

Original Research

iRest™ Meditation Webinar Series Addresses Depression Symptoms in Older Adults

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Abstract

Older adults in the U.S. have higher rates of depression, stress, and chronic diseases. There is an urgent need for effective interventions to reduce depressive symptoms and enhance overall health and well-being. Meditation presents an appealing therapeutic option due to its cost-effectiveness, minimal risks, ease of use, and active patient involvement, with growing evidence indicating its effectiveness in reducing depressive symptoms. Online platforms may provide more accessible options for meditation interventions. Using a within-participant prospective design, this study aims to evaluate a webinar series of four weekly one-hour meditation videos designed for older adults with depressive symptoms for its feasibility of use and effectiveness in improving symptoms of depression, pain, quality of sleep, well-being, and capacity for compassion in older adults. Of the 288 people interested in participating, 138 qualified for the study, and 42 completed the four-week intervention, representing 32.6% of those eligible. Despite strong interest, only one-third completed all program activities. Significant improvements were observed in self-reported depressive symptoms ($p \leq 0.000$), pain ($p \leq 0.02$), sleep quality ($p \leq 0.000$), well-being ($p \leq 0.000$), and compassion ($p \leq 0.000$). The study highlights promising results of the online webinar series in improving depression symptoms in older adults, offering an easily accessible solution with the potential to improve well-being, longevity, and quality of life. However, further research is needed to



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comprehensively assess the intervention's impact and address participant recruitment, retention, and support challenges. In particular, future studies need to address motivation barriers in participants experiencing depressive symptoms and technical skills requirements for older populations.

Keywords

Integrative restoration (iRest™); meditation; yoga; yoga Nidra; older adults; depression

1. Introduction

Many people have experienced some degree of depressive symptoms or witnessed a friend or family member suffering, not knowing how to support them. Major depression is one of the most common mental disorders in the United States. In 2016, an estimated 16.2 million adults had at least one major depressive episode in the past year [1].

Older adults are a growing population in the U.S., with the number of adults over 55 continuing to rise as the 78 million children born during the “baby boomers” period continue to age [2]. With fewer physiological reserves, older adults are especially at risk for stress, depression, and changes in cognition. One study found increased rates of chronic disease in this population, along with the likelihood of increased healthcare needs and costs, compared to previous generations [2]. Late-life depression has especially devastating consequences, such as increased risk of morbidity, increased risk of suicide, decreased physical, cognitive, and social functioning, and greater self-neglect, all of which are associated with increased mortality [3]. This is a serious public health issue. Effective interventions for older adults to reduce depressive symptoms and improve health and well-being are urgently needed.

Meditation is a beneficial therapy for older adults because of its relatively low cost, low physical and emotional risk, ease of implementation, and facilitation of patients’ taking a more active role in their treatment [4]. Meditation has a growing body of positive evidence for decreasing depressive symptoms in large systematic reviews [5, 6]. For example, mindfulness meditation consistently improves depressive symptoms with effect sizes similar to traditional Cognitive Behavioral Therapy, Behavior Therapy, and pharmaceuticals [6]. Meditation capitalizes on the interactions between the psychological, neurological, immunological, and endocrine systems to support the body’s innate ability to heal, and offers promising potential as an effective treatment for depressive symptoms. However, there is a lack of studies evaluating meditation, specifically for older adults with depression.

Research has shown that mental health services are often underutilized by older adults [7]. As aging increases physiological fragility, non-pharmacological interventions for addressing depression pose fewer risks. Studies suggest that meditation interventions can help older adults reduce symptoms related to stress, anxiety, and depression and improve their overall well-being [8, 9]. Compared to younger adults, depression, stress, and anxiety in older adults are associated with physical disability to a greater extent. Therefore, mental health interventions, such as meditation, can help prevent the onset of physical disability, ultimately promoting longevity and a better quality of life [10].

