Nocturnal Suicide Risk across Months and Methods

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Background: Insomnia is a risk factor for suicide, and suicide incidence is disproportionately highest at night. We investigated whether this risk varied across months and/or methods of suicide.

Methods: Time, date, method (e.g. firearm, poisoning) and demographic information for 35,338 suicides were collected from the National Violent Death Reporting System for the years 2002-2010. Time of fatal injury was grouped into one-hour bins and compared to the estimated hourly proportion of the population awake from the American Time Use Survey for 2002-2010. Negative binomial modeling then generated hourly incidence risks of completed suicide. We aggregated these risks into four categories: Morning (06:00 to 11:59), Afternoon (12:00 to 17:59), Evening (18:00 to 23:59), and Night (00:00 to 05:59).

Results: The risk of completed suicide was higher at night across all months (p<0.001) and methods (p<0.001). The average nocturnal risk across months was 3.18 (SD 0.314), with the highest risk in May (3.90) and the lowest in November (2.74). The average nocturnal risk across methods was 3.09 (SD 0.472), with the highest risk for fire (3.75) and the lowest for drowning (2.44). Additionally, nocturnal risk elevated within all demographics (all p<0.001). However, there were no month-by-time or method-by-time interactions across demographics (all p>0.05).

Discussion: Regardless of month or method, the incidence risk of completed suicide at night is higher than any other time of day. Additionally, demographic subgroups did not differentially experience higher risks across months or mechanisms at night.

Keywords: suicide, nocturnal wakefulness
Sleep in Traumatic Brain Injury (TBI): A Descriptive Study

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Introduction: Sleep disturbance is highly prevalent in traumatic brain injury (TBI). Approximately 30-70% of TBI patients report some type of sleep disruption. Nevertheless, studies characterizing sleep in TBI are lacking. The present study investigated the association of sleep disturbance with TBI neuropsychiatric symptoms and sequelae.

Methods: Thirty-three participants with mild to moderate TBI completed baseline self-report measures of sleep (ISI, ESS, PSQI), psychiatric factors (GAD-7, PHQ-9, PCL-5), alcohol abuse (AUDIT-C), impulsivity (BIS-11) and aggression (BPAQ-SF) as part of a study testing the efficacy of behavioral insomnia treatment in TBI.

Results: The participant sample has a mean age of 39.9 ± 12.7 years, and is predominantly female (70%), white (67%), at least college educated (52%), and unemployed (58%). Subjects endorsed moderately severe insomnia symptoms (µ=18.7, SD=5.4), above-normal daytime sleepiness (µ=6, SD=3.8), poor sleep quality (µ=12.7, SD=3.2), mild to moderate depression (µ=9.2, SD=5.3) and anxiety (µ=6, SD=4.8), moderate PTSD symptom severity (µ=24.4, SD=17.8), impulsivity (µ=61.6, SD=10.8), aggressiveness (µ=23.5, SD=10.3), and risk for alcohol abuse (µ=4.3, SD=1.7). Insomnia severity was associated with depression and PTSD symptom severity. Sleep quality was associated depression and impulsivity. Depression was associated with PTSD and aggression while impulsivity was associated with anxiety, PTSD, and aggression.

Conclusion: In this sample of TBI study participants, sleep disturbance is associated with both neuropsychiatric factors and TBI sequelae. Hence, effective treatment of sleep disturbance in TBI patients may not only improve sleep but also potentially improve long-term outcomes via improvements in neuropsychiatric health and sequelae characteristic of brain injury.

Support: ASMF Strategic Research Award
Sleep Tracking Devices: A Comparison between Actigraphy and FitBit Alta HR in College Students
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Background: Studies have compared mean sleep readings across actigraphy and sleep tracking devices. However, few examine the reliability among devices or include devices that track heart rate. Thus, this study examined reliability in daily sleep data between Actiwatch and FitBit Alta HR.

Methods: FitBit Alta HRs and Actiwatches were worn by 85 college students (76.9% female, \( M = 18.94 \) years) over two nights. There were 64 participants with accurate tracking for night one, 60 for night two, and 39 participants with two nights of accurate tracking on both devices. Bedtime, waketime, total time in bed, minutes asleep, and sleep efficiency scores were compared.

Results: Intraclass correlations were conducted to evaluate absolute agreement between the two devices on night one, night two, and the average of the two nights. Agreement for bedtime, time in bed, and minutes asleep was acceptable to good (.52-.88). Waketime agreement was poor for night one (.21) but adequate for night two (.77). Sleep efficiency agreement was unacceptable (.03-.04). Minutes to fall asleep was not calculable as the FitBit reported zero minutes to fall asleep for every participant.

Conclusions: The FitBit Alta HR may be clinically useful and may adequately measure bedtime, minutes asleep, and time in bed as compared to actigraphy. Overall, FitBit underestimated sleep variables as compared to actigraphy. Furthermore, sleep efficiency and minutes to fall asleep were not comparable across devices. Thus, FitBit may not be an acceptable alternative to actigraphy for some variables. Implications and future directions will be discussed.
Nocturia: Prevalence and Associations with Sociodemographics, Socioeconomics, and Overall Health

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INTRODUCTION: Nocturia is a common symptom known to impair sleep. Yet, population-level data on this symptom is scarce. The present study examined prevalence and correlates.

METHODS: Data from the National Health and Nutrition Examination Survey (NHANES) 2015-2016 wave was used. Nocturia was assessed as voids per night, categorized as 0, 1, 2-3, and 4+. Other factors assessed included age, sex, race/ethnicity, immigrant status, language spoken, education level, relationship status, household size, children in household, income-poverty ratio (IPR), home ownership, employment, body mass index (BMI), and overall health. Multinomial regression analyses using NHANES survey weights examined relative likelihood of nocturia categories (reference=0), adjusted for age, sex, race/ethnicity, IPR, and education.

RESULTS: In the population, 40.2% report 1/night, 25% report 2-3/night, and 4% report 4/night. In adjusted models, nocturia 4+ times/night was reported by those age 50-59 (RRR=11.3, p<0.0005), 60-69 (RRR=6.5, p<0.0001), 70-79 (RRR=17.4, p<0.0001), and 80+ (RRR=17.2, p<0.0001). Prevalence was higher among Blacks/African-Americans (RRR=2.5, p<0.0001), and those with both High School (RRR=2.0, p<0.05) and Less Than High School (RRR=2.2, p<0.05) education. Higher IPR was associated with lower prevalence (RRR=0.7, p<0.0001). Higher prevalence was also associated with being divorced (RRR=1.9, p<0.05), unemployment (RRR=2.0, p<0.05) and disabled status (RRR=4.3, p<0.0001), obesity (RRR=2.6, p<0.0005) and morbid obesity (RRR=3.3, p<0.005), and poor health vs excellent (RRR=5.4, p<0.005). Decreased prevalence was associated with immigrant status (RRR=0.5, p<0.05), children in the household (RRR=0.8, p<0.005), and Spanish exclusively (RRR=0.3, p<0.005) and predominantly (RRR=0.3, p<0.05).

CONCLUSIONS: Nocturia is prevalent and associated with older age, as well as race/ethnicity, socioeconomic status, and general health. Novel risk and protected groups are identified, which may inform screening and intervention efforts.
Impact of Age-related Social and Environmental Determinants in Insomnia- Cardiometabolic Health Relationships in Individuals Who Exercise

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Background: Sleep impairment is associated with cardiometabolic disease risk. Physical activity may be important to improve both conditions. Few studies have investigated the influence of age-related socio-environmental determinants on insomnia-cardiometabolic health relationships. This study examined whether sociodemographic, health behavior, environmental, stress, and cardiometabolic disease risks are associated with insomnia in a diverse sample of insured adults in Hawaii who engaged in moderate to strenuous exercise.

Methods: Adult medical patient data were used (N=39,999; female(53.2%). Physical activity was categorized by duration (0-150+ minutes) and frequency (0-7 day/week). Determinants included geolocation, sex, race/ethnicity, education and income level, caregiver and work stress, and nutrition/exercise counseling. Kruskal-Wallis H test and logistic regression analysis were performed.

Results: In this sample, 20.52% were diagnosed with a sleep disorder, 12.01% with insomnia, and 18.36% with comorbid cardiovascular or metabolic disease and a sleep disorder, with majority between 55-74 years of age. Statistically significant differences in the presence of a sleep disorder, insomnia, and comorbid cardiovascular/metabolic disease and a sleep disorder, respectively, were found between different age ranges($\chi^2(7)=1206.12, p<0.0001$; $\chi^2(7)=138.17, p<0.0001$; $\chi^2(7)=1790.77, p<0.0001$), sexes($\chi^2(1)=139.76, p<0.0001$; $\chi^2(1)=26.13, p<0.0001$; $\chi^2(1)=150.74, p<0.0001$), and races($\chi^2(6)=195.38, p<0.0001$; $\chi^2(6)=303.68, p<0.0001$; $\chi^2(6)=159.37, p<0.0001$). In our logistic regression model that examined associations with insomnia, cardiovascular/ metabolic disease($p<0.0001$), age(55 years+)($p<0.0001$), female($p<0.0001$), urban living($p=0.0118$), caregiver stress($p<0.0001$), and work stress($p=0.0018$) were associated with a higher likelihood of insomnia, while Asian, Native Hawaiian/Pacific Islander, Multiple, and Unknown race were not ($p<0.0001$).

Discussion/Implications: Exploration of the role of mediating determinants in sleep-cardiometabolic health relationships is needed to design targeted interventions that include modifiable health and lifestyle factors for unique, at-risk profiles of individuals with insomnia who vary by age, sex, and race.
The Relationship Between Mindfulness, Stress, and Sleep Quality in Student Veterans

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Background: Quality sleep plays a significant role in physical health and cognitive functioning. Certain groups are at a higher risk of experiencing poor sleep quality and examining the factors that shape sleep quality, such as levels of stress and mindfulness, within these populations should be a research priority. Student veterans represent one of these at-risk populations, and the current study investigated sleep quality and related factors within this group.

Methods: Using an online subject-pool, a sample of 30 student veterans were recruited to test predictions examining the relationship between levels of mindfulness and sleep quality; stress and sleep quality; mindfulness and stress; and a model investigating mindfulness as a moderator by weakening the relationship between stress and sleep quality. The student veterans’ sleep quality was also compared to a sample of 128 civilian students.

