# The Impact of Imagery Rehearsal Therapy on Dream Enactment in a Patient With REM-Sleep Behavior Disorder: A Case Study

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*Imagery rehearsal therapy (IRT) is an evidence-based treatment for nightmare disorder (ND), and numerous studies have demonstrated its efficacy in reducing the frequency and severity of nightmares. ND and REM sleep behavior disorder (RBD) co-occur, yet the impact of successful treatment of nightmares on dream enactment in RBD has not been studied. In this case study, we present the treatment of ND using IRT and its impact on dream enactment in the context of RBD. A total of 5 sessions of IRT over 5 months resulted in a reduction in nightmares and, according to the patient and her husband, a decrease in dream enactment. We hypothesize that reducing the emotional valence of the dream content may make dream enactment less likely. As a result, IRT may provide helpful adjuvant treatment to pharmacological treatment of RBD.*

**Keywords:** imagery rehearsal therapy, REM-sleep behavior disorder, case study, older adults, nightmares

Nightmare disorder (ND) is classified in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, as clinically significant distress across multiple domains of functioning caused by repeated, well-remembered, disturbing, or terrifying dreams (American Psychiatric Association, 2013; Gieselmann et al., 2019). Nightmares occur during the REM phase of the sleep cycle and are not better

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explained by the use of a substance or medication (American Academy of Sleep Medicine [AASM], 2014; Owens & Mohan, 2016). When treating ND, imagery rehearsal therapy (IRT) is the gold standard, evidence-based treatment, as recommended by the Oxford Center for Evidence-Based Medicine (Cranston et al., 2011) and the American Academy of Sleep Medicine (Aurora et al., 2010; Morgenthaler et al., 2018). IRT describes a behavioral technique wherein the patient rescripts their nightmare however they wish and then rehearses the new script 10–20 min a day while awake (Aurora et al., 2010; Ellis et al., 2019; Gieselmann et al., 2019). IRT inhibits the nightmare by replacing it with a new, nonthreatening dream and reduces the need to escape (Gieselmann et al., 2019; Nadorff et al., 2014).

REM sleep behavior disorder (RBD) is often comorbid with ND. RBD is classified as repeated vocalization and/or complex motor movements during the REM stage of sleep (American Psychiatric Association, 2013). Although often comorbid with ND, frontline treatment for RBD typically involves combined environmental modifications (e.g., placing barriers on the side of the bed and removing dangerous objects, such as weapons, from the sleep environment) and pharmacotherapy (clonazepam; Howell & Schenck, 2015; Jung & St Louis, 2016) versus behavioral treatments such as IRT for ND (Aurora et al., 2010; Gieselmann et al., 2019; Nadorff et al., 2014). RBD and ND share various comorbidities, including neurodegenerative disorders (Howell & Schenck, 2015), other sleep disorders (Aurora et al., 2010), medication use (Aurora et al., 2010; Nadorff et al., 2014; Neikrug & Ancoli-Israel, 2010; Wolkove et al., 2007), psychiatric conditions (Aurora et al., 2010; Gieselmann et al., 2019; Nadorff et al., 2014), and older age (Neikrug & Ancoli-Israel, 2010; Wolkove et al., 2007).

Although research on ND and RBD is scarce, existing research suggests strong associations between RBD and ND. For example, a recent Romanian study of 43 individuals with early Parkinson's disease (PD) or parkinsonian syndrome found that 81.39% of the sample endorsed depressive symptoms, 46.51% reported nightmares, and 25.58% reported symptoms of RBD (Tohanean et al., 2018). Another study of 661 individuals with PD found that 20.9% of the sample endorsed depressive symptoms, 39.0% endorsed RBD, and 86.4% of individuals with both PD and RBD endorsed other parasomnias including nightmares (Ylikoski et al., 2014).

Given the similarities between RBD and ND, there is reason to believe that modifying bad dreams and nightmares may help improve RBD symptoms. Indeed, there is a literature demonstrating an association between negative dream intensity and dream enactment behaviors (Baltzan et al., 2020). Fantini et al. (2005) compared the dream and daytime aggressiveness of individuals with and without RBD, finding that although there were no differences in daytime aggressiveness, RBD patients reported a significantly higher percentage of having at least one dream with aggression (66%) than the control group (15%). This difference is also present in relation to PD, with those with RBD having significantly more negative dreams than those with PD. In addition, there was a nearly significant trend toward also having more intense action in their dreams when compared with those with PD (Valli et al., 2015). This is important as dream content has been shown to be associated with motor behaviors in RBD (Valli et al., 2012).