iRest™ is one such meditation intervention that has already shown positive preliminary benefits. iRest™ was developed by Dr. Richard Miller, who is both a clinical psychologist and a yogic scholar. Dr. Miller developed the intervention by combining principles of yoga with principles of neuroscience and western psychology [11]. iRest™ is specifically based on Yoga Nidra, which is a state of meditation and complete relaxation where meditators withdraw into the sensory world. The goal of this type of meditation is to observe sensations without responding to them [11]. Researchers suggest that one of the ways that iRest™ helps people with depression is that it focuses on emotional regulation in the present moment, teaching the skill of being more comfortable with emotions [12]. Studies have demonstrated that iRest™ reduces anxiety and hostility [13], and stress [14] in participants with chronic illness, as well as stress, and fatigue in school counselors [15]. Studies have also demonstrated a reduction in perceived stress, worry and depression among college students (age range 18-56) [16]. Other small pilot studies with veterans have shown reduced rage, anxiety, emotional reactivity, and depression, as well as increased feelings of relaxation, peace, self-awareness, joy, and self-efficacy, and improved quality of sleep and ability to manage stress [17].

Our team has evaluated iRest™ specifically for older adults with mood symptoms. The first study randomized thirty older adults with mood symptoms to receive an intensive two-day workshop on iRest™ or a vacation (control group), and outcome measures were collected before and after the workshop and six weeks post-intervention. We found preliminary results showing improvement in sleep impairment in the iRest™ group compared to the control group and promising trends in improvements in depressive symptoms and pain severity [18]. At the end of the six weeks, all participants then received iRest™ workbooks and guided meditations they could use to practice at home. The second study collected the same measures at six and twelve months after the initial workshop period and found that both the intervention and control groups had improved depression scores when compared to time points at the beginning of the study. That is, regardless of study group, being exposed to iRest™ after the initial randomized control trial period improved depression scores [19]. The results from these two studies are preliminary findings but are nonetheless encouraging and warrant further research. Such in-person interventions, however, can be barriers to older populations receiving care due to physical mobility and transportation issues.

Building on these previous two studies, we developed a webinar series that could be disseminated to older adults with depressive symptoms. The iRest™ for Older Adults webinar series consists of four one-hour modules designed to be watched once per week for four weeks with on-demand access to guided meditations and a workbook. Each module includes dialogue with expert teachers who walk the participants through the iRest™ program and how it could support their daily lives. The current study disseminated the iRest™ webinar series to older adults with depressive symptoms, and the specific aims were to 1) determine the feasibility of use and 2) assess the effects of the iRest™ intervention on symptoms of depression, levels of pain, quality of sleep, well-being, and capacity for compassion by comparing pre-intervention and post-intervention scores. We hypothesized that the program would be feasible to use in the target population (indicated by reaching our target recruitment numbers and full completion of the study) and that decreases in symptoms of depression and pain measures, as well as increases in well-being, sleep quality, and compassion would be observed.

2. Methods

2.1 Study Design

This study was a within-participant prospective design conducted between April 3 and December 31, 2019. The iRest™ for Older Adults 4-video course is taught online through the Institute of Noetic Sciences (IONS) Thinkific Noetic Program site. Measures were taken before participants began the video course and again when they completed it four weeks later. All activities occurred online, and there was no in-person interaction between study staff and potential volunteers, and enrolled participants.

2.2 Participants

We aimed to enroll 100 participants for this study. Participants were recruited through advertisements to the IONS membership (~100,000) via the general IONS eNewsletters, our IONS Community Groups-specific eNewsletter, targeted email outreach, posting on our website, and through our associated social networks (~85,000 followers), as well as our affiliate organizations' social networks. Additionally, we recruited through networking sites such as NextDoor and Craigslist. A \$50 USD Visa Gift Card was provided upon completion of the final study surveys.