Results: Findings suggest significant relationships between levels of mindfulness, perceived stress, and sleep quality in student veterans. While both student veterans and their civilian counterparts experienced clinically poor sleep quality, student veterans reported significantly poorer sleep quality scores. Additionally, those with elevated levels of mindfulness were more likely to have a weakened relationship between stress and poor sleep efficiency.

Discussion/Implications: This study provides important data regarding the sleep quality of a unique, at-risk group. The relationships between stress, mindfulness, and sleep quality examined offer a platform to guide future clinical interventions regarding sleep quality improvement within the student-veteran population.

Keywords: student-veterans, sleep, mindfulness
An Invitation to the Snoozeum: Use of an Asynchronous Virtual Learning Environment in Behavioral Sleep Medicine

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Background: The standard postgraduate-level training model in empirically supported treatments is a two-day workshop, after which trainees largely implement the protocol into their clinical practice independently. To augment and expand traditional training for behavioral sleep medicine (BSM), we developed the ‘Snoozeum’, an immersive self-paced virtual learning environment in Second Life that allows avatars to explore interactive exhibits on the assessment, diagnosis, and treatment of sleep disorders.

Methods: We developed a framework of key sleep knowledge points and interventions from a behavioral health perspective which drove content creation of potential exhibits/exercises. In collaboration with technology firm 2b3d, this content was translated into a 3D digital environment replicating the experience of visiting a museum.

Results: Avatars enter the Snoozeum entry hall and progress through three wings. As examples of exhibits, avatars can complete a step-by-step diagnostic appraisal, observe a polysomnography, score and titrate a sleep log, and even engage in a simulated session of stimulus control with a bot. We will provide a demonstration of the Snoozeum for firsthand experience.

Discussion/Implications: The Snoozeum represents a novel use of technology to expand BSM learning beyond traditional resources such as didactics, consultation and readings; an engaging, personal experience promotes a deep level of internalization. Challenges exist, such as logistics of installation and bandwidth, and user technology comfort. There are numerous potential benefits including the possibility of continuing education credits to encourage use, round-the-clock, geographically-unlimited, no-cost access, and the ability to add and update exhibits allowing for continual evolution to reflect current state of the sleep science.

Key Words: behavioral sleep medicine, technology, training
Clinical Applications of a Modified Home Sleep Apnea Test in the Diagnosis of Obstructive Sleep Apnea

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Background: OSA affects a growing percentage of the civilian and Veteran population. The disorder is associated with higher risk of mortality, reduced quality of life, and an annual economic cost of $65-$165 billion. An important diagnostic modality is home sleep apnea testing (HSAT), a modified version was evaluated by the Memphis VA sleep clinic.

Methods: A retrospective chart review of all patients who underwent a modified HSAT from 1/1/2011 – 12/31/2016 were included in the sample. The diagnostic results of modified HSAT, clinical access and cost savings were analyzed.

Results: Of the 961 Veterans in the sample, the majority were 89% male, 55% minority, 50 years old, 37 BMI, and 29 AHI. The modified HSAT diagnosed 38% of the sample with severe OSA, 24% with moderate OSA, and 21% with mild OSA. The remaining 16% of patients had indeterminate results. Of that subset who completed a follow-up PSG, 50% were diagnosed OSA. Overall, the modified HSAT confirmed the clinical suspicion of OSA 84% of the time. The modified HSAT is cost effective with estimated savings of over 1 million dollars when compared to Medicare reimbursement rates. Lastly, by adding the modified HSAT the SHC increased access by 37.5%.

Discussion/Implications: The modified HSAT was found to be an accurate and reliable way to confirm high clinical probability of OSA in this Veteran population. Given the negative health impacts of untreated OSA, accurate and timely diagnosis followed by initiation of appropriate treatment methods is of the utmost importance.
Veterans Affairs Primary Care Provider Perceptions of Insomnia Treatment: Provider Interviews
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Background: Patients are likely to first report their insomnia complaint to their Primary Care Provider (PCPs). Since primary care is the front line for insomnia management, it is vital to understand PCP perspectives on assessment, treatment, and referral. Using qualitative interviews, we explored and clarified themes emerging from a prior survey of PCPs’ insomnia treatment perceptions.

Methods: PCPs (N=12) were recruited from the Durham VA Healthcare System to complete semi-structured individual interviews. Participants were middle-aged (50 yrs; SD=7.5), mostly female (75%), half were medical doctors, and half were mid-level providers. Transcribed interviews were coded and analyzed using direct content analysis with Atlas.ti software.

Results: PCPs prescribe sleep medications as first-line therapy, sometimes along with sleep hygiene education. Most PCPs don’t refer patients to CBTI because they are either unaware of it or conflate it with sleep hygiene education. PCPs often perceive insomnia to be “secondary” to another condition which, if treated, would address the insomnia complaint. This perception drives both treatment planning and the decision not to document insomnia in the medical record.

Implications: Knowledge deficits among PCPs about Insomnia Disorder and CBTI create a host of barriers to receipt of the standard of care. Providing sleep hygiene education delays effective treatment and fosters insomnia chronicity. The perception of insomnia as a symptom rather than a disorder precludes an accurate accounting of the condition. Tools such as VA’s Sleep Check-Up that facilitate sleep disorders screening and increase PCP knowledge of sleep disorders could help.
Differential Effects of Prazosin on Disability Ratings among Service Members with Treatment-Resistant PTSD

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Background: Posttraumatic nightmares occur in approximately 60% of patients with PTSD and are associated with decreased quality of life. For some patients, PTSD treatment does not resolve nightmare symptoms, and they require a targeted approach. Previously, Prazosin was recommended for nightmare treatment; however, recent guidelines have indicated there is insufficient evidence to recommend for or against its use. Despite this, prescribers will likely continue to prescribe Prazosin due to a lack of pharmaceutical alternatives. Therefore, it is important to understand differences in perceived disability in patients who are and are not prescribed Prazosin.

Methods: The present analyses utilized baseline data collected from a RCT examining the use of Riluzole, a glutamate modulator, for augmentation of SSRI or SNRI for treatment of PTSD. Participants in the present analyses were active duty and retired service members with treatment-resistant PTSD.

Results: There was no statistically significant difference in nightmares between participants prescribed Prazosin and those who had not been prescribed Prazosin prior to joining the study. Participants did not differ in regards to work or family life disability. Notably, participants taking Prazosin reported statistically greater social disability.

Discussion: In contrast to our hypothesis that Prazosin would be associated with lower disability ratings, these results suggest social disability may be greater in patients that warrant a targeted treatment. Alternatively, it is possible providers prescribe Prazosin more often to patients who report greater social disruption. In addition to assessing PTSD-related self-reported disability, providers should examine nightmare-related disruptions as well, particularly when considering Prazosin for nightmares.

Keywords: Prazosin, Nightmares, Military
Child Sleep Moderates Mother-Child Relationships and Externalizing Problems
Poster Presentation
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Background: Positive mother-child relationships are associated with less child externalizing behavior. Poor child sleep is associated with poor parent-child relationships and increased externalizing problems among children. However, no studies have examined child sleep’s impact on parent child relationships and child externalizing problems. The current study examined how child sleep problems affect the mother-child relationship and child externalizing problems, with child gender as a moderator.

Methods: The sample (319 m, 405 f) consisted of adolescents aged 15-19 (M = 17.43, SD = 1.51) and their mothers from the 3rd wave of the Welfare, Children, and Families Study. Measures included the Child Behavior Checklist and the Parent-Child Relationship Quality Inventory.

Results: The interaction between mother-child anger/alienation and lack of child sleep t (1, 723) = 7.57, p = .006 as well as overall mother-child relationship quality and lack of child sleep were significant in predicting child externalizing problems, t (1, 723) = 7.13, p = .008. When examining child gender, a 3-way interaction was significant for overall mother-child relationships t (1, 723) = 5.64, p = .018.

Discussion/Implications: Consistent with the mother-child anger/alienation model, low child sleep had little effect when anger/alienation was high but was associated with less externalizing problems when children got an appropriate level of sleep. Too little child sleep resulted in more externalizing problems for both sons with a poor mother-child relationship, and for daughters with a close mother-child relationship. These results suggest important gender differences when examining the role of sleep on child externalizing problems.

Key Words: Externalizing Problems, Child Sleep, Parent-Child Relationship
Mood and Sleep Are Mediators between Health Literacy and Health Outcomes
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Background: Multiple studies have linked low health literacy to poor health status, including increased depressed mood. In this study we explore the relations between health literacy, mood, sleep, and health-related quality of life (HRQOL).

Methods: Data were drawn from a previous study that included 497 individuals (245 English- and 252-Spanish speaking). Their ages ranged from 18 to 93 with a mean of 52.9 for English and 53.4 for Spanish speakers. Assessments included health literacy (a computer-delivered measure we developed, FLIGHT/VIDAS), depressive symptoms (Center for Epidemiological Studies Depression scale, CES-D) sleep quality (Pittsburgh Sleep Quality Index, PSQI) and HRQOL (EQ5D score derived from the SF-36). Relations were explored in a bootstrapped multiple mediation model that also included age, gender, race, language, and education.

Results: In the mediation model health literacy was significantly related to depressive symptoms ($p = < 0.01$), which were related to sleep ($p = < 0.01$). Sleep quality was significantly related to HRQOL ($p = < 0.001$). Health literacy was not directly related to sleep ($p = 0.40$). The indirect effect of health literacy on HRQOL via depressive symptoms and sleep was statistically significant ($p = < 0.01$). After including mediators and covariates, the direct effect of health literacy on HRQOL remained significant indicating partial mediation.

Discussion/Implications: The significant mediated effect of health literacy on sleep via and depressive symptoms suggests a possible mechanism for the relation of health literacy to health status and underscores the importance of sleep for HRQOL.

KEY WORDS (2-3 Words): Mood, Sleep, Health Literacy,
Sleep Behaviors and Classroom Attendance in University Students: A vicious cycle
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Background: Both poor sleep and increased absences in university students independently predict worsened academic outcomes. While research in high school populations demonstrates a link between sleep and absences, this relationship in university students requires further investigation. Thus, the current study sought to examine the relationship between sleep behaviors and absences in university students and analyze the factors driving all-nighters.

Methods: Thirty-six university students (Mage=22.85, SDage=2.76; 25% male; 41.7% Caucasian) completed self-reports of demographic information, absences, and all-nighters in addition to the Pittsburgh Sleep Quality Index. Bivariate correlations assessed the relationships between variables, and a final regression model examined absences in relation to sleep quality, all-nighters, and school classification (e.g. Freshman).

