event of future outbreaks, this kind of mapping will enable a rapid implementation of the protocol.

Study limitations include the small sample and the use of an unequal allocation (4,1) to the study's arms. While our findings are encouraging, efficacy should be further validated in a larger RCT (Chen and Schulz, 2016), a more socially and linguistically heterogeneous study sample and by using a 1:1 randomization ratio to avoid the possible loss of statistical power (Dumville et al., 2006). Moreover, although randomized within, we utilized a convenience sample with participants were more likely to have already enjoyed relatively high digital literacy (Fang et al., 2019). Future studies should examine the intervention with adults that have different levels of digital capabilities. The dropout rate, which in the current study reached 17%, should also be considered as a potential source of bias. However, since no significant differences were observed between these participants and those who completed the full program, we believe this did not adversely affect the outcomes in a significant manner.

To conclude, this pilot RCT demonstrated the potential utility of a short-term intervention to improve the mental health of older adults during the COVID-19 pandemic. The intervention met the relevant social distance guidelines and promoted individual coping and social connections online. We utilized a short, simple tool that can be widely implemented in various communities; its relevance extends beyond the current pandemic - as the techniques and skills acquired can be applied in other forms of social crisis as well as during routine life after this epidemic dies down in order to promote the mental health of older adults who live alone and/or reside in remote areas.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.invent.2021.100368.

Declaration of competing interest

The authors have no conflict of interest to declare.

dedicated moderators. We would also like to thank Ganit Goren, Adi Vilenski, Shachar Michael and Milca Hanukoglo - our dedicated moderators, and to Ayellet Yogev, our research coordinator, for her valuable work and devotion to this project.

References

Anderson, M., Perrin, A., 2017. Technology Use Among Seniors. Pew Research Center for Internet & Technology, Washington, DC.

Andersson, G., 2018. Internet interventions: past, present and future. Internet Interv. 12, 181–188. https://doi.org/10.1016/j.invent.2018.03.008.

Andersson, G., Titov, N., Dear, B.F., Rozental, A., Carlbring, P., 2019. Internet-delivered psychological treatments: from innovation to implementation. World Psychiatry 18 (1), 20–28. https://doi.org/10.1002/wps.20610.

Armitage, R., Nellums, L.B., 2020. The COVID-19 response must be disability inclusive. In: The Lancet Public Health, vol. 5, issue 5. Elsevier Ltd., p. e257. https://doi.org/10.1016/S2468-2667(20)30076-1.

Baym, N.K., 2015. Personal Connections in the Digital Age. John Wiley & Sons, Ltd.

Beck, A.T., 1979. In: Beck, A.T. (Ed.), Cognitive Therapy of Depression. Guilford Press.

Cacioppo, S., Grippo, A.J., London, S., Goossens, L., Cacioppo, J.T., 2015. Loneliness: clinical import and interventions. Perspect. Psychol. Sci. 10 (2), 238–249. https://doi.org/10.1177/1745691615570616.

Chen, Y.-R.R., Schulz, P.J., 2016. The effect of information communication technology interventions on reducing social isolation in the elderly: a systematic review. J. Med. Internet Res. 18 (1), e18 https://doi.org/10.2196/jmir.4596.

Clarfield, A.M., Jotkowitz, A., 2020. Age, ageing, ageism and "age-itation" in the age of COVID-19: rights and obligations relating to older persons in Israel as observed through the lens of medical ethics. Israel Journal of Health Policy Research 9 (1), 64. https://doi.org/10.1186/s13584-020-00416-y.

Cohen, J., 1988. The effect size index: d. Statistical Power Analysis for the Behavioral Sciences 2 (1).

Courtin, E., Knapp, M., 2017. Social isolation, loneliness and health in old age: a scoping review. Health & Social Care in the Community 25 (3), 799–812. https://doi.org/10.1111/hsc.12311.

Cudjoe, T.K.M., Kotwal, A.A., 2020. "Social distancing" amid a crisis in social isolation and loneliness. In: Journal of the American Geriatrics Society, vol. 68, issue 6. Blackwell Publishing Inc., pp. E27–E29. https://doi.org/10.1111/jgs.16527.

Dear, B.F., Zou, J.B., Ali, S., Lorian, C.N., Johnston, L., Terides, M.D., Staples, L.G., Gandy, M., Fogliati, V.J., Klein, B., Titov, N., 2015. Examining self-guided internet-delivered cognitive behavior therapy for older adults with symptoms of anxiety and depression: two feasibility open trials. Internet Interv. 2 (1), 17–23. https://doi.org/10.1016/j.invent.2014.11.002.