When treating ND, behavioral treatments such as IRT have been shown to successfully reduce nightmare frequency, posttraumatic stress disorder severity, and other mental health problems including depressive symptoms, and increase sleep quality (Ellis et al., 2019; Gieselmann et al., 2019). Individuals with ND and comorbid RBD

vocalize or physically act out their nightmares, but behavioral treatments are often side-lined in favor of pharmacotherapy combined with environmental modifications to prevent injury (Howell & Schenck, 2015; Jung & St Louis, 2016). However, it is possible that IRT may help reduce the dream intensity and aggressive content, which has been shown to be associated with REM behavior. Therefore, we hypothesize that IRT may continue inhibiting nightmares, improving quality of sleep and the likelihood of RBD events by changing the emotional valence of dream content.

## Case Introduction

The patient presented as a 77-year-old non-Hispanic White female with a significant prior medical history and concomitant polypharmacy (see Table 1). At intake, her primary sleep concerns included nightmares with dream enactment and attendant insomnia. Previously documented diagnoses included ND, RBD, obstructive sleep apnea partially controlled with intermittent continuous positive airway pressure use, restless leg syndrome, and psychophysiological insomnia with comorbid major depressive disorder (MDD).

In addition to nightmares and dream enactment, the patient reported experiencing unusual perceptual experiences and had a psychiatric history positive for MDD, generalized anxiety disorder, panic disorder, several psychiatric hospitalizations, as well as suicidal ideation. She also reported a history of childhood sexual trauma and met criteria for clinically significant posttraumatic stress disorder related to these traumas. At intake, the patient endorsed significant marital distress, mood symptoms, and passive suicidal ideation. Review of systems revealed a significant prior medical history positive for polymorbidity in addition to extensive use of medications (see Table 1).

**Table 1**
*List of Patient's Medical Conditions and Medications*

| Medication | Dosing | Use/Treatment of |
| --- | --- | --- |
| Amlodipine | 5 mg daily | Hypertension |
| Atorvastatin | 80 mg nightly | Cholesterol |
| Clopidogrel | 75 mg daily | Cardiovascular disease |
| Ergocalciferol | 50,000 units once weekly | Vitamin D deficiency |
| Glimepiride | 4 mg BID with meals | Diabetes mellitus type II |
| Hydrochlorothiazide | 25 mg daily | Hypertension |
| Levothyroxine | 75 mcg | Hypothyroidism |
| Losartan | 100 mg daily | Hypertension |
| Memantine | 5 mg BID | Parkinson's disease |
| Metroprolol | 50 mg BID | Blood pressure |
| Pantoprazole | 40 mg nightly | GERD |
| Potassium chloride | 20 mEq daily | Hypokalemia |
| Quetiapine | 50 mg BID | Mood |
| Ropinirole | 0.5 mg nightly | Restless leg syndrome |
| Sertraline | 100 mg daily | Mood |
| Risperidone | 1 mg every 12 hr PRN | Mood |
| Tramadol | 50 mg BID PRN | Chronic pain |
| Clonazepam | 0.5 mg PRN | Anxiety and RBD |
| Temazepam | 50 mg BID PRN | Insomnia |
| Nitroglycerin | 0.4 mg PRN | Angina |

*Note.* BID = twice a day; GERD = gastroesophageal reflux disease; PRN = as occasion requires; RBD = REM sleep behavior disorder.

The patient reported first experiencing nightmares with dream enactment approximately 20 years prior to presenting to the clinic. When the patient presented to the clinic, she reported experiencing these symptoms approximately 4 to 5 times per week. A collateral interview with the patient's husband corroborated the patient's self-report, emphasizing that enactments almost invariably co-occurred with her nightmares. The patient's dream enactment presented a danger to both herself and her bedpartner, as she flailed her arms, punched, and fell out of bed at times, causing musculoskeletal trauma.

## Case and Treatment Conceptualization

Figure 1 outlines our patient's case conceptualization, including the biopsychosocial components of her presentation and their functional connections.