Results: Absences correlated with sleep quality (r = -0.35, p<0.05) and all-nighters (r = 0.48, p<0.01) but not sleep duration. The combined effects of sleep quality (β =-0.50, p<0.05), all-nighters (β=0.59, p<0.01), and school classification (β=0.22, p<0.05) accounted for 40.3% of the variance in absences (Adj. R² = 0.40, F(3,31)=8.65, p<0.01) with all variables representing significant predictors. Students frequently identified both academics and social activities as underlying causes of all-nighters.

Conclusions: Our results show that poor sleep has a strong, negative impact on class attendance in university students. Further, our results support interventions targeting multiple aspects of sleep quality and routine setting over those targeting duration alone. Results also offer insight into the viscous cycle of all-nighters, which are often driven by academic goal setting but may result in lower academic attainment, thus potentiating unhealthy sleep behaviors.

Key Words: sleep, education, and achievement
Impact of a Novel Group Intake Approach on Wait Times in a U.S. Veterans Health Administration Behavioral Sleep Medicine (BSM) Clinic

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Background: Veterans have high rates of sleep disorders, yet few VA Healthcare facilities are equipped with BSM clinics capable of meeting the needs of Veterans. Although an individual clinical interview is the standard of care for diagnosing BSM disorders, systemic pressures to reduce wait times in the Durham VA Health Care System prompted the development of a group intake approach. Presented here are preliminary findings examining the impact of this novel approach on clinic wait times.

Methods: A group intake program was developed and implemented by 3 VA CBSM psychologists. Retrospective review of randomly selected charts compared clinic wait times and no-show/cancellation rates for Veterans scheduled for traditional individual (IND: n = 51) vs. novel group (GRP: n = 49) intakes.

Results: There were significant reductions in wait time between consultation date and dates of offered and attended intake appointment. GRP intakes reduced wait time by more than 11 weeks (GRP mean = 83.6 days vs. IND mean = 166.3 days). Attendance rates between GRP and IND intakes were similar (GRP: 75.5%; IND: 70.6%).

Discussion/Implications: BSM clinic wait times were significantly reduced with a group intake format compared to traditional individual interview. This approach provided a more efficient use of provider time and did not adversely impact intake attendance. These preliminary findings suggest that a group intake approach may be an effective strategy for accelerating access to care.

KEY WORDS: Veterans, Program Evaluation, Sleep Assessment
Acceptability and Tolerability of Brief Behavioral Therapy for Insomnia among At-Risk Cannabis Users with Insomnia Symptoms

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Background: Insomnia is associated with cannabis use disorder (CUD). Treating insomnia may be a promising way to reduce CUD, yet little is known about the acceptability of behavioral treatments for insomnia in this group. Thus, we recruited cannabis users with elevated insomnia, who received Brief Behavioral Treatment for Insomnia (BBTI). We hypothesized BBTI would be acceptable and tolerable, regardless of demographic or clinical characteristics.

Methods: Trauma-exposed weekly cannabis users (n = 28) were recruited (Mage = 20.69; 58.9% women). We assessed acceptability via the Credibility/Expectancy Questionnaire (CEQ), and tolerability via attendance rates. The Insomnia Severity Index (ISI), CUD Identification Test (CUDIT), and the posttraumatic stress disorder (PTSD) Checklist-5 measured clinical characteristics. BBTI is a 4-session treatment focused on sleep restriction and stimulus control.

Results: Mean acceptability was 40.59 (SD=7.29). There were generally no differences in acceptability across groups, except for higher acceptability among those with increased insomnia (r=.48, p=.027), and Black/African American participants (F(1, 19)=5.71, p=.027). Racial differences were not significant when controlling for insomnia. Attendance rates ranged across sessions from 28.6% to 52.4%, and were not associated with any variables.

Discussion: BBTI is acceptable among cannabis users, regardless of clinical or demographic characteristics. Indeed, those with severe insomnia reported better acceptability, which were higher than in previous insomnia treatment research. However, tolerability may need improvement. Perhaps fewer sessions would be preferable as a third of participants were “good sleepers” by Session 2. Future research should utilize larger samples and multimethod assessments, including qualitative measures.

Keywords: insomnia, cannabis, cognitive behavioral therapy
Associations between prior nights of sleep and negative affect in response to a lab stressor

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Introduction: Only 40% of adolescents obtain the recommended amount of sleep per night (approximately 9 hours) and many adolescents have difficulties with sleep onset and maintenance. Sleep duration and time in bed spent asleep (sleep efficiency; SE) are associated with psychosocial stress and negative affect. However, most studies on sleep, stress, and affect are cross-sectional. We examined whether adolescent SD and SE predicted positive affect (PA) and negative affect (NA) in response to conflict with a parent.

Methods: Twenty-eight young adolescents (mean age = 12.26) completed 10 days of sleep diaries. Duration and SE (total time in bed/ time spent asleep) were averaged over 10 days. Upon completing diaries, participants then underwent a laboratory stressor task during which parents and adolescents discussed a frequent conflict for 8 minutes. PA and NA were rated at baseline and post-task using the Positive and Negative Affect Schedule (PANAS-X).

Results: Average 10-day duration was 8.72 (SD = 1.50). Average SE was .88 (SD = .090). Correlational analyses revealed no significant associations between 10-day duration and PA or NA change scores (all p’s > .05). However, participants lower 10-day SE had more NA in response to a conflict task ($r = -.427$, $p = .026$). There was no association between 10-day SE and PA ($p > .05$).

Conclusion: Findings suggest that poor sleep efficiency in young adolescents may contribute to more negative affect in response to social stress. Improving sleep efficiency may decrease negative affectivity in young adolescents with sleep problems.
Is resilience a protective factor for sleep disturbances among earthquake survivors?

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Background: The prevalence of insomnia complaints in populations exposed to trauma is estimated to range from 41% to 91%. Posttraumatic stress disorder (PTSD) has been associated with elevated autonomic nervous system (ANS) arousal during sleep and alterations in sleep stages. Research on the relationships between depression and sleep is inconclusive. The protective effect of psychological resilience on PTSD and depression has been demonstrated. However, a critical gap remains as to the influence of resilience on sleep among survivors of natural disasters.

Aims: This study investigated the relationships among psychological resilience, peritraumatic distress, PTSD and depression symptoms severity, and sleep disturbances among survivors of the 2010 earthquake in Haiti two years later.

Methods: The sample comprised 165 participants living in Port-au-Prince, Haiti, one of the areas affected by the 2010 earthquake. Measures included demographic factors, the Peritraumatic Distress Inventory (PDI), the PTSD Checklist Specific (PCL-S), the Beck Depression Inventory (BDI) and the Connor–Davidson Resilience Scale (CD-RISC). Spearman correlations and multilinear regressions were used to explore associations among resilience, PTSD, depression, and sleep disturbances.

Results: The majority of the population was male (52.1%) and the mean age was 30.7 (SD=11.07) years. Of the sample, 60.4%, 94% and 43% reported fearing for their life during the event, experiencing subsequent insomnia symptoms, or having nightmares, respectively. Among our participants, 42.4% and 21.8% showed clinically significant levels of PTSD and symptoms of depression. There were significant positive correlations between sleep disturbances and peritraumatic distress (r=0.41, p< 0.001), PTSD (r=0.76, p< 0.001), symptoms of depression (r=0.32, p< 0.001), and age (r=0.15, p< 0.001), but not with resilience factors. The most significant risk factors for sleep disturbances were peritraumatic distress, PTSD and depression symptoms, explaining 58% of the variance (F 4, 157 =0.57, R²=0.59, adjusted R² =0. 58, p < 0.001).

Conclusions: This is one of the first epidemiological study to investigate prevalence of sleep disturbances among survivors of the 2010 Haiti earthquake and its associations with peritraumatic distress, PTSD, depression and resilience. The findings provide evidence supporting the importance of sleep in intervention programs aiming at improving daily functioning and quality of well-being in the affected population.

Keywords: sleep, resilience, trauma-related disorders, natural disaster.

Support: This study was supported by funding from the NIH (T32HL129953, K07AG052685).
Cognitive Behavioral Therapy for Insomnia to Address Insomnia Symptoms and Fatigue in Individuals with Multiple Sclerosis

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Background: Poor sleep quality has been associated with increased fatigue, anxiety, depression, and risk of relapse in people with MS. While cognitive behavioral therapy for insomnia (CBT-I) is the recommended first-line of treatment for chronic insomnia, the treatment effect of CBT-I in people with MS is unclear.

Methods: This is an ongoing RCT. To date, 28 individuals (26 female, 2 male; 25 relapsing-remitting; 3 secondary-progressive) have enrolled, and 25 have completed the study. Ten individuals participated in an in-person 6-week program of CBT-I, 6 participated in a 6-week light activity (LA) program, and nine received a single bout of sleep education (SE). Participants completed a battery of surveys to assess insomnia severity (Insomnia Severity Index, ISI) and fatigue (Fatigue Severity Scale, FSS). Due to the small sample size at this stage, change scores for each group are reported. Actigraphy data is currently being analyzed.

Results: On the ISI, the CBT-I group showed a decrease in insomnia symptoms from 18.9 to 5.7 (70%), the LA group from 14.6 to 8.2 (43.8%), and the SE group from 16.7 to 9.6 (42.3%). On the FSS, the CBT-I group showed an improvement in fatigue from 33.9 to 25.4 (25% improvement), the LA group from 38.2 to 30.2 (20% improvement), and the SE group from 45.6 to 42.8 (6.1% improvement).

Discussion/Implications: Preliminary results suggest CBT-I may be an efficacious treatment to improve insomnia symptoms and fatigue in people with MS whereas the light activity and sleep education condition appear to have less improvement.
Development of a momentary sleep versus wake classification algorithm using balanced data from two multisensor consumer wearable devices

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Background: Consumer-grade devices for identifying sleep abound, but with limited validation.
Data from a new class of multisensor wearable devices allow for development of an algorithm informed by more data modalities and generalizable across devices. Using robust physiological data, we tested the hypothesis that multisensor wearables with high-density motion and photoplethysmography-derived heart rate could be used to develop a new assessment of sleep versus wake.

