

aimed to determine whether the effectiveness of CBTi is reduced in the presence of mild, or moderate-severe co-morbid obstructive sleep apnea.

Methods: A retrospective chart review was conducted to examine 455 insomnia patients entering a CBTi treatment program in a hospital outpatient setting. Of these 455, 314 patients were diagnosed with insomnia-alone, 103 were found also to have mild sleep apnea, and 38 also had moderate or severe OSA. Improvements in sleep diary parameters, the Insomnia Severity Index, and several daytime functioning questionnaires from baseline, to post-treatment, to 3-month follow-up were compared between these groups.

Results: Patients with co-morbid insomnia and OSA experienced significant improvements in insomnia symptoms during treatment. For example, among patients with mild sleep apnea, sleep onset latency was reduced by 46 minutes, wake after sleep onset was decreased by 66 minutes, and sleep efficiency was increased by 19%. Among patients with moderate and severe sleep apnea, sleep onset latency reduced by 18 minutes, wake after sleep onset by 70 minutes, and sleep efficiency increased by 16%. These improvements in average sleep-diary parameters as well as global insomnia severity, and daytime functioning measures were not significantly different between patients with insomnia-alone, patients with mild sleep apnea, or patients with moderate to severe sleep apnea.

Conclusion: Cognitive/behavioral therapy for insomnia is an effective treatment in the presence of mild, moderate, and severe co-morbid obstructive sleep apnea. This information offers some support for the suggestion that patients with co-morbid insomnia and OSA should be treated with CBTi prior to initiating treatment of the OSA.

Support (If Any): No support.

0371

EFFECT OF SLEEP AID ON SLEEP: COMPARISON OF SLEEP TIME PARAMETERS USING POLYSOMNOGRAPHY AND DRUG INFORMATION DATABASE

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Introduction: Many different sleep aids are used to manage insomnia symptoms. Nevertheless, there is paucity of literature comparing this wide range of sleep aids comprehensively by measuring the effect of sleep aids using the gold standard, polysomnography (PSG). We conducted a study showing the effect of each sleep aid category on the sleep time parameters using PSG database.

Methods: Twelve months of diagnostic polysomnographic data and drug information from the University Sleep Disorders Center database totaling 847 subjects of 18 years of age or older were collected and analyzed. The sleep aids were categorized into: benzodiazeping (BDZ) receptor agonists (Z-drugs), BDZs, melatonin agonists (MTN), antihistamines (AH), sedating tricyclic antidepressants (TCA), 5HT_{2A} antagonists (5HTA: trazodone, mirtazapine, quetiapine). We examined the PSG time parameters of total sleep time (TST), sleep efficiency (SE), sleep latency (SL), and wake after sleep onset (WASO) based on the sleep aid category including sleep aid non-users.

Results: Out of 847 subjects, 607 were sleep aid non-users and 240 were sleep aid users. Sleep aid non-users showed TST 333 min, SE 77.5%, SL 24.3 min, WASO 72.3 min. When adjusted for age, sex, body-mass index and apnea-hypopnea index, sleep aid users showed significantly better sleep parameters in SE (79.8 %; $p < 0.05$) and WASO (64.2 min; $p < 0.05$). Further analysis based on sleep aid categories showed the following: TST was significantly increased in MTN (413 min; $p < 0.001$) and BDZ (357 min; $p < 0.05$); SE was significantly increased in 5HTA (81.4 %; $p < 0.05$) and elevated in MTN (84.8%; $p = \text{NS}$); WASO was significantly lower in 5HTA (57.5 min; $p < 0.05$). AHs showed worse parameters than sleep aid non-users across all four sleep time (TST 298 min, SE 72.4%, SL 32.6 min, WASO 83.8 min).

Conclusion: All sleep aids except antihistamine can benefit sleep quantity in patients with insomnia. The best categories are melatonin and 5-HT_{2A} antagonists such as trazodone. On the other hand, antihistamines may worsen sleep. Melatonin receptor and 5-HT_{2A} receptor might be more effective target of interest in future insomnia research.