The patient's treatment team, comprising a movement disorders neurologist board certified in sleep medicine, a clinical psychologist board certified in behavioral sleep medicine (BSM), and a clinical psychology doctoral student, conceptualized her case as one requiring integrated sleep, depression, health management, and harm-prevention treatment using a geriatric behavioral medicine approach (American Psychological Association, 2014). Because treatment focused on managing insomnia and nightmares, intervention involved an eclectic combination of IRT and cognitive behavioral therapy (CBT) for late-life insomnia, modified slightly to address the patient's contributory depressive symptoms. The team coupled features of these evidence-based treatments with ongoing psychoeducation and safety

**Figure 1**

*Depicts the Case Conceptualization of the Patient*
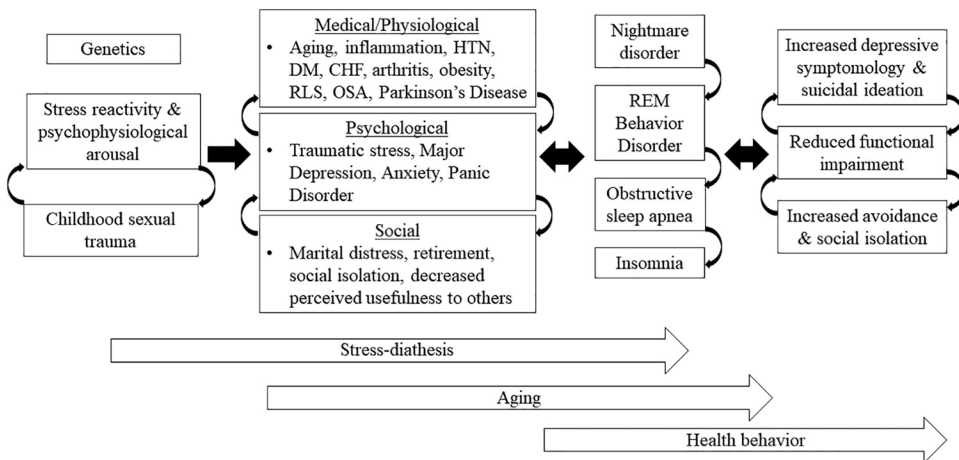


*Note.*   HTN = hypertension; DM = diabetes mellitus type II; CHF = congestive heart failure; RLS = restless leg syndrome; OSA = obstructive sleep apnea. The far left boxes contain the patient's predisposing factors. The middle left boxes provide a biopsychosocial conceptualization of the patient's symptoms in these domains. These symptoms then are assumed to have a bidirectional relation with the disorders in the middle right boxes. Perpetuating factors are depicted on the far right. The long arrows at the bottom of the figure depict additional factors that cut across multiple steps of the case conceptualization.

planning, as needed. Throughout treatment, the patient remained on clonazepam, a benzodiazepine, for treatment of RBD.

## Course of Treatment

We outline six sessions (one intake, five treatments) of the evidence-based psychotherapy the patient received at an outpatient BSM clinic and the Society of Behavioral Sleep Medicine-accredited training program. Throughout this case study, we outline a step-by-step approach to using IRT and offer additional considerations for adapting IRT for medically complex older adults with comorbid mood and sleep disorders.

### Session 0: Intake, Baseline Assessment, and Safety Planning

In addition to undergoing an extensive structured intake, the patient also completed the Insomnia Severity Index, Geriatric Anxiety Inventory, and Geriatric Depression Scale. Table 2 outlines the patient's pre- and posttreatment scores. At baseline, the patient reported "moderate" difficulty falling asleep and "very severe" difficulty staying asleep and waking up too early, as well as significant anhedonia, feelings of worthlessness, hopelessness, irritability, and excessive worry. At the conclusion of the intake, the patient and her husband received psychoeducation about RBD and ND, their respective evidence-based protocols, and recommended treatment options. The intake concluded with the patient and provider problem-solving strategies for increasing the safety of her bedroom environment (e.g., adding bed safety rails, removing weapons, moving nightstands). In preparation for relaxation training scheduled for Session 1, the provider invited the patient to consider a target nightmare with which she would pair relaxation.