Methods: Eight healthy adults participated in a four-night study under controlled laboratory conditions with concurrent polysomnography (PSG). Data from multisensor devices (Apple Watch and Oura Ring) were used to train a Gradient Boosting classifier, also informed by time elapsed within a night. Model training and evaluation used nested, leave-one-participant-out cross-validation, optimizing for the area under the ROC curve. Class imbalance was managed by oversampling the minority class (wake) during training, but not evaluation. Classification performance was evaluated on metrics including $d'$, sensitivity (for sleep) and specificity (for wake). Model quality was compared to the predictive output of research-grade devices included in the study.

Results: The Apple Watch algorithm ($d'=2.11$, $SD=0.41$, sensitivity: $M=0.84$, $SD=0.11$, and specificity: $M=0.81$, $SD=0.14$) classified the data better than the Oura Ring algorithm ($d'=1.92$, $SD=0.42$, sensitivity: $M=0.84$, $SD=0.10$, and specificity: $M=0.75$, $SD=0.18$) followed by the ActiGraph Link algorithm ($d'=1.72$, $SD=0.44$, sensitivity: $M=0.91$, $SD=0.07$, and specificity: $M=0.61$, $SD=0.16$).

Discussion: Multisensor wearables can build improved classifiers less biased towards sleep, with greater specificity to detect wake, although at some sensitivity costs. Replication studies are needed to validate the approach across populations.
Effects of Cognitive Behavioral Therapy for Insomnia and Hot Flashes in Midlife Women

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Introduction: Menopausal women with hot flashes often report worse sleep quality and are more likely to meet criteria for insomnia disorder. There is some preliminary evidence suggesting cognitive behavioral therapy for insomnia (CBT-I) is also effective in ameliorating depressive symptoms. Thus, this study aimed to examine CBT for insomnia and hot flashes on sleep and depressive symptoms among midlife women.

Methods: Forty women (mean age= 55±6.2) self-described as peri- or post-menopausal who reported ≥ 1 nocturnal hot flash/night and met diagnostic criteria for insomnia disorder were randomized CBT-I or menopause education control (MEC). Pre- and posttreatment measures included: Insomnia Severity Index (ISI), Center for Epidemiologic Studies Depression Scale (CES-D), Hamilton Depression Rating Scale (HDRS), and daily sleep diaries.

Results: Mixed models revealed a significant time x treatment arm interaction for insomnia severity (p=.003), sleep disturbance (p=.005), sleep efficiency (p = .01), subjective complaint of depression (p=0.019), and objective rating of depression (p=0.01). Women receiving CBT-I had significantly greater decreases from pre to post treatment on ISI (15±4 to 4±4), wake after sleep onset (WASO; 33±21 to 9±8 minutes), CES-D (16±9 to 8±7), and HDRS (11±7 to 2±3); and significantly greater increases in sleep efficiency (79±14 to 91±6) compared to women receiving MEC [ISI (16±4 to 10±5), WASO (33±33 to 33±39), CES-D (15±11 to 13±9), HDRS (9±6 to 6±4), and sleep efficiency (82±10 to 84±9)].

Discussion: For midlife women experiencing insomnia and nocturnal hot flashes, a 4-session CBT intervention targeting both insomnia and hot flashes led to clinically meaningful improvements in sleep and depressive symptoms.

Support: National Institutes of Health Grant # K23NR014008 (PI: Nowakowski) and UTMB Clinical and Translational Science Award (UL1 TR001439). Registered trial on ClinicalTrials.gov (NCT02092844).

Keywords: Menopause, Women, Insomnia, Hot Flashes
A Meta-Analytic Review of the Effectiveness of Interventions for Traumatic Brain Injury with Sleep Disturbance
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Background: Sleep disturbance among individuals with traumatic brain injury (TBI) is a leading cause of disability with millions of Americans affected each year. Sleep disturbance can impede the healing process of TBI patients, negatively affecting their cognition, mood, appetite, motivation, personality, and overall functioning. Understanding the neurological impact of traumatic brain injury and the effectiveness of various treatment options (exercise, medication, CBT-I) is important for clinicians since rates of TBI are expected to rise as the nation ages.

Methods: Searches for articles were conducted using the MEDLINE, PsycINFO, PubMed, and PsycARTICLES databases. The following search terms were used: “traumatic brain injury,” “concussion,” “head injuries,” “insomnia,” “brain trauma,” and “brain injury.” Effect sizes from each of the articles were calculated using Cohen’s $d$, then combined via weighted averaging to find an overall effect size for all interventions implemented.

Results: The total effect size for interventions implemented to treat insomnia associated with traumatic brain injury was 0.364, a small overall effect size for this meta-analysis. Cognitive Behavioral Therapy for Insomnia (CBT-I) was found to be the most effective form of treatment for individuals with TBI.

Discussion/Implications: While there is no gold standard of treatment, CBT-I is an evidence-based treatment that has been found to be effective. However, without more data and research, information and literature on sleep disturbance among individuals with TBI will remain limited and patients will continue to receive uninformed, mismanaged, and non-comprehensive care.
Associations of Psychosocial Factors with Short Sleep and Insomnia among African-Americans: the Jackson Heart Sleep Study (JHSS)

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Background: African-Americans are disproportionately affected by poor sleep. Identifying risk factors for insomnia and short sleep duration, and the combined phenotype, insomnia-short sleep phenotype (ISSP), may help to target sleep interventions for African-Americans. We examined the associations of psychosocial factors with insomnia, short sleep, and ISSP among African-Americans.

Methods: Insomnia was defined by the Women’s Health Initiative Insomnia Rating Scale (WHIIRS ≥10); short sleep (< 6 hours) by wrist actigraphy; and ISSP by the presence of both insomnia and short sleep. Psychosocial factors included perceived stress (Perceived Stress Scale ≥18), depressive symptoms (Center for Epidemiologic Studies Depression Scale-20 ≥16), anxiety (State-Trait Anxiety Inventory score ≥38), and hostility (Cook-Medley Hostility Scale). Logistic regression models were fit to test associations between psychosocial factors and each sleep phenotype in separate models adjusted for covariates.

Results: Participants (N=824) had a mean age of 63.4 years (standard deviation: 10.7), 33.6% were male, 53.6% had a college degree, and a mean BMI of 31.9 kg/m² (6.9). Insomnia and short sleep were common (22.8% and 26.1%, respectively), and 7% had the ISSP. All psychosocial factors were associated with insomnia and ISSP, P<0.01 all. However, only high anxiety was associated with short sleep duration, adjusted odds ratio=2.00 (95% confidence interval: 1.34, 2.98).

Conclusion: Psychosocial factors were related to insomnia and ISSP. Anxiety (but not depressive symptoms, perceived stress or hostility) was related to short sleep duration. Psychosocial factors are important social determinants of sleep, and should be considered in the design and implementation of sleep interventions for African-Americans.
The interplay between nicotine dependence and sleep disturbances among young adults
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Background: Sleep disturbances are among the negative consequences of nicotine withdrawal but their role in nicotine dependence remains largely unknown. This study aimed to systematically investigate the association between nicotine dependence, sleep disturbances, and negative emotionality.

Methods: The participants of this study were young adults aged 18-28, with 15 of them being regular smokers and 20 non-smokers. Smokers were compared to non-smokers on subjective and objective measures of sleep, nicotine dependency, stress and anxiety. Participants completed the Pittsburgh Sleep Quality Index, the Fagerstrom Test for Nicotine Dependence, the Personal Stress Scale, and the State- Trait Anxiety Inventory, and provided salivary samples for detecting levels of two important biomarkers of stress: cortisol, reflecting hypothalamus-pituitary-adrenal axis activity and alpha amylase, reflecting sympathetic activity. Participant’s sleep was continuously monitored for 1 week with a wrist actigraph. Subsequently, smokers began 5 days of abstinence from nicotine during which sleep was continuously monitored with a wrist actigraph. Saliva samples were collected, and all questionnaires completed, at 4 time points: 0, 2, 3 and 5 days into abstinence.

Results: Compared to non-smokers, smokers experienced increased activity during sleep that was correlated with their urge to smoke. Moreover, abstinence from smoking induced a sharp decline in sleep quality, reflected by reduced sleep efficiency, increased latency to sleep onset, and increased activity during sleep. This decline in sleep quality was associated with increased anxiety, somatic and emotional withdrawal symptoms, and in the urge to smoke.

Discussion: Nicotine addiction involves substantial sleep disturbances that are related to heightened stress and anxiety, supporting the pathological motivation to seek nicotine.

Key words: sleep disturbances; nicotine dependence
Avoidance of Thoughts about Media during a Natural Disaster Amplifies the Link between Anxiety and Sleep Disturbance

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Introduction. Hurricane Harvey was among the most devastating weather-related events to hit the U.S. with continuous graphic broadcast. A dose-response relationship between viewing disaster coverage and anxiety symptoms is commonly found, but relationships are poorly understood. Both exposure to graphic media and anxiety can negatively impact sleep, during which emotional information is processed and consolidated. This study explored relationships among media, anxiety and sleep disturbance in relation to Hurricane Harvey.

Method: The semester immediately following the hurricane, 183 undergraduate students, aged 18-25 ($M=20.73$, $SD=1.78$) at a major university in Houston completed questionnaires regarding their experiences during the storm, anxiety symptoms, sleep patterns, and media exposure (i.e., amount of time viewing and thinking about media reports).

Results: Trait (but not state) anxiety significantly predicted global sleep disturbance ($p < .001$) but this relationship was not moderated by total time viewing media coverage. However, amount of time spent thinking about viewed media content served as a moderator ($p = .01$) such that the relationship between anxiety and sleep disturbance was strongest when less time was spent thinking about media content. Alternatively, sleep disturbance predicted trait anxiety; this relationships was not moderated by media.

Conclusion: Rather than total media viewing, time spent thinking about the content of media reports dampened the relationship between anxiety and sleep disturbance. Deliberate processing of emotional media images during natural disasters may serve as a form of ‘imaginal exposure’ leading to decreased levels of arousal. Better sleep may also allow for adequate processing of emotional media images and reduced anxiety.

Keywords: Sleep, Anxiety, Media
Factors Affecting Sleep Quality and Its Association to Quality of Life in Adult Filipinos with Cancer
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Background: Sleep disturbances are highly prevalent in cancer patients. There is substantial evidence that sleep disturbance is associated with many aspects of cancer treatment, morbidity, mortality and quality of life. This study evaluated sleep quality in adult Filipinos with cancer and determined the association of demographic characteristics and clinical features to sleep quality.

