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COMMENTARY

Considerations for integrated cognitive behavioural treatment for older adults with coexisting nocturia and insomnia

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Abstract

Nocturia and chronic insomnia disorder are common conditions that frequently coexist in older adults. Existing medication treatments for each condition have risks, particularly in older adults. While treatment guidelines recommend starting with behavioural therapy for each condition, no existing program simultaneously addresses nocturia and insomnia. Existing behavioural interventions for nocturia or insomnia contain concordant and discordant components. An expert panel (including geriatricians with sleep or nocturia research expertise, sleep psychologists and a behavioural psychologist) was convened to combine and reconcile elements of behavioural treatment for each condition. Concordant treatment recommendations involve using situational self-management strategies such as urge suppression or techniques to influence homeostatic drive for sleep. Fluid modification such as avoiding alcohol and evening caffeine and regular self-monitoring through a daily diary is also appropriate for both conditions. The expert panel resolved discordant recommendations by eliminating overnight completion of voiding diaries (which can interfere with sleep) and discouraging routine overnight voiding (a stimulus control strategy). The final product is an integrated cognitive behavioural treatment that is delivered by advanced practice providers weekly over 5 weeks. This integrated program addresses the common scenario of coexisting nocturia and chronic insomnia disorder.

Keywords: sleep, insomnia, nocturia, aged, behavioural therapy, older people

Key Points

- Given that nocturia and insomnia frequently coexist and each condition contributes to development and maintenance of the other, an integrated treatment for both conditions is needed.
- Given the risks associated with drug therapies for nocturia and insomnia in older adults, an easily implemented, integrated cognitive behavioural treatment approach is proposed.

- This treatment approach is built on existing interventions for nocturia and insomnia and Spielman's 3-P model and improves these interventions (which are typically delivered separately) by addressing discordant components and reducing redundancy among concordant components.

Background

Two frequent contributors to poor sleep quality in older adults are nocturia (waking to pass urine during the main sleep period), which occurs in $\geq 50\%$ of older adults [1], and chronic insomnia disorder (sleep difficulties that impact how a person feels or functions during the day and occur three or more times per week for at least 3 months, despite adequate sleep opportunity), which occurs in 10% of adults [2, 3]. More than one-third of older adults have chronic insomnia symptoms [4]. Evidence suggests that nocturia and chronic insomnia disorder have a bidirectional relationship [5, 6]. As a geriatric syndrome, sleep disturbance in older adults is often multifactorial [7]; yet treatments for nocturia and chronic insomnia disorder do not address the situation where these conditions coexist.

Current nocturia treatments primarily target conditions that impact the lower urinary tract, without addressing sleep disturbance, even though a core feature of nocturia is 'waking' to pass urine. Other limitations are the side effects associated with anticholinergic and antidiuretic therapies in older adults [6, 8]. Moreover, although therapies reduce nocturia frequency, many older individuals continue to wake from sleep to void and are bothered by nocturia even after symptom-specific treatment [9]. These findings suggest that treatment of additional mechanisms, including non-urinary tract factors such as insomnia, is warranted.

Similarly, although chronic insomnia disorder improves with sleep-focused, non-drug strategies such as cognitive behavioural therapy for insomnia (CBTI), it is often complicated by comorbid conditions such as nocturia, particularly in older adults [10]. While CBTI can be effective in patients with comorbidities [11], a recent study found that non-drug treatment for insomnia is less efficacious for improving sleep outcomes among older adults with nocturia [12], suggesting that targeted treatment of nocturia may also be necessary. Hypnotics, similar to nocturia medications, pose safety concerns in older adults and could induce nocturnal enuresis; hence, experts recommend non-drug therapy (e.g. CBTI) as first-line therapy for chronic insomnia. However, conventional CBTI does not directly address nocturia as a frequently complicating contributor to insomnia [10, 13].

Given the bidirectional relationship between nocturia and chronic insomnia disorder and the risks associated with drug therapies for both conditions in older adults, we sought to develop an integrated cognitive behavioural treatment that would simultaneously address nocturia and insomnia.

Integrated cognitive behavioural treatment conceptual model

The 3-P conceptual model guided development of an integrated treatment [14]. The original model proposes that predisposing (e.g. genetic) and precipitating (e.g. acute life events) factors interact with perpetuating factors (e.g. maladaptive behaviours such as prolonged time in bed, poor sleep hygiene), ultimately leading to insomnia. In our adapted model, the bidirectional relationship between nocturia and insomnia, where each condition acts as a perpetuating factor in the pathogenesis of the other, is added.

Considerations for the integrated treatment program (see Table 1)

To develop the program, we reviewed and adapted existing behavioural interventions specific to nocturia or insomnia [9, 15] and then convened an expert panel comprised of geriatricians with sleep or nocturia research expertise, sleep psychologists and a behavioural psychologist. During each step, we reduced redundancy among concordant components, addressed discordant components and introduced new components.