### Session 1: CBT for Insomnia Skills: Relaxation Training and Stimulus Control

The patient returned to the clinic for her second visit alongside her husband having implemented safety measures discussed at the last session. During this appointment, the patient shared that she had a forthcoming evaluation for suspected PD, which is often pre or comorbid with RBD (Nadorff et al., 2018). Brief cognitive screening of the patient using the St. Louis University Mental Status examination

**Table 2**
*Patient's Pre- and Posttreatment Scores on Self-Report Measures*

| Measure | Type | Baseline | Posttreatment |
|---|---|---|---|
| Insomnia Severity Index | Self-report | 22 | 14 |
| Geriatric Depression Scale | Self-report | 15 | 10 |
| Geriatric Anxiety Inventory | Self-report | 4 | 3 |
| Nightmare and enactment frequency | Self-report | Session 1: "Nightly" | Session 2: "Less than every other night." Session 3: "Twice a week." Session 5: "One or less per week." |

*Note.* The last measure relied on patient's self-reported qualitative data. Please refer to the Limitations section for additional discussion.

revealed a score within normal limits for someone of her age and education (Tariq et al., 2006). The patient and her husband continued reporting significant difficulties initiating and maintaining sleep due to traumatic nightmares, which the patient reportedly experienced nightly with enactments. During this session, the provider performed a guided relaxation technique with psychoeducation—an intervention strongly indicated for insomnia, anxiety, traumatic stress, and ND (Aurora et al., 2010; Sharma & Andrade, 2012). Practiced with the patient in session, the relaxation protocol derived from Lichstein et al. (2001) included three components: diaphragmatic breathing, passive muscle relaxation, and autogenic phrases (e.g., "I am at peace . . . my arms and legs are heavy and warm"). The patient described the exercise as relaxing in session, planned to practice at home, and had no questions. The patient then received psychoeducation on how to pair relaxation with stimulus control if attempts to fall or return to sleep with 15–30 min after a nightmare failed. In preparation for her next appointment at the clinic, the providers instructed the patient to engage in CBT for insomnia (CBT-I) skills including: (a) establishing a relaxing prebedtime ritual, (b) practicing relaxation before bed, (c) practicing stimulus control, and (d) pairing relaxation with stimulus control. The provider asked the patient to start keeping an informal nightmare log, noting their frequency and themes, and to identify a target nightmare with which to pair relaxation in preparation for IRT during the next session.

### Session 2: Introduction of IRT and CBT-I

The patient returned for her third visit to clinic with nightmare logs and an identified target nightmare. She found logging her dreams therapeutic and attributed corresponding reductions in the number of nights she had nightmares—down from nightly to less than every-other-night—to practicing CBT-I skills introduced in the first session.

The patient then voluntarily read her target nightmare aloud, which included her experiencing childhood sexual abuse. The patient and the provider processed its themes and motifs and the provider praised the patient's courage and commitment to treatment. After sufficiently processing her target nightmare, the provider outlined a worksheet with an overview of IRT treatment, depicted in Table 3. Extensive, adjunctive psychoeducation focused on explaining the treatment's two-component therapeutic processes, (a) its educational/cognitive restructuring component to help the patient consider her nightmare as a learned sleep disorder and (b) an imagery education/training element to teach her about the nature of human imagery, as well as to appreciate the connections between daytime imagery and dreams (Krakow & Zadra, 2010). Other important elements of this largely psychoeducational session focused on clarifying how nightmares promote insomnia and the potential function of nightmares for emotional adaptation to emotionally traumatic events (Krakow & Zadra, 2010; Levin & Nielsen, 2007). The patient denied any questions or concerns about the treatment and, in the provider's estimation, appeared ready and motivated to continue with treatment. Because she had already completed Steps 1–3 in previous sessions, the therapist invited the patient to proceed to Steps 4 and 5 of the IRT protocol. During this phase of treatment, the therapist coached the patient to "change the nightmare however she wished" and to write it down, clarifying that the change should (a) occur before anything traumatic or bad happens (i.e., her

**Table 3**
*Imagery Rehearsal Therapy Protocol*

| Step (Session) | Procedure |
| --- | --- |
| 1 (1) | Practice relaxation (e.g., progressive muscle relaxation, paced breathing) and pleasant imagery to ensure readiness to work on changing nightmares. |
| 2 (1) | Choose a recurring nightmare. This serves as the "target" nightmare the patient will process throughout treatment. |
| 3 (1) | Write down the target nightmare. Encourage patients to include sensory descriptions (sights, sounds, tastes, etc.) and thoughts, feelings, and assumptions they have about themselves during the dream. |
| 4 (2) | Choose a changed outcome for the nightmare. The change should occur before anything traumatic or distressing happens to the patient or others in the nightmares. The patient will imagine a change that prevents the bad outcome in the original target nightmare from happening. |
| 5 (2) | Write down the full nightmare with changes. |
| 6 (3) | Rehearse and relax each night before going to sleep. During this step, patients visualize and rehearse the changed dream each night, prior to practicing relaxation. |
| 7 (3−6) | Rehearse and relax during the day. In this final step, patients visualize the entire dream with the change, practicing relaxation as often as possible during the day. |