Because this was a feasibility study, the analysis focused on participants who completed both pre- and post-intervention assessments. The primary aim was to evaluate usability and preliminary signals of change, rather than to estimate treatment effects at the population level. In this context, intention-to-treat methods are not appropriate because attrition is informative rather than random, and imputing post-intervention scores for participants who did not engage with the intervention would introduce bias. This approach follows standard guidance for feasibility designs, which prioritize completer data while examining differences between completers and non-completers to inform future studies.

Potential participants were screened by self-report through a SurveyMonkey survey to ensure appropriate enrollment according to the following inclusion/exclusion criteria. Inclusion criteria were: Age 55-90 years old; baseline Center for Epidemiologic Studies Depression Scale (CESD5) score ≥ 4 [20]; stable on medications six weeks prior to and during study; willing to learn and use study technology; can hear and understand instructions; willing to accept randomization scheme and agree to follow the study protocol; and have own computer and internet connection. Exclusion criteria were: significant, untreated depression, as assessed by CESD-5 > 32 and interview; and current daily meditation practice (≥ 5 min/day daily for at least 30 days in the last 6 months; past practice not exclusionary, but was recorded). Broad inclusion criteria were used to aid in recruitment. In order to maximize the generalizability and public health relevance of the study, exclusion criteria were minimized and based primarily on screening out participants for whom an internet-delivered mindfulness course may not be an appropriate intervention.

After meeting the eligibility criteria, participants completed the baseline measures. (See Data Sources and Measurement section.) They were then given access to the four videos of the webinar series. After completing the iRest™ webinar, participants were asked to complete the measures again. It was estimated to take approximately 20-30 minutes to complete both surveys. Participants were informed that they may or may not receive benefits from the iRest™ video course. They were

also informed that the findings from these measures would serve as the basis and the ongoing refinement of noetic curriculum – exploring what works, for whom, and under what conditions.

Participants were referred to their primary care or mental health provider if symptoms arose or worsened during the course of the study (e.g., anxiety or depression). If they did not have one, they were given referrals and encouraged to contact a clinician. Multiple steps were taken to ensure data safety and integrity, and patient confidentiality, and all study personnel were trained on the participant safety study guidelines. All data was either locked or in password-protected computers. No adverse events were noted in our previous experience with iRest™ in this population, and no adverse events were reported in this study either.

2.3 Intervention

Integrative Restoration or iRest™ is a meditation program based on Yoga Nidra (or “yogic sleep”), which is a form of meditation that guides the mind and body to a state of consciousness between waking and sleeping. In this state, the body is completely relaxed, and the meditator becomes systematically and increasingly aware of their inner sensory world by following a set of verbal instructions. The goal of this type of meditation is to observe sensations without responding to them. This form of meditation focuses on emotional regulation in the present moment, teaching the skill of being more comfortable with emotions. It also incorporates a technique to reconcile opposing emotions, allowing participants to become more comfortable with the full range of human emotions, even those that can be uncomfortable. This may be useful to enhance the quality of late life by easing the associated suffering, as opposed to superficial palliation of depressive symptoms through medication [19].

This program consists of four one-hour modules designed to be watched once per week for four weeks. These modules are publicly available. (See video links embedded within the module descriptions below.) The modules include dialogue with facilitators to walk participants through the iRest program and how it can support them in their daily lives with conversation and direct experience of the meditations. Viewers are encouraged to review this supplementary material at their own pace. Prior to watching each module, participants are advised to have a journal or other writing materials on hand, prepare a warm beverage, ensure physical comfort by wearing loose clothing and having a blanket nearby, and choose to watch the module alone, with a friend or pet, or as part of a supportive group environment. It is important for viewers to feel empowered to pause the video at any time to take a break and resume when they are ready. It is also important for them to feel empowered to re-watch the module as often as desired for a deeper understanding and practice of the content [19].

