Bright Light as a Preventive Intervention for Depression in Late-Life: A Pilot Study on Feasibility, Acceptability, and Symptom Improvement

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Objectives: *We examined the feasibility and acceptability of a portable bright light intervention and its impact on sleep disturbance and depressive symptoms in older adults.* **Methods:** *One-arm prevention intervention pilot study of the Re-Timer (Re-Timer Pty Ltd, Adelaide, Australia) bright light device (worn 30 minutes daily for 2 weeks) in 1 older adults (age 65 + years) with subsyndromal symptoms of depression and poor sleep quality. Participants were assessed on intervention acceptability and adherence, depressive symptoms (Patient Health Questionnaire- 9), and sleep (Pittsburgh Sleep Quality Index, Insomnia Severity Index, actigraphy and daily diary reports).* **Results:** *The Re-Timer device was rated positively by participants, and, on average, participants only missed 1 day of utilization. Although depressive symptoms declined and self-reported sleep improved, improvement was seen largely before the start of intervention.* **Conclusions:** *An effective preventive intervention that is targeted towards a high risk group of older adults has the potential to reduce distress and costly health service use.* (Am J Geriatr Psychiatry 2017; ■■:■■–■■)

Key Words: Sleep disturbance, depressive symptoms, prevention, light therapy, intervention

Highlights

- Participants found the Re-Timer bright light intervention acceptable with 91% reporting it very easy to use.
- Participants had 93% adherence to the intervention with no adverse events reported.
- Evidence points toward potential for improvement in mood with the intervention.

Despite the presence of empirically validated treatments, major depressive disorder is common among older adults. Older adults also have poorer response and adherence to treatments for depression compared with younger age groups.[1] Consequently, research on the development of preventive interventions for later-life depression utilizing knowledge of risk and protective factors to decrease incidence of new depression, has the potential to reduce associated quality of life and disability.

Disturbed sleep is common in mid/late adulthood and considered to be a contributing factor to the development and expression of depression.[2] A previous study found the incidence of depression over time was 13.1% in individuals with insomnia symptoms compared with only 4% among individuals without sleep problems.[2] Underlying circadian rhythm disturbances may also play an etiological role in sleep disturbances in older adults. Healthy older adults are exposed to only approximately an hour of 1,000 lux light a day.[3] Light therapy has been beneficial for older adults with insomnia and depression and is helpful for irregularities in individuals' sleep patterns.[4,5] For example, early morning light can help shift the circadian sleep phase earlier and evening light can delay the sleep phase.[6] Bright light interventions thus present

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a promising approach to target sleep disturbance by entraining circadian rhythms.

Depression prevention efforts carry the potential to prevent more severe distress before it starts and reduce costly health service use; few behavioral prevention approaches for older adults exist, however. The current pilot study used a portable bright light therapy as a behavioral, indicated, preventive intervention in older adults with both subsyndromal symptoms of depression and self-reported sleep disturbance. The primary aim of the current study was to assess the feasibility and acceptability of the intervention. Secondarily, we examined whether individuals' sleep and depressive symptom scores would change across the intervention.

METHODS

Study Design

Participants were recruited through flyers at senior centers, geriatric outpatient clinics, a university research recruitment Web site, and other public locations. Survey data were collected at baseline, midpoint (following 2 weeks of baseline sleep assessment and prior to the start of intervention), and 4-week immediately post-intervention follow-up between May 2015 and March 2016. The study received institutional review board approval and is posted on clinicaltrials.gov.

Study Participants

Participants were screened by phone and eligible if they were 65 years of age or older, scored in the mild symptom range on the Patient Health Questionnaire-9 scale (PHQ-9; score of 5–9), and reported poor sleep quality (score of 6 or greater on the Pittsburgh Sleep Quality Index [PSQI]). Exclusion criteria to avoid risk of harm included history or current presence of bipolar disorder, current use of a photosensitizing medication, a retinal disorder, and/or having had an eye surgery.

Intervention

The intervention consisted of utilizing the Re-Timer (http://re-timer.com/; Re-Timer Pty Ltd, Adelaide, Australia), a consumer health device. Re-Timers emit a blue-green 500-nm dominant wavelength, ultraviolet-free light in portable, lightweight glasses. All participants wore the device at the high (506 lux lm/m^2 and 230 μW/cm^2) setting. Participants were instructed to wear the Re-Timer glasses for 30 minutes a day for 14 days (with some wearing it less or more depending on follow-up interview scheduling) corresponding to the timing suggested by their sleep chronotype as assessed by the Re-Timer sleep calculator (N = 1 before bedtime, N = 10 after waking).

Measurement and Procedure

Study initiation included a baseline interview and 2 weeks of sleep tracking (daily diary and Actiwatch [Philips, Amsterdam, The Netherlands]; full procedures found in the supplemental digital content). At the midpoint interview, the Re-Timer was introduced and the sleep tracking continued for 2 weeks, concluding with a follow-up interview. Depressive symptoms and self-reported sleep measures were assessed at baseline, midpoint, and post-intervention. Based on scheduling availability, data was collected over 26 to 29 days.

Primary Outcomes

Acceptability and Feasibility of the Re-Timer

Adherence was measured by examining the number of days participants utilized the intervention. Participants rated ease of use from very easy to very difficult (4-point scale; acceptability). They rated feasibility (5-point scale, strongly disagree to strongly agree) on whether or not they felt the device fit their routine, was comfortable, and whether they would continue to wear the device if they owned one.

Secondary Outcomes

Depressive Symptoms

Depressive symptoms were assessed with the PHQ-9.[7]

Severity of Insomnia

The Insomnia Severity Index[8] classifies the severity of one's sleep disturbance.