assault), thereby preventing the distressing outcome, (b) produce a sense of peace upon awakening, and could (c) include usual or extraordinary properties, such as flying to escape perpetrators (Krakow & Neidhardt, 1992; Neidhardt et al., 1992). The provider and the patient planned to review the revised nightmare at the next session, with the provider offering corrective feedback on the new script as indicated.

## Session 3: Dream Rescripting

The patient and her husband returned to the clinic a month later, reporting that she generated content for a changed nightmare and continued practicing relaxation during the day and before bed. She and her husband reported an overall decrease in nightmare frequency, intensity, and her distress about them (see Table 2).

The patient elected to rescript her dream to include magical and realistic modifications (Krakow & Zadra, 2010). With her script requiring no changes, the patient proceeded into Steps 6 and 7 of the IRT treatment, rehearsing the *new* dream (and not the nightmare) at night *before* practicing relaxation techniques for homework.

## Session 4: Cognitive Therapy

The patient returned to clinic a week later for her fifth visit after completing homework assigned last session. She reported significant progress toward achieving her behavioral sleep and mood management treatment goals. Specifically, she noted decreases in the frequency of her nightmares, reportedly down from about every night to twice a week, as well as reductions in their emotional salience and her distress toward them. Further, the patient's husband reported significant decreases in the number of his wife's concomitant dream enactments, explaining that: "it's the safest [he'd] felt sleeping in the same bed with [the patient] in a long while."

The session transitioned to discussing the relationship between cognitions and sleep symptoms. The provider illustrated this connection using a CBT antecedent–behavior–consequence worksheet demonstrating how thoughts influence

insomnia, which the patient completed herself. The session concluded with a collaborative exploration of how the patient's lifelong passive communication style and pattern of self-neglect continued to maintain her sleep and mood problems. For homework, the provider invited the patient to start rehearsing her rescripted dream during the day—continuing to pair it with relaxation—as well as to start noticing her patterns of problematic thinking using CBT thought records. The patient had no questions about her assignments and appeared motivated to finalize IRT and start practicing new cognitive skills.

## Session 5: Wrapping Up IRT and CBT-I

The patient returned for her sixth visit to the clinic and reported experiencing overall improvements in her sleep quality and duration due to fewer nightmares, reduced distress about the content of her nightmares, as well as downstream decreases in her dream enactments since initiating IRT at Session 2 nearly 2 months prior. The patient reported experiencing one or less nightmares with enactments per week (vs. nightly nightmares with enactments) since starting treatment. For the remainder of the discharge planning session, the patient and the provider problem-solved any barriers to her continued relaxation and rescripting practices, discussed relapse-prevention strategies, and reviewed findings from her thought logs, resuming cognitive therapy for her sleep and depressive symptoms. Because the patient's primary sleep concerns—nightmares with enactment—had reached clinically significant levels of improvement, and she also no longer met criteria for insomnia, the patient and her care team agreed to meet on a monthly maintenance basis to monitor and manage any appreciable changes in her symptoms. In the meantime, her providers referred her for local outpatient treatment for her depressive symptoms. The patient planned to return for her seventh visit a month later to problem-solve any barriers to treatment or relapse prevention as well as to continue refining her cognitive behavioral skills.

## Discussion

### Follow-Up and Summary

Since starting IRT treatment, the patient and her husband reported significant, subjective decreases in: (a) her overall distress about nightmares and other unusual perceptual experiences, (b) reductions in the number, frequency, and intensity of her dream enactments, as well as (c) improvements in her sleep quality, duration, and abilities to initiate and maintain sleep. The patient also reported improved knowledge, safety, and increased hygienic sleep behaviors, including adding guard rails to her bed to prevent falls, practicing relaxation, stimulus control, and reducing daytime napping. However, upon her return to clinic for her seventh visit, the patient was admitted to the emergency room for endorsing active suicidal ideation with intent. Following her emergent psychiatric hospitalization, and subsequent transfer to an inpatient psychiatric unit, the patient did not return to clinic. However, given the patient's significant, aforementioned psychosocial stress and extensive traumatic history, we suspect that her ideation had more to do with psychosocial stress than her sleep concerns.