2.3.1 Module 1 - Well-Being and Thriving

[Module 1](#). This module focuses on aging and ways to improve well-being and thriving. Facilitators introduce themselves, outline the program with its four modules, and provide an overview of iRest™. The first theme discussed is “Well-being and Thriving,” with an interview between the facilitators. Definitions of awareness, welcoming, and container are given, followed by a reflection activity imagining the qualities of admired elders. Journaling instructions are provided, and the importance of realizing one’s wholeness and perfection is emphasized. The 10 steps of iRest, including Inner

Resource, Heartfelt Desire, and Intention, are explored before preparing for meditation. The session concludes with a meditation and closing remarks.

2.3.2 Module 2 - The Body

[Module 2](#). This module delves into the changes that occur in our bodies as we age and explores how to approach these changes with loving kindness and self-awareness. Topics covered include Well-being and Thriving, Inner Resource, Heartfelt Desire, and Intention reviews. A meditation practice grounding into the body is conducted, followed by an interview with one of the elder facilitators about the body. The concept of the body as a temple or curse is discussed, along with radical acceptance, pain, and discomfort. The session concludes with a meditation, reflections on the relationship with the body through journaling, and addressing challenges of the aging body.

2.3.3 Module 3 - Grief, Loss, and Decline

[Module 3](#). In this module, the focus is on experiences of grief, loss, and decline that are common to all individuals and how to navigate the accompanying emotions. The session begins with a review of previous modules before delving into a meditation practice. A conversation ensues about loss of capacity and losing loved ones, followed by a journal exercise prompting reflection on personal losses. One of the facilitators shares her own personal story, and the importance of authenticity and moving toward the unknown is emphasized. The session concludes with a meditation and an invitation to share experiences with others.

2.3.4 Module 4 - Thriving in Death and Dying: A Portal

[Module 4](#). This module discusses the profound impact of death and dying as a transformative force, prompting reflection on the quality of life when living with an awareness of mortality. Following a review of previous modules, a meditation practice is conducted to explore these themes. Participants engage in a journal exercise to reflect on their experiences, leading to a conversation about thriving in the face of death. The discussion touches on the concept that death can give meaning to life. Unfinished business is explored, with suggestions provided on how to address these lingering issues. The module concludes with a review, emphasis on forgiveness, and the importance of sleep in this process.

It was highly recommended for participants to watch the modules preferably at a consistent time each week, to allow ample time for reflection on the content and the opportunity to engage in the guided meditations. Participants also received access to two guided iRest™ meditations that could be used throughout the four-week program. Each meditation was approximately 15 to 20 minutes in duration. The first focused on establishing an inner resource, intention, and heartfelt desire while guiding participants through body sensing and breath awareness to support relaxation and emotional regulation. The second emphasized welcoming physical sensations and emotions, including the use of opposites, to cultivate greater comfort with internal experience. Both recordings followed the standard iRest™ structure and were designed to reinforce the skills introduced in the weekly video modules. Along with the video modules, they received a workbook containing additional written material that provides more in-depth information about iRest™ and the various concepts discussed in the sessions. Participants also received access to two guided

meditations. The Research Assistant provided basic technical support as needed, including assistance with accessing the course site, navigating the interface, and locating required study components. Technical support was provided informally, and no systematic record of support requests was kept.

2.4 Data Sources and Measurement

Depressive symptoms were the primary outcome of this study. In addition, well-being, compassion, levels of pain, and sleep quality were evaluated before and after the intervention. The intervention consisted of four videos that ranged in duration from one hour and two minutes to one hour and eleven minutes. The first video focused on well-being and thriving, the second video focused on the body, the third video focused on grief, loss, and decline, and the fourth video focused on thriving through death and dying. The measures were:

- Depressive symptoms - Center for Epidemiologic Studies Depression Scale (CESD): Depression was assessed during the screening procedure with the CESD [21], a commonly used subjective measure of depressive symptoms that asks participants 20 questions about how they felt or behaved in the past week, yielding global scores ranging from 0 to 60, with higher scores indicating greater depression.
- Well-being - The Arizona Integrative Outcomes Scale (AIOS) [22] is a one-item visual analogue self-rating scale that evaluates overall subjective sense of well-being for the last 24-hours. "Please reflect on your sense of well-being, taking into account your physical, mental, emotional, social, and spiritual condition over the past 24 hours/past month. Please move the slider below to a point that summarizes your overall sense of well-being for the past 24 hours," anchored by "Worst you have ever been" at 0 and "Best you've ever been" at 100.
- Compassion - The Dispositional Positive Emotions Scale (Compassion subscale) is a five-item scale asking participants about their capacity for compassion and compassionate acts rated on a Likert Scale from "Strongly disagree" (1) to "Strongly agree" (7) [23]. Compassion is an emotional response when suffering is perceived and involves an authentic desire to help alleviate that suffering. Higher scores indicate greater levels of positive compassion.
- Pain - The Numeric Pain Rating Scale (NPRS) [24] is a visual analog scale in which a respondent rates their pain on a slide, "How would you rate your pain intensity over the past 24 hours?" "No pain" to "Worst possible pain" (Slider 0-10). Lower numbers reflect less pain.
- Sleep Quality - The Sleep Quality Scale (SQS) [25] is a single-item 11-point numeric scale measuring acute sleep or sleep quality. Participants are asked, "How would you rate the quality of your sleep LAST NIGHT?" moving the slider for their response. The slide is anchored by "Best possible sleep" (0) and "Worst possible sleep" (10).

2.5 Statistical Methods

Means and standard deviations were reported for each measure. To evaluate any demographic characteristics differences between participants who completed all study activities and are included in the analyses to those who did not, the non-parametric Mann-Whitney U/Wilcoxon Rank-Sum Test was used for continuous variables to account for unequal and small sample sizes, and chi-squared tests were used for categorical demographic variables. Some participants did not complete all the measures due to technical difficulties on their part. The number of participants who completed each

measure is listed in the relevant results sections. Measures were evaluated for significant within-group changes using a repeated measures analysis of variance with each measure as the dependent variable and visit number (before the video course, after the video course) as the repeated-measures variable. Corrections for multiple comparisons were made using the False Discovery Rate [26].

2.6 Ethics Statement

All participants signed an informed consent to participate in the study, and all study activities were approved and overseen by the Institutional Review Board at the Institute of Noetic Sciences (IORG#0003743).

3. Results

3.1 Participants

A total of 288 people expressed interest in the study by accessing the iRest™ Screening Questionnaire. Of those 288 people, 81 were excluded at screening for one or more of the following reasons: being between the ages of 50 and 90, not being stable on medications for the duration of the study, comfort with and regular access to technology (e.g., smartphone, table or desktop/laptop), previous experience with iRest with current daily practice, past or present significant medical illness that would preclude participation, or not including contact information. Two-hundred and seven volunteers continued to the CESD-Depression Questionnaire. Of those, 10 were repeated administrations and only the first administration was included: 58 had CESD scores 4 or below ($n = 4$) or above 32 ($n = 54$) and were not eligible to continue. 138 were eligible to continue the study. Of those, 96 did not complete all the study activities and were not included in the analyses. Eligible participants were eager to participate in the study intervention initially, however, many had trouble completing the entirety of the study components despite regular contact from our research team. Reasons they did not complete the study varied but were mostly ascribed to difficulty managing the technology and/or not enough time. Forty-two volunteers completed all of the study requirements, including watching all four videos (the course platform tracked videos watched) and completing the depression measure before and after the intervention, and were thus included in the outcome analyses. Once enrolled in the study, the study team encouraged participants to set times in their calendars to complete the iRest Course video (one hour per week) and the daily meditations. Additionally, our Research Assistant checked in with each participant once a week to send a reminder and to solicit feedback on their experience with the study. Participants who were able to engage with the study materials shared that they enjoyed the content and found it supportive. Participants also reported being unable to engage with the materials as they had originally intended for various reasons including technical challenges, life events precluding them from engaging (e.g., “too busy,” illness in themselves or family members, or travel). The approach proved beneficial for participants who demonstrated commitment to completing the full program, notwithstanding that only 32.6% of enrolled individuals completed it.