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0372

NURSE DELIVERED BRIEF BEHAVIORAL THERAPY-INSOMNIA FOR LUNG CANCER SURVIVORS

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Introduction: Insomnia occurs in 45 to 57% of lung cancer survivors. Cognitive behavioral therapy for insomnia (CBT-I) is the standard treatment for insomnia; however access is impaired by treatment length and shortage of trained psychologists to deliver CBT-I. Nurses are uniquely positioned to deliver a modified version of CBT-I, i.e., Brief Behavioral Therapy-Insomnia (BBT-I) involving sleep restriction, stimulus control, sleep hygiene education and brief telephone therapy. This study determined efficacy of BBT-I compared to attention control (healthy eating education) for insomnia in lung cancer survivors.

Methods: Lung cancer survivors were randomized to either the experimental (BBT-I) or attention control (healthy eating education). The study inclusion criteria were Insomnia Severity Index (ISI) >7, stage I/II non-small cell lung cancer ≥ 6 weeks from surgery, and ≥ 21 years of age. Exclusion criteria included untreated pre-existing sleep disorders or medical or psychiatric instability. Objective measures included screening for sleep apnea (ApneaLink) and 14-day actigraphy before and after the interventions. Subjective measures included Pittsburgh Sleep Quality Index, Dysfunctional Beliefs & Attitudes about Sleep, Epworth Sleepiness Scale, Profile of Moods Fatigue Scale, Hospital Anxiety and Depression Scale, Functional Assessment of Cancer Therapy-Lung and 14-day sleep diaries.

Results: Demographics on randomized sample (n=40): 66 years of age (± 7.6 ; range 53–82), 40% (n=16) male, 87.5% (n=35) Caucasian, 50% (n=20) married, BMI 27.7 (± 5.8), and 10% (n=4) never smokers. Disease-treatment characteristics included 80% (n=32) adenocarcinoma, 60% (n=24) stage 1A, and 90% (n=36) lobectomy. At baseline there was no significant difference between the groups ($p=.12$). Post-treatment mean ISI for the experimental intervention was 6.40 ± 4.98 , while the attention control mean was 14.10 ± 4.48 ($p=.001$) with an effect size of 1.61. One third of patients screened required referral for treatment: 4/44 (9%) screened positive for sleep apnea and 12/44 (27%) had low nighttime oxygenation.

Conclusion: This study demonstrated efficacy of nurse delivered BBT-I in lung cancer survivors and will inform a larger study to evaluate implementation strategies to promote dissemination and sustainability. Brief, practical interventions can significantly improve sleep in cancer survivors with insomnia.

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0373

DE-CLUTTERING THE BEDROOM AS A POSSIBLE SLEEP HYGIENE STEP TO IMPROVE SLEEP QUALITY

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Introduction: Clinicians often suggest sleep hygiene interventions for sleep disorders, such as developing a bedtime routine, sleeping in

one's own bed, and regular bed/waketimes. Contextual cues such as cluttered bedrooms may also interfere with sleep quality, perhaps by contributing to rumination or anxiety. Our study examined whether de-cluttering the bedroom helps improve sleep.

Methods: Participants were 1052 subscribers to a website offering help with housekeeping routines, particularly de-cluttering and discarding (95% female, mean age 50.5 years). Subscribers were given access to an on-line study link for five consecutive days in December 2015. Measures included demographics; Pittsburgh Sleep Quality Index (PSQI); Daytime/Nighttime Sleep Problems (DNSP), and Housekeeping Habits Survey (HHS). The HHS asked participants which of four recommended habits they had adopted on an at-least weekly basis: 1) regular, brief de-cluttering (tidying and discarding objects in the bedroom); 2) planning for next day's activities; 3) self-care (eating regular meals and keeping "reasonable" bedtimes; and 4) keeping thoughts positive and avoiding perfectionism.

Results: Hierarchical regression revealed that De-cluttering and Self-Care habits predicted increased sleep quality (PSQI; beta = -.13 and -.13, respectively) and fewer sleep-related problems (DNSP; beta = -.08 and -.17); earlier bedtimes accounted for the largest amount of variability (beta = -.18 and -.23). Length of website subscription predicted better sleep quality. Global PSQI was highest (M:13.2) for new subscribers, positive outcomes were achieved ($p=.04$) after as little as 4 weeks of regular engagement with the recommended habits, although PSQI scores remained elevated (global score: 11.4) even for those who spent 3 years on the website.