Concordant areas

Existing treatment strategies for both conditions include the use of a daily diary to promote self-monitoring and individualisation of therapeutic strategies during one-on-one sessions with an interventionist. Another commonality is the daily recording of sleep or toileting activity and the burden of sleep or urinary symptoms. We developed an integrated daily diary to capture these common elements. Moderation of caffeine and alcohol and reduction of fluid intake before bedtime are also commonalities, so we included these recommendations in the integrated intervention. Both strategies have situational self-management strategies such as the nocturia program's 'freeze and squeeze' technique (pelvic floor muscle exercise-based urge suppression to reduce the need to get out of bed during awakenings that were prompted by the urge to void) and the CBTI program's sleep restriction strategies to reduce insomnia, so self-management strategies were retained in the integrated intervention.

Discordant areas

One discordant area involved the use of timekeeping in the daily diary. Bladder diaries usually involve timekeeping, including overnight, to determine when voids occur relative to daytime or nighttime. However, avoidance of attention to exact time overnight (clockwatching) is a key theme of

Table 1. Insomnia and nocturia integrated behavioural treatment considerations and content

Cognitive behavioural therapy for insomnia	Behavioural therapy for nocturia	Integration
Session 1: ‘Overview: Introduction, getting solid sleep naturally, the science of sleep and bladder’		
<ul style="list-style-type: none"> • <u>Education</u>: Sleep stages; 3-P insomnia model (causes and contributors), homeostatic and circadian sleep processes • <u>Self-Management Skill</u>: Sleep restriction techniques (prescribed time-in-bed window based on sleep diary) 	<ul style="list-style-type: none"> • <u>Education</u>: Nocturia causes & contributors. Non-pharmacological strategies for peripheral edema with compression stockings. 	<ul style="list-style-type: none"> • Complete treatment-specific daily diary for sleep, voiding, habits, medications. • Avoid looking at the clock (even for nighttime voids) • Discuss bidirectional relationship between insomnia and nocturia • Set integrated goals for the week
Session 2: ‘Healthy steps for healthy sleep and bladder control: pelvic floor muscle exercises and urge control’		
<ul style="list-style-type: none"> • <u>Education</u>: Stimulus control for insomnia and sleep hygiene • <u>Skill Reinforcement</u>: Sleep restriction 	<ul style="list-style-type: none"> • <u>Education</u>: Voiding processes • <u>Self-Management Skill</u>: Urge suppression techniques • <u>Self-Management Skill</u>: Pelvic floor muscle exercises (PFME) 	<ul style="list-style-type: none"> • Complete treatment-specific daily diary for sleep, voiding, habits, medications. • Implement sleep hygiene and nocturia non-pharmacological strategies such as fluid modification to minimise sleep disruption • Practice PFME during daytime (but not overnight), track PFME #sets and frequency of sets • Practice urge suppression strategies for nocturia to promote improved sleep • Situational self-management strategies for sleep and bladder including metaphors to reinforce strategies
Session 3: ‘Sleep, stress and your bladder’		
<ul style="list-style-type: none"> • <u>Education</u>: Impact of stress and napping on nighttime sleep • <u>Self-Management Skill</u>: Avoiding naps • <u>Self-Management Skill</u>: Relaxation techniques at night 	<ul style="list-style-type: none"> • <u>Self-Management Skill</u>: Review urge suppression techniques 	<ul style="list-style-type: none"> • Complete treatment-specific daily diary, PFME activity record • Practice relaxation techniques for stress and distinguishing from PFME skill • Get out of bed when unable to sleep, but don’t encourage overnight voiding
Session 4: ‘Sleep, your mind and your bladder: thinking about sleep’		
<ul style="list-style-type: none"> • <u>Self-Management Skill</u>: Challenging maladaptive/catastrophic thoughts about sleep • <u>Self-Management Skill</u>: Identify barriers. Build self-confidence for maintaining sleep schedule, stimulus control 	<ul style="list-style-type: none"> • <u>Self-Management Skill</u>: Avoiding catastrophic thoughts about nocturia • <u>Skill Reinforcement</u>: Build self-confidence for PFME and urge suppression strategies. 	<ul style="list-style-type: none"> • Complete treatment-specific daily diary • Catch it, Check it, Change it strategies for insomnia and nocturia • Practice techniques previously discussed
Session 5: ‘Checking on progress, preparing for the future’		
<ul style="list-style-type: none"> • <u>Review</u>: ‘treatment-specific daily diary’ results and adjust time in bed. • <u>Skill Reinforcement</u>: Identify pitfalls and barriers to implementing strategies, relapse prevention strategies for insomnia and nocturia. 		<ul style="list-style-type: none"> • Follow prescribed sleep schedule • Practice techniques • Assess adherence

CBTI to reduce fixation on specific timeframes and reduce sleep-focused effort. Thus, in the case of timekeeping, we instructed individuals to document the voiding events that occurred during the sleep period each morning instead of documenting the voids in real time.