Dumville, J.C., Hahn, S., Miles, J.N.V., Torgerson, D.J., 2006. The use of unequal randomisation ratios in clinical trials: a review. In Contemporary Clinical Trials (vol. 27, issue 1, pp. 1–12). Elsevier. https://doi.org/10.1016/j.cct.2005.08.003.

Etzelmueller, A., Radkovsky, A., Hannig, W., Berking, M., Ebert, D.D., 2018. Patient's experience with blended video- and internet based cognitive behavioural therapy service in routine care. Internet Interv. 12, 165–175. https://doi.org/10.1016/j.invent.2018.01.003.

Fang, M.L., Canham, S.L., Battersby, L., Sixsmith, J., Wada, M., Sixsmith, A., 2019. Exploring privilege in the digital divide: implications for theory, policy, and practice. The Gerontologist 59 (1), e1–e15. https://doi.org/10.1093/geront/gny037.

Galea, S., Merchant, R.M., Lurie, N., 2020. The mental health consequences of COVID-19 and physical distancing: the need for prevention and early intervention. In: JAMA Internal Medicine, vol. 180, issue 6. American Medical Association, pp. 817–818. https://doi.org/10.1001/jamainternmed.2020.1562.

Hawkley, L.C., Cacioppo, J.T., 2010. Loneliness matters: a theoretical and empirical review of consequences and mechanisms. Ann. Behav. Med. 40 (2), 218–227. https://doi.org/10.1007/s12160-010-9210-8.

Hughes, M.E., Waite, L.J., Hawkley, L.C., Cacioppo, J.T., 2004. A short scale for measuring loneliness in large surveys results from two population-based studies. Research on Aging 26 (6), 655–672. https://doi.org/10.1177/0164027504268574.

Käll, A., Backlund, U., Shafran, R., Andersson, G., 2020a. Lonesome no more? A two-year follow-up of internet-administered cognitive behavioral therapy for loneliness. Internet Interv. 19, 100301. https://doi.org/10.1016/j.invent.2019.100301.

Käll, A., Jägholm, S., Hesser, H., Andersson, F., Mathaldi, A., Norkvist, B.T., Shafran, R., Andersson, G., 2020b. Internet-based cognitive behavior therapy for loneliness: a pilot randomized controlled trial. Behav. Ther. 51 (1), 54–68. https://doi.org/10.1016/j.beth.2019.05.001.

Kharicha, K., Manthorpe, J., Iliffe, S., Davies, N., Walters, K., 2018. Strategies employed by older people to manage loneliness: systematic review of qualitative studies and model development. Int. Psychogeriatr. 30 (12), 1767–1781.

Kooistra, L.C., Ruwaard, J., Wiersma, J.E., van Oppen, P., van der Vaart, R., van Gemert-Pijnen, J.E.W.C., Riper, H., 2016. Development and initial evaluation of blended cognitive behavioural treatment for major depression in routine specialized mental health care. Internet Interv. 4, 61–71. https://doi.org/10.1016/j.invent.2016.01.003.

Kroenke, K., Spitzer, R.L., Williams, J.B.W., 2001. The PHQ-9: validity of a brief depression severity measure. J. Gen. Intern. Med. 16 (9), 606–613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x.

Lin, J., Lüking, M., Ebert, D.D., Buhrman, M., Andersson, G., Baumeister, H., 2015. Effectiveness and cost-effectiveness of a guided and unguided internet-based acceptance and commitment therapy for chronic pain: study protocol for a three-armed randomised controlled trial. Internet Interv. 2 (1), 7–16. https://doi.org/10.1016/j.invent.2014.11.005.

Mahlo, L., Windsor, T., 2020. Feasibility, acceptability, and preliminary efficacy of an app-based mindfulness-meditation program among older adults | the gerontologist | Oxford academic. The Gerontologist. https://doi.org/10.1093/geront/gnaa093.

Masi, C.M., Chen, H.Y., Hawkley, L.C., Cacioppo, J.T., 2011. A meta-analysis of interventions to reduce loneliness. In: Personality and Social Psychology Review, vol. 15, issue 3. SAGE PublicationsSage CA, Los Angeles, CA, pp. 219–266. https://doi.org/10.1177/1088868310377394.

McGinty, E.E., Presskreischer, R., Han, H., Barry, C.L., 2020. Psychological distress and loneliness reported by US adults in 2018 and April 2020. JAMA. https://doi.org/10.1001/jama.2020.9740.

Pettigrew, S., Roberts, M., 2008. Addressing loneliness in later life. Aging Ment. Health 12, 302–209.