Conclusion: De-cluttering the bedroom area is not typically recommended to insomnia patients by health care providers; our results indicate that for some patients, recommendations to tidy the bedroom area may be helpful as a way to improve sleep. Because many insomniacs attempt to fall asleep too early, practitioners usually emphasize delaying bedtimes, to keep sleep efficiency high. Some patients, however, may be delaying sleep excessively, and directions to advance bedtimes may be more appropriate.

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0374

GROUP COGNITIVE BEHAVIORAL THERAPY FOR INSOMNIA (GCBT-I) AND PREDISPOSING FACTORS IN COLLEGE STUDENTS

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Introduction: Insomnia is prevalent in college students, who may be vulnerable, due to high academic demands, to predisposing factors such as perceived stress, pre-sleep arousal, and perfectionism. Although the effectiveness of group cognitive behavioral therapy for insomnia (GCBT-I) on insomnia severity in the general population is well established, its effects on predisposing factors are unclear. Our objectives were to assess (1) the effects of GCBT-I on symptoms of insomnia, perceived stress, pre-sleep arousal, and perfectionism; and (2) how changes in predisposing factors relate to changes in insomnia among college students.

Methods: This prospective study included 39 undergraduate students (mean age 25±5; 21% male), with an insomnia severity index (ISI) > 14, indicating mild to severe insomnia, who volunteered to take part in a GCBT-I intervention lasting four weekly sessions. The multi-component intervention included sleep restriction, stimulus control, sleep education, sleep hygiene and relaxation methods. Students completed

validated questionnaires to assess insomnia symptoms (ISI), stress (perceived stress scale - PSS), arousal (pre sleep arousal scale - PSA), and perfectionism (perfectionism cognitions inventory - PCI), before treatment and at seven weeks post-treatment. Paired t-tests were performed to assess changes pre to post treatment. Linear regression was performed to assess change scores in predisposing factors as predictors of change scores in insomnia.

Results: ISI total scores decreased from 16.08±3.93 to 12.69±4.58 ($p<0.01$), indicating lower symptom severity. Changes in predisposing factors included decreases in PSS (21.58±7.90 to 14.89±6.59; $p<0.001$), PSA (44.77±9.69 to 40.33±10.95; $p<0.05$), and PCI (49.82±24.38 to 38.97±21.31; $p<0.01$). Changes in predisposing factors accounted for 61% of the explained variance for change in insomnia (PSA: $\beta=0.57$, $p<0.001$; PCI: $\beta=0.24$, $p=0.04$; PSS: $\beta=0.16$, $p=0.21$).

Conclusion: Results support the effectiveness of GCBT-I in college students, and suggest that the beneficial effects of GCBT-I extend beyond symptoms of insomnia, to affect predisposing factors that may be state-dependent.

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0375

CHANGES IN EPWORTH SLEEPINESS SCALE DURING BEDTIME RESTRICTION THERAPY IN CO-MORBID INSOMNIA AND OBSTRUCTIVE SLEEP APNEA

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Introduction: Co-morbid insomnia and sleep apnea (COMISA) is a highly prevalent and debilitating condition. Recommended treatment for COMISA includes initial treatment with Cognitive Behavioral Therapy for Insomnia (CBTi). Bedtime restriction therapy is an effective component of CBTi that involves temporarily reducing time spent in bed to consolidate sleep periods and decrease pre-sleep hyperarousal. However bedtime restriction also temporarily increases daytime sleepiness. As sleep apnea is commonly associated with increased sleepiness at baseline, it is important to monitor the effect of bedtime restriction therapy in COMISA patients during CBTi to avoid potentially dangerous excessive daytime sleepiness.

Methods: 72 patients with co-morbid insomnia (ICSD-2) and sleep apnea (AHI ≥ 15) who were participating in a randomized controlled trial completed 7-day sleep diaries, and Epworth Sleepiness Scales at baseline, during 4-weekly sessions of CBTi, and at post-treatment. Paired t-tests were used to compare differences in average sleep parameters and sleepiness between baseline and each week of treatment.

Results: Epworth Sleepiness Scale scores did not increase significantly during any week of CBTi compared to baseline. Instead they showed a small significant reduction by week-4 (2 point reduction, $p\leq0.001$) and post-treatment (1.5 point reduction, $p\leq0.001$) compared to baseline. Subjective total sleep time showed a 30 minute decrease by the second CBTi session ($p\leq0.001$), but was significantly greater than baseline by week-4 (15 minute increase, $p\leq0.01$) and post-treatment