## Limitations

Despite significant improvements in the patient's sleep concerns, her treatment had several noteworthy limitations. To begin, she received a highly tailored, "*n* of 1" treatment that may not generalize to other patients with the same or similar presenting problems. For example, we do not necessarily indicate IRT for all persons meeting criteria for ND (Krakow & Zadra, 2010). The authors want to emphasize the importance of recognizing individual differences in treatment planning, response, and outcome and to reiterate the importance of treating the individual, not the disease. However, real-world patients are rarely as uncomplicated as those included in treatment studies, so having evidence that IRT was effective with such a complex case, and may also have helped reduce RBD symptoms, is a meaningful addition to the literature. Another limitation of the case included our reliance on subjective rather than objective (e.g., polysomnography, actigraphy, or consistent within-persons repeated measures) treatment outcome measures, due to time, resource, and setting-related barriers. However, treatment used validated self-report measures and these subjective measures may outperform, or at least correlate with, traditional "objective" sleep measures (O'Donnell et al., 2009). Of course, the intervention also used an eclectic, integrative approach including IRT with components of brief CBT that may have diluted the "purity" and dose effectiveness of treatment. However, this case reflects common, real-world practice—particularly with complex patients—illustrating how to combine these different modalities to treat such a patient. Finally, in the absence of follow-up data, findings cannot speak to the durability of treatment, though its effects appeared to persist through the 5-month observation period documented in this case study. However, IRT's lasting effects have been documented in prior literature.

## Implications

The results of this case study show promise that the use of IRT may help to reduce the number, frequency, and intensity of RBD events for older adults. Given the inherent limitations of a case study design, additional research on IRT's effects on RBD outcomes is needed. Specifically, future research should explore the efficacy of IRT as both a standalone treatment and in combination with other evidence-based approaches for the treatment of RBD. To further elucidate this novel treatment approach, future research should explore the mediating and moderating variables associated with IRT on RBD, such as comorbid PD, cognitive decline, and sleep disorders. Further, this case study highlights the comorbidity of RBD and PD and generates an empirical question of whether interventions for RBD, such as IRT, may attenuate the likelihood of subsequent PD or other neurodegenerative disorders. The field would benefit from longitudinal clinical trial research aimed to answer this question.

The associations among ND, RBD, MDD, and PD in later life also have clinical implications (Neikrug & Ancoli-Israel, 2010). For example, the prevalence of PD appears to steadily increase across the life span from an estimated .04% in 40-year-olds and up to 1.9% people aged 80+ (Pringsheim et al., 2014). Depression affects an estimated 7%–13% of older adults and co-occurs at higher rates with neurodegeneration, such as PD (Crowley, 2011; Neikrug & Ancoli-Israel, 2010; World

Health Organization, 2017). Many sleep disorders, including RBD (Kang et al., 2013) grow in their prevalence with aging (Nielsen & Zadra, 2005). Thus, older adults presenting to BSM clinics may benefit significantly from the targeted assessment of these interrelated disorders.

## Recommendations to Clinicians and Students

This case demonstrates the need to integrate treatment modalities when working with complex patients. In addition, it highlights the importance of interdisciplinary care when treating older adults with sleep disorders. When integrated with Sleep/Wake Disorder clinics in larger hospitals, BSM clinics appear to provide well-positioned, precise, and comprehensive gerontological care.

Clinicians treating sleep disorders, especially those among older adults, should receive additional education on the interrelations of RBD, ND, MDD, and PD at the graduate level and beyond. Older adults also deserve to receive more information about these disorders. As the population ages, gerontological research continues increasing to expand knowledge but these findings require dissemination to reach older adults. Finally, conceptualizing BSM as a frontline psychological treatment may help to normalize and destigmatize psychological treatment in the eyes of older adults who may harbor negative attitudes and beliefs about therapy.

## Conclusions

The results of this case study show promise that the use of IRT may help to reduce the number, frequency, and intensity of RBD events for older adults. Further, attendant distress may also decrease. Using IRT for RBD is a novel approach, as it is a seldomly used treatment in RBD. Although additional research is warranted, our case suggests that IRT may be an efficacious treatment for older adults experiencing RBD.

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