The greatest challenge was developing recommendations for urinary urgency that occurs in bed—specifically, addressing the conflicting recommendations of in-bed urinary urge suppression strategies with CBTI stimulus control strategies (get out of bed when unable to sleep). CBTI discourages performing non-sleep activities in bed, and when individuals experience insomnia, it encourages arising from bed and engaging in a calm activity until the individual feels sleepy again. In the integrated treatment, the team opted to advise against immediate use of the bathroom after a nighttime awakening due to the potential detrimental effect on in-bed urge suppression self-management techniques that are core to nocturia treatment and instead, advised first implementing techniques to diminish the urge, and only getting up to void if urge suppression techniques were not successful.

Another discordant area involved the specialisation of the interventionist. Advanced practice providers (APPs), such as nurse practitioners or physician assistants, often deliver

behavioural therapy for nocturia, whereas mental health providers with cognitive behavioural sleep training (e.g. psychologists, psychiatrists) are the most common providers of CBTI. To enhance the potential for broad implementation in clinic settings, the team designed the integrated program for delivery by APPs.

A review of the delivery strategies for each condition revealed discordant timing of sessions. Treatment for nocturia typically occurs over an 8-week period with visits every 2 weeks, while CBTI typically involves weekly sessions delivered over 5 weeks [9, 11]. The team adapted behavioural treatment for nocturia to weekly frequency to maintain the 5-week curriculum common to CBTI. Given that long sessions could impede uptake of the program, the team pruned content until each session was approximately 60 min [9].

New content

For nocturia treatment, a new metaphor—‘tuning a radio’—was added to communicate and reinforce self-monitoring of bladder sensations and timing of the decision to void (i.e. not immediately arising to void after awakening to give the patient the opportunity to use the urge suppression

technique and help the mind fine-tune when voiding is needed). The addition of this metaphor complemented the existing metaphors used in insomnia treatment to communicate concepts such as homeostatic sleep drive (i.e. the increasing desire to sleep that occurs the longer a person stays awake).

Contributing conditions

Obstructive sleep apnoea, depression and heart failure are examples of conditions that contribute to both nocturia and insomnia symptoms. However, the team identified other conditions that contribute to nocturia but not insomnia (and vice versa), but should be considered when selecting appropriate candidates for an integrated treatment. For example, nocturnal polyuria, which is detected with a baseline 24-h voided volume assessment, is common in older adults and could impact responsiveness to behavioural treatment, although a prior trial suggests the impact is not significant [9]. Significant urinary retention (i.e. post-void residual ≥ 200 ml measured by bladder ultrasound or catheterisation) due to an untreated underlying cause may reduce responsiveness to behavioural treatment. Other medical conditions such as diabetes, chronic kidney disease and urologic conditions associated with bladder irritability such as stones or a urinary tract infection make it prudent to review or obtain relevant laboratory studies to detect contributors to nocturia. Bipolar disorder is a potential contraindication to the sleep restriction component of CBTI and screening for this condition should be considered for an integrated program.

Development of interventionist training

The team developed interventionist training that includes training sessions for APPs, with the goal of providing the fundamentals of both CBTI and behavioural treatment for nocturia through online modules and selected readings, in addition to interventionist training on tailoring components of integrated treatment to the needs of the participant. The intervention manual contains scripted content to optimise treatment quality and fidelity.

Proposed next steps

The next step is a feasibility study that focuses on both acceptability of the program and evaluation of our success in delivering the integrated program to older adults (e.g. ≥ 60 years) with nocturia and chronic insomnia disorder. Considerations for evaluating this program—a complex intervention given its multiple interacting components—include quantitative and qualitative process evaluations (e.g. measuring fidelity to the integrated treatment program, adherence to intervention components such as sleep restriction and pelvic floor muscle exercises in a diverse sample including those with mild cognitive impairment) and outcome evaluations (measurement of potential effects and longevity of effects) across a range of clinical outcome

measures including insomnia severity, nocturia frequency and overall sleep quality.

Conclusions

Older adults with coexisting nocturia and chronic insomnia disorder may benefit from this non-pharmacologic, integrated cognitive behavioural treatment approach that simultaneously addresses synergistic contributors to both conditions. A feasibility study and future trial are needed to test the efficacy of the program.

Availability of Data and Materials: The integrated behavioural treatment program will be made available upon request at the completion of studies demonstrating its efficacy.

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