Participants who completed the study were, on average, 63.4 ± 8.0 years old, 69.1% Caucasian, 76.2% female, well-educated (17.1 ± 2.7 years education), and 47.7% reported being in a relationship (Table 1). There were no significant differences in demographic variables between

completers and non-completers. While we recommended the participants watch one video per week, the average time it took for participants to complete the four videos was about 5 weeks (36 days $\pm$ 21 days with a range of 1 day to 87 days).

Table 1 Participant's Demographic Data.

Demographic	<i>Mean (Standard Deviation) or N (%)</i>		<i>Statistics</i>
	Completers (<i>n</i> = 42)	Not Included (<i>n</i> = 96)	
Age	63.4 (8.0)	64.4 (8.8, <i>n</i> = 78)	$Z = 0.66, p = 0.51$
Gender (% Female)	32 (76.2)	79 (84.0)	$\chi^2 = 0.20, p = 0.67$
Education	17.1 (2.7, <i>n</i> = 34)	17.4 (2.6, <i>n</i> = 46)	$Z = 0.38, p = 0.71$
Race			
Black or African American	2 (4.8)	2 (2.1)	$\chi^2 = 4.4, p = 0.11$
Hispanic or Latino(a)	3 (7.1)	0	
White or Caucasian	29 (69.1)	44 (45.8)	
Did not disclose	8 (19.1)	50 (52.1)	
Relationship			
In relationship	20 (47.7)	20 (20.8)	$\chi^2 = 0.58, p = 0.45$
Single	13 (31.0)	13 (13.5)	
Did not disclose	11 (26.2)	63 (65.6)	
Screening CESD	21.9 (7.4)	21.4 (7.3)	$Z = 0.41, p = 0.69$

Notes. CESD – Center for Epidemiologic Studies Depression Scale.

3.2 Outcome Data

Table 2 displays means, standard deviations, and statistical tests for the measures. There were significant improvements in all measures, with decreased depression and pain symptoms, and increased well-being, compassion, and sleep quality. All of these statistical improvements remained significant after correction for multiple comparisons.

Table 2 Differences in outcome measures from before to after intervention.

	<i>Before Average (Standard Deviation; n)</i>	<i>After Average (Standard Deviation; n)</i>	<i>Statistics</i>
Depression	22.0 (7.6; 42)	11.3 (8.0; 42)	$F(1,83) = 58.9, p \leq 0.000$
Well-being	54.4 (16.7; 35)	67.7 (15.8; 38)	$F(1,72) = 16.3, p \leq 0.000$
Compassion	5.5 (0.71; 36)	12.6 (8.4; 38)	$F(1,73) = 24.5, p \leq 0.000$
Sleep Quality	5.2 (2.3; 36)	2.5 (1.7; 35)	$F(1,70) = 36.5, p \leq 0.000$
Pain	4.3 (2.5; 37)	3.4 (2.6; 38)	$F(1,74) = 5.9, p \leq 0.000$

Notes: Sleep Quality Last Night (0-10; 0 is best sleep); Pain Last 24 Hours (0-10; 0 is no pain).

All measures are statistically significant after correction for multiple comparisons with False Discovery Rate.

4. Discussion

In this study, an iRest™ webinar series was developed to make the meditation technique more easily accessible to older adults, with one of the aims being to evaluate feasibility of use in this population by examining recruitment statistics for study completion. While numerous older adults enrolled in the study, only one-third completed the entire study. In those participants who completed the study, we found significant improvements in depressive symptoms, levels of pain, sleep quality, well-being, and compassion between the pre- and post-intervention timepoints.