Methods: This was a cross-sectional surveillance study conducted among adult Filipinos with cancer seen at a tertiary hospital. Questionnaires were used to assess subjective sleep quality, pain score and quality of life. Factors affecting sleep quality were analyzed using univariate and multivariate statistics.

Results: Eighty percent of the 406 cancer patients studied were women and the mean age was 53 years old. Seventy-nine percent complained of poor sleep quality characterized by prolonged sleep latency and shortened sleep duration. Majority reported daytime dysfunction related to poor sleep. Presence of more advanced disease, moderate to severe pain and treatment with chemotherapy and/or radiotherapy were demonstrated to lead to poorer sleep. Surprisingly, even patients who were under surveillance (not receiving active therapy) reported sleep disturbances. In turn, poor sleep quality predicted worse quality of life among the study participants.

Implication: Sleep quality among Filipinos with cancer is significantly impaired compared to the general population. Disturbed sleep predicted poorer quality of life. Thus, there is a need to include assessment of sleep quality for a more holistic approach to cancer care.
Effects of Cognitive Behavioral Therapy for Insomnia and Vasomotor Symptoms in Menopausal Women

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Introduction: Between 30-60% of peri- and postmenopausal women in the United States suffer from insomnia symptoms. Menopausal women with nocturnal vasomotor symptoms (hot flashes) often report worse sleep quality and are more likely to meet criteria for insomnia disorder than those without nocturnal hot flashes. Thus, tailoring interventions to treat both insomnia and hot flashes may improve sleep and quality of life in millions of women. There is some preliminary evidence suggesting cognitive behavioral therapy for insomnia (CBT-I) is also effective in ameliorating depressive symptoms in the general population. This pilot study is the first to examine the effects of CBT-I on insomnia and depressive symptoms among midlife women.

Methods: Forty women (mean age= 55±6.2) self-described as peri- or post-menopausal who reported ≥ 1 nocturnal hot flash/night and met diagnostic criteria for insomnia disorder were randomized CBT-I or menopause education control (MEC). Participants were not excluded if they had a comorbid diagnosis of major depression. Based on structured clinical interview, four participants met DSM-5 criteria for present major depressive episode. CBT-I included four individual 50-minute sessions over eight weeks focused on the treatment of insomnia and hot flashes, delivered by social workers or psychologists in gynecology clinics. MEC included a 1-hour meeting to discuss menopausal symptoms and sleep hygiene; and provide educational pamphlets and a non-directive suggestion to “make any behavioral changes as desired.” Pre- and posttreatment measures included: Insomnia Severity Index (ISI), Center for Epidemiologic Studies Depression Scale (CES-D), Hamilton Depression Rating Scale (HDRS), and daily sleep diaries. Averages for sleep diaries were calculated for data collected between 5-30 nights before and after the intervention.

Results: Mixed models revealed a significant time x treatment arm interaction for insomnia severity (p=.003), sleep disturbance (p=.005), and sleep continuity (p = .01). There was a significant main effect for time for all domains (p’s <.01) and for treatment arm for insomnia severity (p=.007). Women receiving CBT-I had significantly greater decreases from pre to post treatment in ISI score (15 ± 4 to 4 ± 4) and sleep diary wake after sleep onset (WASO; 33 ± 21 to 9 ± 8 minutes) and significantly greater increases in sleep diary sleep efficiency (79% ± 14 to 91% ± 6) compared to women receiving MEC [pre to post treatment changes for MEC group: ISI score (16 ± 4 to 10 ± 5), WASO (33 ± 33 to 33 ± 39), sleep efficiency (82% ± 10 to 84% ± 9)]. Mixed models also revealed a significant time x treatment arm interaction for subjective complaint of depression (p=0.019) and objective rating of depression (p=0.01), and significant main effects for time (p’s < 0.001). Women receiving CBT-I had significantly greater reductions in depressive symptomology from pre to post treatment on the CES-D score (16 ± 9 to 8 ± 7) and HDRS score (11 ± 7 to 2 ± 3) compared to women receiving MEC [pre to post treatment changes for MEC group: CES-D score (15 ± 11 to 13 ± 9), HDRS score (9 ± 6 to 6 ± 4)].

Discussion: For midlife women experiencing insomnia and nocturnal hot flashes, a 4-session CBT intervention targeting both insomnia and hot flashes led to clinically meaningful improvements in sleep and depressive symptoms.

Support: National Institutes of Health Grant # K23NR014008 (PI: Nowakowski) and UTMB Clinical and Translational Science Award (UL1 TR001439). Registered trial on ClinicalTrials.gov (NCT02092844).
The association between chronotype, circadian-related sleep symptoms, and internalizing symptoms
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Background: Prior work suggests that circadian phase preference, or chronotype, is associated with sleep quality, as well as mental health outcomes. However, it is unclear how chronotype and circadian related sleep difficulties interact to influence internalizing symptoms.

Methods: Participants include 277 college students (Mean Age = 18.84±1.08; 66% female). Participants completed the Morningness-Eveningness Questionnaire (MEQ), SLEEP-50 questionnaire, the Beck Depression Inventory-II (BDI-II), and the State Trait Anxiety Inventory (STAI). Two linear multiple regression analyses were conducted to determine the relationship among chronotype (obtained from the MEQ), circadian rhythm symptoms (CRS; obtained from the SLEEP-50 questionnaire), and internalizing symptoms. Predictor variables: MEQ and CRS. Outcome variables: STAI, BDI. Multiple regression analyses controlled for sex, age, and body mass index.

Results: There was a significant interaction between CRS and MEQ in predicting depressive symptoms (b = .077, p = .003). A test of simple slopes revealed that among participants who reported low CRS, morning-type was associated with lower depressive symptoms (b = -.185, p = .005). There was also a significant interaction between CRS and MEQ in predicting anxious symptoms (b = .107, p = .011); however, a test of simple slopes revealed no significant slopes.

Discussion/Implications: Results suggest that college students with a later chronotype may demonstrate greater depressive symptoms compared to those with an earlier chronotype.

Keywords: chronotype, circadian symptoms, internalizing disorders
Differences between “good” sleepers and “bad” sleepers in a population of women undergoing treatment for breast and gynecologic cancer

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Introduction: Up to 60% of cancer survivors report sleep disruption. However, few studies investigate the differences between cancer patients who report low levels of insomnia symptomatology, and those with diagnosable levels of insomnia. We sought to characterize the differences between “good sleepers” and “bad sleepers” among a diverse set of women being seen for routine treatment and follow-up of breast and gynecologic cancer.

Methods: From July 2018-February 2019, all breast and gynecologic cancer patients at the Stanford Women’s Cancer Center were approached for the study (14% declined). Of those who consented, 255 patients (M=54, SD=12) completed an online survey related to their sleep (ISI), QOL (FACT-G), distress (PHQ4), supportive care needs (SCNS-SF34), and symptom severity (MDASI). Patients who scored <8 on ISI were categorized as “good sleepers”, patients with ISI >/= 8 were as “bad sleepers”.

Results: 119 (46.5%) of patients were “good sleepers”, 136 (53.1%) were “bad sleepers”. Age did not differ significantly between “good” and “bad sleepers”. ‘Good sleepers’ reported significantly higher QOL (p<.001), less distress (p<.001), and lower supportive care needs (p<.001). All subscales of supportive care needs including: psychological, health system & information, physical & daily living, patient care & support, and sexual needs were significantly lower for patients with low insomnia severity (all p <.05). “Good sleepers” also reported lower symptom severity for pain, fatigue, nausea, distress, shortness of breath, memory, lack of appetite, drowsiness, and sadness (all p<.05). There were no significant differences between “good” and “bad sleepers” and their symptom severity of dry mouth, vomiting, and numbness or tingling (all p>.05).

Conclusions: Cancer patients who reported low insomnia symptoms had better psychosocial outcomes as compared to those who reported higher insomnia. Further research is needed to characterize how sleep impacts health outcomes, and to determine causality of these findings.
Behavioral Sleep Medicine training in Australia: Audit of the APS Practice Certificate in Sleep Psychology

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Background: To address the need for behavioural sleep medicine skills in Australia, the Australian Psychological Society (APS) in collaboration with the Australian Sleep Association (ASA) developed an online behavioural sleep medicine training program for health professionals: the APS Practice Certificate in Sleep Psychology. The 4-module Practice Certificate was launched in 2013. The current study conducted an audit of the APS Practice Certificate in Sleep Psychology to establish the impact and relevance of the training.

Methods: Data on the number of participants who completed the training across the four modules and non-identifiable descriptive feedback data were analysed.

Results: From 2013 to 2018, 946 health professionals (98% psychologists) completed Module 1, 428 (99% psychologists) completed Module 2, 197 (97% psychologists) completed Module 3, and 137 (96% psychologists) completing Module 4. In total, 121 health professionals completed all four modules that form the Practice Certificate. Although data revealed positive feedback on the overall quality of the training, three themes were identified for consideration in the current revision of the training: too much repetition of content across modules; poor/ambiguous wording of practice and assessment questions; and more case studies and video demonstrations needed.

Discussion: The APS Practice Certificate in Sleep Psychology is the first online, behavioural sleep medicine training program for health professionals in Australia. To date, only 121 health professionals have successfully completed the Practice Certificate. There are currently 29,598 registered psychologists in Australia and the data highlights that more Australian psychologists need to be trained in behavioural sleep medicine.

Keywords: sleep; education; psychology training
The Association Between Sleep Quality and Impulsivity in Traumatic Brain Injury

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Introduction: Impulsivity is a common and debilitating consequence of traumatic brain injury (TBI). Poor sleep can exacerbate the ability to regulate emotions including the ability to inhibit impulses. Prior research has demonstrated that poor sleep quality predicts impulsivity in a forensic psychiatric population. The present study evaluated sleep quality as a predictor of impulsivity in TBI patients.

Methods: Participants include 33 individuals who completed baseline assessment in a study testing the efficacy of behavioral insomnia treatment in patients with mild to moderate TBI. The sample is predominantly female (70%), white (67%), at least a college degree (52%), and unemployed (58%). The mean age of the sample is 39.9 years ($SD = 12.7$ years). The Pittsburgh Sleep Quality Index (PSQI; $\mu=12.7$, $SD=3.2$) was used to assess sleep quality and the Barratt Impulsiveness Scale (BIS-11; $\mu=61.6$, $SD=10.8$) was used to assess self-rated impulsivity.