Rajkumar, R.P., 2020. COVID-19 and mental health: a review of the existing literature. Asian J. Psychiatr. 52, 102066. https://doi.org/10.1016/j.ajp.2020.102066.

Satre, D.D., Knight, B.G., David, S., 2006. Cognitive-behavioral interventions with older adults: integrating clinical and gerontological research. In: Professional Psychology: Research and Practice, vol. 37, issue 5, pp. 489–498. https://doi.org/10.1037/0735-7028.37.5.489.

Schoenmakers, E.C., Van Tilburg, T.G., Fokkema, T., 2012. Coping with loneliness: what do older adults suggest? Aging Ment. Health 16 (3), 353–360. https://doi.org/10.1080/13607863.2011.630373.

Smith, J., Newby, J.M., Burston, N., Murphy, M.J., Michael, S., Mackenzie, A., Kiln, F., Loughnan, S.A., O'Moore, K.A., Allard, B.J., Williams, A.D., Andrews, G., 2017. Help from home for depression: a randomised controlled trial comparing internet-delivered cognitive behaviour therapy with bibliotherapy for depression. Internet Interv. 9, 25–37. https://doi.org/10.1016/j.invent.2017.05.001.

Smith, R., Wuthrich, V., Johnco, C., Belcher, J., 2020. Effect of group cognitive behavioural therapy on loneliness in a community sample of older adults: a secondary analysis of a randomized controlled trial. Clinical Gerontologist 1–11. https://doi.org/10.1080/07317115.2020.1836105.

Steinman, M.A., Perry, L., Perissinotto, C.M., 2020. Meeting the care needs of older adults isolated at home during the COVID-19 pandemic. In: JAMA Internal Medicine, vol. 180, issue 6. American Medical Association, pp. 819–820. https://doi.org/10.1001/jamainternmed.2020.1661.

Tatrow, K., Montgomery, G.H., 2006. Cognitive behavioral therapy techniques for distress and pain in breast cancer patients: a meta-analysis. J. Behav. Med. 29 (1), 17–27. https://doi.org/10.1007/s10865-005-9036-1.

Torous, J., Myrick, K.J., Rauseo-Ricupero, N., Firth, J., 2020. Digital mental health and COVID-19: using technology today to accelerate the curve on access and quality tomorrow. J. Med. Internet Res. 22 (3), 1–6. https://doi.org/10.2196/18848.

Tyrrell, C.J., Williams, K.N., 2020. The paradox of social distancing: implications for older adults in the context of COVID-19. Psychological Trauma: Theory, Research, Practice, and Policy 12 (S1), S214. https://doi.org/10.1037/tra0000845.

Vanderweele, T.J., Hawkley, L.C., Thisted, R.A., Cacioppo, J.T., 2011. A marginal structural model analysis for loneliness: implications for intervention trials and clinical practice. J. Consult. Clin. Psychol. 79 (2), 225–235. https://doi.org/10.1037/a0022610.

Watts, S., Mackenzie, A., Thomas, C., Griskaitis, A., Mewton, L., Williams, A., Andrews, G., 2013. CBT for depression: a pilot RCT comparing mobile phone vs. computer. BMC Psychiatry 13 (1), 1–9. https://doi.org/10.1186/1471-244X-13-49.

Weisel, K.K., Zarski, A.C., Berger, T., Krieger, T., Schaub, M.P., Moser, C.T., Berking, M., Dey, M., Botella, C., Baños, R., Herrero, R., Etchemendy, E., Riper, H., Cuijpers, P., Bolinski, F., Kleiboer, A., Görlich, D., Beecham, J., Jacobi, C., Ebert, D.D., 2019. Efficacy and cost-effectiveness of guided and unguided internet- and mobile-based indicated transdiagnostic prevention of depression and anxiety (ICare prevent): a three-armed randomized controlled trial in four European countries. Internet Interv. 16, 52–64. https://doi.org/10.1016/j.invent.2018.04.002.

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., p. 100317. https://doi.org/10.1016/j.invent.2020.100317.

Zhou, X., Snoswell, C.L., Harding, L.E., Bambling, M., Edirippulige, S., Bai, X., Smith, A.C., 2020. The role of telehealth in reducing the mental health burden from COVID-19. Telemedicine and E-Health 26 (4), 377–379. https://doi.org/10.1089/tmj.2020.0068.

Zubatsky, M., Berg-Weger, M., Morley, J., 2020. Using Telehealth groups to combat loneliness in older adults through COVID-19. J. Am. Geriatr. Soc. https://doi.org/10.1111/jgs.16553.