The majority of participants identified as being older in age, Caucasian, educated, women, and in a relationship. This demographic aligns with our numerous previous studies in this population [18, 19, 27, 28], and research consistently shows that women are more likely to use modalities, such as iRest™, when compared to men [29, 30]. Similarly, individuals aged 45-64 [30] and those with higher socioeconomic status use such complementary and alternative therapies more often [29]. Thus, while our participants represented a specific demographic that limits the generalizability of our findings across the broader older adult population, their demographic characteristics are reflective of those reported in similar research studies. Regardless, future research would benefit from exploring the impact of the intervention on older adult populations with diverse identities.

Numerous volunteers were initially interested in participating in the study. However, we faced challenges with adherence as only approximately one-third of the participants were able to complete the entirety of the study, including post-study measures, despite consistent reminders and guidance. Once enrolled in the study, we encouraged participants to set reminders in their calendars to watch the iRest™ Course video (one hour per week) and complete the daily meditations. Additionally, our Research Assistant checked in with each participant once a week by sending a personal reminder. We found this to be helpful with the participants who were committed to completing the program and study. This is a common trend in studies involving older adults experiencing depressive symptoms, as seen in our previous studies with similar populations [18, 19, 27, 28]. Although eligible participants were initially eager to participate in the study intervention, they faced difficulties in completing the intervention. It is possible that incompleteness was due to a lack of motivation or lack of desire for self-care, which are hallmarks of depression and considered depressive symptoms. It is also possible that participants encountered adversity using an online/technical program. Importantly, there were no significant differences in demographic characteristics or screening CESD scores between participants who completed the study and those who did not, suggesting that attrition was not driven by identifiable structural differences between the groups. Thus, while the webinar version of the program does appear to have reasonable feasibility of use in older populations, the recruitment and retention challenges indicate that it is crucial to continue exploring ways to engage at-risk and vulnerable older populations, possibly by adapting incentives to motivate and facilitate their participation effectively.

For those who did complete the entire study including outcome measures, we found significant improvements in all the outcomes. When compared to the pre-intervention timepoint, post-intervention depression scores were significantly decreased, with average values being reduced by half, being clinically meaningful, and moving from the moderate depressive symptomology category (scores of 21-26) to the little or no depression symptomology category (scores of 0 to 16) [31]. These findings are in line with previous research on meditation's effects on depression. A recent meta-analysis of 19 studies and 1,076 participants (71.8 ± 5.2 years old) evaluated the effects of

mindfulness meditation interventions on depression and found significantly improved depression ($ES = 0.65$, 95% CI 0.35, 0.94) compared to controls. These findings also add to the body of literature on meditation interventions in older adults, which points to positive, albeit less clear, evidence showing significant improvements in loneliness, depression, anxiety, stress, sleep problems, rumination, general mood, and positive affect [32]. Although the study's small size and lack of control pose limitations, this noteworthy outcome underscores the need for further investigation.

Our findings of improved compassion are also supported by the literature. Previous research has demonstrated the link between meditation interventions and self-compassion, and the link between self-compassion and well-being. A study by Li et al., conducted over a four-week period, diverging from a focus on older adults, explored the effects of self-compassion meditation on psychological health by applying a meditation intervention for one week within the study period [33]. In contrast, Allen et al. discovered that among older adults with poor physical health, self-compassion correlated with enhanced subjective well-being [34]. Additionally, research by Phillips & Ferguson found a significant relationship between self-compassion and positive affect as well as psychological well-being in older adults [35]. Another study found that participants who underwent a compassion meditation intervention exhibited more pronounced reductions in self-criticism compared to participants in a support group, and that these improvements in self-criticism were associated with alleviation of depressive symptoms [36].

Similarly, previous research supports our findings on sleep quality improvement. Research has demonstrated the positive effects of mind-body interventions on sleep quality in adults, with movement-based meditation interventions specifically demonstrating effectiveness in addressing sleep concerns in older adults [37, 38].