Results: Relevant demographic characteristics were not associated with the dependent variable. Linear regression analysis indicated that sleep quality ($b = 1.21, p < .05$) explained 13% of the variance in impulsivity ($F(1,31) = 4.61, p < .05$).

Conclusion: The results reveal that in this sample of mild to moderate TBI patients, poor sleep quality is associated with increased impulsivity. These results suggest that interventions designed to reduce sleep disturbance may help TBI patients regulate their behavior by decreasing impulsivity following injury.

Key Words: Sleep Quality, Impulsivity, Traumatic Brain Injury
Predictors of Adolescent Insulin: The Impact of Sleep Efficiency, Duration, and BMI on Insulin

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Introduction: Inadequate sleep is associated with increased cardio-metabolic risk. The relationship between decreased adolescent sleep duration and greater insulin resistance may contribute to this outcome. Sleep duration also relates to BMI, another important factor predicting cardio-metabolic health. Research exploring the impact of sleep duration and efficiency on insulin levels in adolescents is limited. Thus, this project aims to further evaluate the relationships between these variables, investigating the impact of BMI, sleep efficiency, and sleep duration on insulin levels in overweight adolescents.

Methods: Thirty-six overweight/obese adolescents with an average weekday sleep duration of less than 8-hours per day were recruited as part of a larger study. Actiwatches monitored sleep for an average of 7.69 weekdays and blood-draws assessed metabolic data including insulin levels.

Results: Insulin correlated with sleep efficiency ($r=-.343, p<.05$), BMI Z-score ($r=.365, p<.05$), and age ($r=-.323, p<.05$). Increased sleep efficiency and more advanced age related to lower insulin levels, while higher insulin levels were associated with greater BMI. Insulin levels were not significantly related to sleep duration. In a linear regression sleep efficiency, BMI Z-score, and age accounted for 17.5% of variance in insulin levels (Adj. $R^2=.175, F(3,32)=3.478, p<.05$), however, no variable reached independent significance.

Conclusion: Sleep efficiency better predicts insulin levels than sleep duration. This could suggest that metabolic rates change as sleep quality decreases. Interventions focusing on sleep efficiency over duration may help lower insulin levels. More research is needed to further assess the relationships between BMI, sleep duration, sleep efficiency, and cardio-metabolic risk.

Key Words: adolescents, sleep, insulin
**The Effects of Resilience and Race/Ethnicity on Sleep Disturbance among American Females with Hypertension**

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Background: The protective effect of psychological resilience against stress has been extensively studied. However, there remains a paucity of data on which sub-populations benefit most from the buffering effects of resilience against sleep disturbance, specifically among at-risk older females. This study examined the relationships between resilience and sleep disturbance in a diverse sample of older women with a history of hypertension and whether this relationship is moderated by individuals’ race/ethnicity and their place of birth.

Methods: Sample includes 700 females from a community-based study in Brooklyn, New York with a mean age of 60.7 years (SD=6.52). Of the participants, 28.1% were born in the U.S.; 71% were black, 17.4% where white and 11.6% were Hispanics. Data were gathered on demographics and sleep disturbance (five items that reflect the most frequent insomnia symptoms), using the Comprehensive Assessment and Referral Evaluation (CARE) and the Stress Index Scale (SIS). A linear composite score was created with the Index of Self-Regulation of Emotion (ISE) and 14 religious health beliefs items to measure resilience. Higher scores indicated greater resilience. Student t-tests and multilinear regression analysis were conducted to explore associations between resilience and sleep disturbance. Interaction effects between resilience and potential moderators (race/ethnicity and place of birth) were conducted to examine which populations benefitted most from the buffering effects of resilience.

Results: As hypothesized, resilience was an independent predictor of sleep disturbance \( \beta = -118(SE=.004); p< 0.001 \). Resilience accounted for a significant amount of variance in sleep disturbance (R2 change=0.27; p<.001) even after adjustment for race/ethnicity, age, place of birth, household income, and BMI. The association between resilience and sleep disturbance was stronger among black women compared with Hispanic \( B(SE)=0.028(0.011); p=.011 \) and white women \( B(SE)=0.020(0.009);p<.05 \). Place of birth did not significantly moderate the association between resilience and sleep disturbance \( B(SE)=0.01 (0.01); p=.077 \).

Conclusions: Results of our study suggest that resilience might be a more important protective factor for sleep disturbance among older black women relative to older white or Hispanic women. Additional research is required to examine how race/ethnicity and resilience may influence treatment of sleep disturbance.

**KEYWORD:** Resilience, Sleep, Women’s health, Race/Ethnicity.

Support: This study was supported by funding from the NIH (T32HL129953).
GMATI – An Individualized Guided Mindfulness Meditation Treatment for Insomnia
William Moorcroft, PhD, Catherine Polan Orzech M.A. LMFT

Background: CBTI is the standard behavioral treatment for insomnia but it does not work for everyone. Ong and others have developed an alternative mindfulness-based treatment for insomnia done in groups. However, many practitioners and clients do insomnia treatment on an individual basis rather than in groups.

Methods: Over the last decade a four session mindfulness treatment for insomnia for administration on an individual basis called GMATI has been developed and clinically tested.

Results: Clinical observations and client feedback show GMATI to be very successful.

Discussion/Implications: GMATI works well when anxiety (generalized or specific to insomnia) is the major contributor to an individual’s insomnia or when the client is unaware of causes of their insomnia (e.g., active mind, can’t relax, etc.) that fit well with the treatment components of CBTI.

Disclosure: Moorcroft & Orzech have a book in press about GMATI.
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CPAP Desensitization for Veterans: Results of a Pilot Treatment Group

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Past research has estimated that up to 65% of military veterans discontinue attempts to adhere to CPAP treatment after first diagnosis (El-Solh et al., 2010). Hyperarousal responses have been identified as a major barrier toward regular use, with up to 49% of veterans reporting unwillingness to use their CPAP due to a “claustrophic” reaction (Weaver et al., 2003).

The present proposal overviews a CPAP desensitization behavioral health group created for veterans with co-morbid PTSD or GAD who are not adherent to CPAP due to the aforementioned hyperarousal response. The desensitization protocol utilized graded exposure and relaxation training as the core foundation of the treatment, as well cognitive restructuring, problem solving, and psychoeducation on healthy sleep behaviors.

Results from pilot data collected from two completed groups (n = 8) showed statistically significant pre to post reductions in measures of sleepiness and symptoms of depression and PTSD. The pilot treatment also indicated significant increases in positive beliefs and attitudes related to sleep apnea and use of CPAP. Further, of the 8 veterans who completed the protocol, 6 advanced to final step of a personalized graded exposure plan with 4 succeeding to full adherence of CPAP by end of the 6-week group. All 4 reported continued consistent use of CPAP at 3-month follow-up.

Additional outcome measures will also be shared in this poster session, along with discussion of implications and recommendations for broader implementation of this programming.
Comparison of the sleepiness curve of men with Attention Deficit Hyperactivity Disorder (ADHD) to that of men without ADHD

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Background: Several lines of investigation suggest that ADHD may be associated with excessive sleepiness in general, and under conditions of insufficient sleep in particular. Thus, in the current study the levels of sleepiness throughout the day of young men diagnosed with ADHD was compared to that of young men without ADHD along 25 hours of sustained wakefulness.

Methods: Thirty young men with (n= 14) or without (n= 16) ADHD enrolled in this study. The participants were instructed to sleep at least 6 hours/night along the 5 days prior to the experimental session, with their sleep being monitored via actigraph. During the experimental session, participants remained continuously awake in a controlled environment for 25 hours (8 a.m.–9 p.m.) and their level of sleepiness was assessed every hour using the Karolinska Sleepiness Scale (KSS).

Results: Actigraphy data demonstrated that the sleep duration, sleep latency and sleep efficiency of the participants with ADHD was similar to that of participants without ADHD. Nevertheless, during the experimental session the ADHD group demonstrated higher sleepiness scores, particularly during the night and the subsequent morning. Moreover, on the morning following sleep deprivation the proportion of participants reporting extreme levels of sleepiness was significantly higher in the ADHD group compared to the control group.

Discussion/implications: Among young men, ADHD is associated with higher levels of sleepiness in general, and following sleep deprivation in particular. Given the deleterious effects of excessive sleepiness over cognition and safe driving, these results may have significant clinical implications.

Key words: ADHD; sleepiness; KSS
Effects of CBT-I and CBT-P on Sleep and Opioid Medication Usage in Adults with Fibromyalgia and Insomnia

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Introduction: Sleep and opioid medications used to treat insomnia and chronic pain are associated with adverse side effects (increased falls, cognitive disturbance). Although behavioral treatments such as Cognitive Behavioral Therapy for insomnia (CBT-I) and pain (CBT-P) improve sleep and clinical pain, their effects on sleep and opioid medication use are unclear. We investigated whether CBT-I and CBT-P reduced reliance on sleep/opioid medication in patients with fibromyalgia and insomnia (FMI).

Methods: Patients with FMI (N=113, Mₐge=53.0, SD=10.9) completed eight-week CBT-I (n=39), CBT-P (n=37) or waitlist control (WLC; n=37). Participants completed 14 daily diaries at baseline/post-treatment/6-month follow-up, assessing sleep/opioid medication usage. Dosages were converted to lowest recommended daily dosage (e.g., codeine: 15mg=1; 30mg=2). Multilevel modeling examined treatment group by time effects on dosage/days of medication use.

Results: Significant treatment group by time interaction revealed CBT-P reduced sleep medication days at post-treatment (M=6.71, SEM=1.1) relative to baseline (M=9.1, SEM=1.0), but usage returned to baseline values at follow-up. There were no other significant within- or between-group effects.

Conclusions: In FMI, CBT-P led to immediate reductions in sleep medication usage, despite lack of explicit content regarding tapering off of sleep medication. We speculate that the pain-specific treatment components of CBT-P led to immediate improvements in sleep/pain, which in turn reduced sleep medication reliance. CBT-I and CBT-P may be ineffective as standalone treatments for altering opioid use in FMI. Future work should explore use of CBT as an adjunct to other behavioral techniques for opioid reduction.

Keywords: opioids, chronic pain, insomnia
Although sleep is fundamental to general health, the American lifestyle and societal schedule are not consistent with healthy sleep patterns. Unfortunately, racial/ethnic minorities are the most affected by the sleep health crisis, which, for Blacks echoes of the historical context of the birth of America. Sleep medicine experts, specialists, practitioners, representatives and policymakers have an ethical responsibility to help to eliminate sleep health inequities.

Although recent data demonstrated that in general there was improvement in sleep health parameters in both privileged groups and disadvantaged ones, there is still a lot to be accomplished in order to eliminate health disparities. Youth and adults from disadvantaged communities would benefit if sleep medicine emphasizes the definition of sleep health dimensions and encourages the changes in practice they embody, in addition to identifying and treating sleep disorders. The positive aspect of sleep health as defined by Byusse (2014), and the ideal of equity in health comprise the anchors for our proposed definition of sleep health equity, and its associated conceptual framework toward the elimination of sleep health inequities.

Keywords: Sleep health – Sleep disparities – Historical context – Sleep health Equity.
A Mobile Tailored App for Sleep Problems in Older Adults: Preliminary Findings

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Background: Sleep disturbances are common in individuals with chronic health conditions. In a multi-component intervention, we included a psychoeducational module on sleep. We will present preliminary results from an ongoing study of this intervention.

Methods: Participants complete a battery of self-report measures including the Pittsburgh Sleep Quality Index (PSQI) and SF-36 before and after the intervention. They completed the Insomnia Severity Index at baseline, and information in the module was tailored to their responses. After the intervention, participants provided ratings of the module’s personal relevance, its usefulness, and its usability and completed a semi-structured interview.

Results: Data were from the first 53 participants (26 men, 27 women; mean age = 59.0 years; 6 whites, 47 blacks). Consistent with other studies of sleep in persons with chronic health conditions, participants reported substantial sleep difficulties (IPSQI mean = 6.6). Participants rated the intervention as personally relevant (mean rating = 3.9 on a 1-5 scale) and both useful and usable. Their PSQI scores were modestly lower at follow-up (6.6 vs. 6.0) but this difference was not significant. The General Health scale of the SF-36 was increased (65 to 68), a difference that approached significance ($p = 0.051$). Participants’ comments have been positive about the intervention, with some citing behavior changes made after completing it.

Conclusions: A brief educational intervention tailored to sleep problems in older persons with chronic conditions may be useful in improving their sleep quality and quality of life.
Background: Primary Care (PC) is the most common venue for the presentation and treatment of insomnia. Medications or sleep hygiene strategies are often the interventions offered versus gold standard behavioral approaches. To increase likelihood that PC patients have access to recommended treatments, the Army rolled out a Brief Behavioral Treatment for Insomnia (BBTI) training to all behavioral health providers embedded in PC, called Behavioral Health Consultants (BHCs).

Methods: We developed a 1.5 day online training workshop followed by 12 weekly consultation calls and evaluated the first training cycle. Anonymous online program evaluation surveys were collected pre-workshop, post-workshop, and post-consultation (N=24).

Results: BHCs rated the workshop as clear/organized and consultation as helpful to implementation of BBTI (4.00 and 3.50, respectively, 1-4 point scale). All implemented BBTI and 67% completed the protocol at least once during consultation. To gauge objective implementation, we noted the number of BHC patient encounters with insomnia coded as primary diagnosis increased 94.7% from the quarter before training cycle to the quarter after.

Discussion/Implications: The BBTI training cycle developed in this project was acceptable and resulted in both self-reported implementation of the protocol itself and potentially increased the number of patients seen for sleep problems in general. BBTI represents an initial approach to insomnia treatment from the stepped care model perspective, where patients presenting to PC can receive accessible interventions known to be effective, e.g. stimulus control and sleep restriction. This model of training and patient care may be adapted to non-military settings to address insomnia related patient concerns.

Keywords: insomnia, behavior therapy, training
Objective Sleep and Affective Predictors of Sleep Quality Ratings in Healthy Children
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Background: Sleep quality is inferred from various objective and/or subjective sleep parameters. However, specific sleep-based predictors of sleep quality during childhood are relatively unknown as this body of research has generally ignored children. We examined objective sleep patterns and sleep architecture as predictors of perceived sleep quality in pre-pubertal children, including whether the presence of depressive and anxiety symptoms moderated potential relationships.

Methods: 52 pre-pubertal children (ages 7-11) and a parent participated in the present study. Self-reported questionnaires collected from caregivers and children assessed mental health symptoms and perceived sleep problems. Children underwent one night of ambulatory PSG with concurrent actigraphy, and completed a self-report measure assessing sleep quality the next morning.

Results: Partial correlations revealed non-significant associations between various objective sleep variables (based on actigraphy and PSG) and subjective sleep quality. Regression analyses revealed greater %REM sleep to predict greater child-reported difficulty waking in the morning, $\beta=.30, 95\%CI [.02,.29]$. A significant interaction between anxiety symptoms and %REM sleep was also found, such that greater %REM was predictive of greater difficulty waking only among children with higher levels of anxiety.

Discussion: No objective sleep variables were associated with sleep quality, though a greater %REM sleep predicted greater difficulty waking in the morning among youth with higher anxiety. Anxious youth may experience more disruptions in slow-wave sleep resulting higher %REM sleep and greater sleep inertia. Various limitations and future directions will be discussed.

Key Words: Sleep quality, children
Associations between pain reduction and cognitive improvement in older adults following Brief Behavioral treatment for Insomnia

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Background: Although cognition and pain are associated, the degree to which pain reduction depends on BBTi-related changes in cognition is unknown. We examined whether cognitive changes following BBTi are associated with reductions in clinical pain.

Methods: Forty-two older adults (Mage=70.0, SD=7.6) with insomnia completed 4-session BBTi (n=21) or self-monitoring control (SMC, n=21). For two weeks at baseline/post-treatment/3-month follow-up (FU), participants completed daily workbooks measuring reasoning (letter series), attention/processing speed (symbol digit modality task, SDMT), and pain intensity ratings. Multiple regressions determined whether cognitive change at post-treatment or FU (mean difference from baseline) independently predicted or interacted with treatment group to predict pain changes at post-treatment/FU.

Results: SDMT improvement interacted with treatment to predict FU pain reduction (B=.08±.03, p=.02, R2=10%). Specifically, SDMT FU improvement predicted greater pain reduction for BBTi (B=.08±.2, p<.001), not SMC (B=.005±.03, p=.87). There were no associations between other predictors and pain changes. Exploratory analyses examining moderating effects of diary-reported sleep (sleep efficiency, SE; total sleep time, TST; time awake after sleep onset) in BBTi revealed that SE (B=.004±.02, p=.047, R=9%) and TST (B=.001±.003, p=.01, R=14%) interacted with SDMT to predict FU pain reduction. SDMT improvement predicted pain reduction consistently at all SE improvement levels. SDMT improvement predicted pain reduction in individuals with small-moderate but not large TST changes.

Discussion: Cognition-pain associations related to sleep improvement in older adults may only be observed at longer follow-ups. Behavioral interventions aimed at improving sleep (particularly through SE/TST improvement) may target attention and processing speed, and associated reductions in pain intensity.

Keywords: pain, behavioral treatment for insomnia, cognition
Treatment Engagement in Veterans Completing Group Intake in a U.S. Veterans Health Administration Behavioral Sleep Medicine (BSM) Clinic
Melanie K. Leggett, Natasha DePesa, Christi Ulmer, Cindy Swinkels

Background: BSM services are in high demand for Veteran populations. In order to reduce BSM clinic wait times within the Durham VA Health Care System, we developed a group intake process. Presented here are preliminary findings examining the impact of this group intake process on treatment engagement within the BSM clinic.


Results: There was no significant difference in the percentage of Veterans recommended for BSM treatment between those attending GRP (59.5%) versus IND (69.4%) intakes. Similarly, the proportion of Veterans accepting treatment did not differ by type of intake (GRP: 94.4% vs. IND: 79.2%). However, Veterans attending GRP intakes waited significantly longer for their first treatment session (GRP: M [SD] = 103.8 [74.7] days vs. IND: 59.9 [38.9] days, $p = .04$). Average number of treatment sessions attended were similar in both groups (GRP = 3.6; IND = 3.9), as was the percent of Veterans completing at least 75% of treatment sessions (GRP = 47%; IND = 42%).

Discussion/Implications: Implementation of a group intake process, although associated with a longer wait for treatment, did not adversely impact treatment initiation and engagement in Veterans treated at a VA BSM clinic.

KEY WORDS: Veterans, Program Evaluation, Treatment Engagement
Graduate psychology training in sleep, sleep disorders and chronobiology in Australia

Background
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Comorbid sleep disturbances and mental health conditions are commonly seen in clinical practice by psychologists, with this complex bidirectional relationship impacting treatment. Yet graduate psychology programs in the U.S. offer minimal training in assessment and management of sleep disturbances. This study examined the current level of education and training on sleep, sleep disorders and chronobiology delivered to graduate psychology students in Australia.

Methods: Program coordinators of graduate psychology programs (Masters/Doctoral) completed a brief online survey about the sleep, sleep disorders and chronobiology education and training delivered in their program.

Results: Seventy percent (34/48) of graduate psychology programs completed the survey. No programs offered a formal course in sleep, and 12% provided no training in sleep, sleep disorders or chronobiology. The average amount of didactic education in sleep provided was 2.4 hours (SD ±2.3; Range 0-9). Program coordinators estimated that 58% (SD ± 31; Range 5–100%) of students would see a client experiencing a sleep disturbance on clinical placement. The top three barriers identified to increasing the amount of sleep education in programs were 1) Lack of time in curriculum (73%); 2) lack of direct Australian Psychology Accreditation Council requirements (39%); 3) lack of expertise of faculty (24%). The majority of programs (75%) were open to implementing a standardised curriculum in sleep psychology.

Discussion: Australian graduate psychology programs offer limited training in sleep, sleep disorders and chronobiology. Collaborations between the sleep and psychology fields are needed to increase the level of sleep education delivered to trainee psychologists.

Keywords: sleep; education; psychology training
Insomnia and depressive symptoms in people living with HIV and chronic pain

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Objective: Chronic pain is increasingly recognized as a common and disabling problem for people living with HIV (PLWH). Chronic pain can contribute to significant health burden, and it frequently co-occurs with depressive symptoms and insomnia. At present it is unclear whether chronic pain and accompanying depressive symptoms might intensify sleep disorders such as insomnia for PLWH. Therefore, the objective of this study was to examine associations among chronic pain, depressive symptoms, and insomnia in PLWH. We hypothesized that 1) PLWH and chronic pain would report greater insomnia severity and depressive symptoms compared to PLWH without chronic pain, and 2) greater pain severity and depressive symptoms would be associated with greater insomnia severity in PLWH and chronic pain.