In line with our current findings, iRest™ has previously demonstrated improvements in pain in veteran populations [12], as well as in older adults based on our previous studies [18]. One review of interventions for older adults identified 14 studies that included participants aged 50 years and above. Although only two studies specifically focused on individuals aged 65 years and older, there were notable positive outcomes, with practices such as Tai chi, yoga, hypnosis, and progressive muscle relaxation being significantly associated with pain reduction [39].

A novel aspect of the iRest™ webinar series is its emphasis on themes of thriving for older populations, including well-being, the body, grief, loss and decline, and particularly death and dying. This last topic is especially powerful considering the taboos surrounding death and dying, especially in the modern world [40, 41]. This series aligns with the principles of the positive death movement, which recognizes death as a natural and integral part of life, advocating for a more accepting and positive attitude towards the end of life. This movement highlights the importance of embracing the concept of death to enhance the quality of life for older populations. Elders who adopt a positive death mindset are more likely to focus on completing their life goals and finding meaning in their experiences, rather than fearing the end of life [42]. By accepting death as a part of the life cycle, elders can approach their later years with a sense of fulfillment and purpose, contributing to overall well-being and mental health [43]. This transformative attitude towards death can lead to improved psychological well-being and a more positive outlook on aging, ultimately enhancing the elder's quality of life.

Overall, while the study demonstrates promising results regarding the effectiveness of the iRest™ webinar series in improving symptoms of depression and other outcomes in older adults, a few important limitations should be taken into consideration when interpreting the findings. As

previously mentioned, a possible motivation barrier was the experience of depressive symptoms among participants, which could have contributed to diminished completion rates. Additionally, the necessity for technical skills to access the webinar could pose a barrier for some older adults, which could have limited the pool of eligible participants. Future research in this area is needed to help confirm these possible barriers. The phenomenon of selection bias arises, as those who completed the series might not accurately represent the broader demographic of older adults experiencing depressive symptoms. Obtaining only 42 of the targeted 100 study completions, the sample size's limitations further constrain the results' generalizability and the study's overall robustness. Further, the study relies on self-reported measures of depressive symptoms, pain, sleep quality, and compassion, which may not always accurately reflect the true impact of the intervention. Thus, future research should include a more comprehensive set of subjective outcome measures, as well as objective measures, such as physiological measures of health and well-being (e.g., heart rate variability) [44]. The absence of a control group and oversight of potential confounding factors, like concurrent treatments or lifestyle changes, might impact the study's internal validity. Given the study's short span and lack of longitudinal follow-up evaluations, the persistence of symptom improvement over time remains uncertain and will require further research. Several aspects of the study could have contributed to beneficial outcomes for participants. The webinars included supportive content beyond the guided meditations, which could have contributed to the results. In addition to watching the webinars, participants completed workbooks, which prompted self-reflection. The participants also received contact from volunteers throughout the study, to offer reminders and solicit feedback. The study is limited in its potential to isolate the degree to which the guided meditations exclusively contributed to the beneficial outcomes that participants experienced. Overall, further research with larger sample sizes, control groups, longer intervention durations, and comprehensive outcome measures may provide a more robust understanding of the intervention's impact.

Future directions in this line of research may involve enhancing or adapting incentives to encourage course completion, incorporating increased technical support for both technology utilization and series completion, and considering community engagement features to facilitate dialogue among participants. Given the promising outcomes, particularly concerning depression symptoms, and the widespread accessibility and dissemination potential of online resources, further research is warranted.

In conclusion, we found that the iRest™ webinar series had some feasibility of use in older adults, but that a number of challenges remain in removing friction points that prevent study and program completion. Despite these challenges, our research shows positive benefits for those who complete the series on several outcomes related to well-being.

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Author Contributions

Oteja Lighthead: Writing - Original Draft Preparation, Writing - Review and Editing. Helané Wahbeh: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Supervision, Writing - Original Draft Preparation, Writing - Review and Editing.

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Competing Interests

The authors have declared that no competing interests exist.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request. Data are located in controlled access data storage at the Institute of Noetic Sciences.

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