Methods: We conducted a cross-sectional study of PLWH recruited from an HIV clinic in the Southeastern United States. Chronic pain was defined as pain that has been present for at least three consecutive months, and that has been an ongoing problem for at least half the days in the past six months. A total of 121 PLWH were enrolled into the study; 85 with chronic pain and 36 without chronic pain. All participants provided sociodemographic data prior to completing the following validated measures: Brief Pain Inventory – Short Form, the Insomnia Severity Index, and the Center for Epidemiological Studies – Depression Scale. Blood was drawn at the beginning of the study to determine CD4 and viral load. Medical records were reviewed to confirm ART usage, as well as to obtain medical history and medication use.

Results: Across the entire sample, median age was 48 years (IQR 41 to 54); 69% were men, 26% women, and 5% transgender; and 77% were African-American, 17% Caucasian, and 6% multiracial. The median CD4+ count was 621 (IQR 407 to 816), 12% had a detectable viral load (> 200 copies/mL), and 98% were prescribed antiretroviral therapy. None of these sociodemographic or clinical data significantly differed between PLWH and chronic pain and PLWH without chronic pain. Among PLWH and chronic pain, the most frequently reported location of chronic pain was low back/hips (46%), legs/feet (25%), widespread (2+ sites) (20%), arms/hands (6%), head (2%), and neck/shoulders (1%). In an adjusted model controlling for trait anxiety in addition to opioid, anti-depressant, efavirenz, and sleep medication use, results revealed significantly greater insomnia severity for PLWH and chronic pain compared to PLWH without chronic pain (p = .043). Depressive symptoms did not significantly differ between these two groups (p = .091). Among PLWH and chronic pain, greater insomnia severity was significantly associated with greater pain severity (p = .009) and greater depressive symptoms (p < .001).

Discussion: Previous literature has suggested that up to 70% of PLWH experience sleep disorders including insomnia. Results of this study suggest that PLWH and chronic pain may be particularly vulnerable to experiencing insomnia, with pain severity and depressive symptoms key contributors. Evidence-based behavioral pain management interventions that also address sleep and mood are desperately needed for PLWH.
Sleepy adults report less positive reactions to video clips that elicit mixed emotions: A pilot study

Jared Minkel, PhD; Zoe Mushkat, MA; Sue Adams, PhD

Background: Sleep disturbance is pervasive throughout psychiatric disorders (Benca et al, 1992) and may play a causal role in their development and maintenance. Experiments have shown that disrupting sleep impacts subjective emotion, but the impact on positive and negative emotions have been studied separately using independent stimuli (Walker et al, 2009). This pilot study was designed to test the effects of sleep disturbance on “mixed” emotional stimuli that simultaneously elicit positive and negative emotions (e.g., a bride passing out at her wedding).

Methods: Short video clips were selected from a validated database of mixed emotion clips (Somson et al, 2016). Following each clip, participants reported their emotional responses on unipolar scales for positive and negative emotion as well as their subjective sleepiness. Nonparametric correlations were used to test the hypothesis that sleepiness would be more strongly related to positive than to negative emotional reactions.

Results: Participants (N=38 young adults) demonstrated less positive reactions to mixed stimuli as sleepiness increased (r_s = -0.39, p = .02). There was no relationship between sleepiness and negative reactivity to the same stimuli (r_s = -0.002, p > 0.99). The difference between these two correlations trended toward significance (z = -1.43, p-value = 0.08).

Discussion/Implications: This pilot study suggests that sleep disturbance may elevate risk for mood disorders by uniquely reducing positive emotional responses to complex stimuli. Sleep was not experimentally manipulated in this study and the sample size was small, but the use of mixed emotional stimuli in sleep research is promising.

Key words: sleepiness, emotion, depression
Examining Smartphone Treatment for Nightmare Distress and Suicide Risk Reduction

Katrina Speed, PhD; Michael Nadorff, PhD; Melanie Stearns, MS

Nightmares are prevalent, have been tied to a myriad of adverse mental health outcomes, are known to exacerbate other medical/mental health symptoms, and persist even after treatment often. Although many treatments exist for nightmares, only Imagery Rehearsal Therapy has continuously been cited as first line treatment (Morgenthaler et al., 2018). Mobile health (mHealth) has emerged as a viable avenue for exploration in the mental health field as technological advances are becoming commonplace in integration of clinical practice to increase accessibility. Using mobile modalities may present a feasible way to provide sleep interventions, but this has yet to be fully explored.

This project assessed a previously untested mobile application (Dream EZ) released by the National Center for Telehealth and Technology based on Imagery Rehearsal Therapy. The purpose of this project was to explore the effectiveness of smartphone-based mHealth application treatment (Dream EZ) in reduction of psychological symptoms as compared to waitlist control.

Findings from the study support use of mHealth nightmare treatment for nightmares distress reduction (main effect: $p = .010, d = .53$; interaction: $p = .145, d = .30$), but were inconclusive in relation to reduction of suicidality (main effect: $p = .007, d = .57$; interaction: $p = .758, d = .07$). Although some hypotheses were underpowered, the strength of this study laid in its use of a randomized control trial design and its timely look at viability of technology use in clinical treatment. Future directions include replication within a clinical population and in various settings such as primary care clinics.

Keywords: nightmares, treatment, technology
Physical activity and sleep in multiple sclerosis: A systematic review of observational and intervention studies

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Objectives: To evaluate and synthesize studies on the (1) relationship between physical activity and sleep, and (2) effects of physical activity interventions on sleep, for individuals with multiple sclerosis (MS).

Data Sources: Four databases (PubMed, Embase, CINAHL, and Cochrane) were searched for studies published through February 2019, using the following keywords, indexed terms, and their variants: “multiple sclerosis,” “sleep,” and “physical activity”.

Study Selection. Two reviewers screened 320 articles. Studies were required to be original research, written in English, and include an MS sample. Observational studies were required to report correlations between physical activity and sleep. Intervention studies were required to report pre-post or between-group differences in sleep. Seven articles (2.2%) met criteria for inclusion.

Data Extraction: Four observational (N=1,311) and three intervention (N=123) studies underwent data extraction and quality assessment by two reviewers (91% agreement). Data included sample characteristics (e.g., N, gender, MS subtypes), intervention characteristics (e.g., type/number/duration of physical activity), measures (e.g., actigraphy), and effect sizes (Pearson’s r or Cohen’s d). Study quality was assessed using the NIH Quality Assessment Tool.

Data Synthesis: Study quality ranged from poor (4 studies) to fair (3 studies). Weak to moderate correlations were observed between physical activity and sleep (rs from .02 to .40). Moderate to strong effects were observed for physical activity interventions on sleep outcomes (ds from .42 to 2.50).

Conclusions: Physical activity interventions show modest potential for improving sleep in individuals with MS. Future studies with greater methodological rigor (e.g., blinding, reliable/valid measures) are needed to inform clinical recommendations.

Registration number. Prospero CRD42019130014.

Key Words. multiple sclerosis; exercise; sleep
Prevalence and Impact of Adverse Childhood Experiences (ACEs) On Outcomes of Stress Management Training (SMT) for Medical Patients

Jaan Reitav, PhD

Background: Adverse Childhood Experiences (ACEs) have substantial impact on physical and mental health problems into adulthood. This study investigated the impact of ACEs on daytime and nighttime symptoms of hyperarousal present in Cardiac Rehab (CR) patients attending SMT. We investigated whether ACEs impacted: 1) the levels of stress symptoms patients reported on starting SMT, 2) response to treatment, and 3) retention of benefits at follow-up.

Methods: 287 participants at the Toronto Rehabilitation Institute enrolled in a seven week SMT program. All participants completed a survey of eight ACEs experienced before age 18, as well as current symptoms of anxiety (BAI), psychological distress (K6), depression (CES-D), and nighttime symptoms of insomnia (ISI). Data was collected before SMT (T1), after seven weeks of SMT (T2), and at two-month follow-up (T3).

Results: 44% of patients reported no ACEs, 40% 1-2 ACEs and 16% 3+ ACEs. ACE scores predicted insomnia scores, with the ACEs groups reporting more insomnia than No ACEs. All patients benefited equally from SMT with reductions in ISI scores. However, at 2-month follow-up those with many ACEs began regressing, while others maintained or continued to improve.

Discussion: Events impacting autonomic dysregulation early in life impact 24-hour hyperarousal, including vulnerability for sleep disturbances, even 50 years later. While SMT was effective in reducing sleep and daytime symptoms for all patients, the group with more ACEs began regressing after standard SMT. CBTi, which targets improving sleep patterns by better modulating sleep-wake rhythms, could improve outcomes of SMT protocols which only target daytime symptoms.
Insomnia and Sleep Apnea Attenuate Benefits of Stress Management Training (SMT) in Reducing Hyperarousal for Cardiovascular Patients

Jaan Reitav, PhD

Background: Stress management training (SMT) is a component of medical rehab that aims to teach patients skills to reduce hyperarousal. Sleep Disorders (SDs) all involve autonomic dysregulation, but SMT programs do not consider impact of sleep on SMT outcomes. This study evaluated whether SDs are common among patients enrolling in SMT, and how SDs impact baseline measures of daytime stress and treatment outcomes.

Methods: 124 cardiac patients completed self-report measures of anxiety (BAI), psychological distress (K6), and depression (CES-D) before and after seven-weeks of SMT. SDs were evaluated with the Sleep Assessment Questionnaire (SAQ), which identifies ID, OSA, Excessive Daytime Sleepiness, Non-Restorative Sleep, Restlessness, and Sleep Schedule Disorder.

Results: 85% of patients enrolling in SMT had clinically elevated Global SAQ scores, and 41% had severe sleep disturbances. Individuals with SDs had significantly higher baseline levels of anxiety, psychological distress, and depression than those without SDs. Patients meeting criteria for Risk of Apnea did not benefit from SMT. Patients meeting criteria for Insomnia and Restlessness achieved lower anxiety and depression, but not psychological distress.

Discussion: Most medical patients attending SMT had significant underlying SDs. The presence of SDs is not being assessed in SMT studies, but is clearly related to higher levels of all daytime symptoms of hyperarousal at baseline. Outcomes of SMT treatment are negatively impacted by OSA and Insomnia. Routine screening for OSA for patients enrolling in SMT is highly recommended. Finally, integrating CBTi into standard SMT protocols may improve outcomes of SMT by targeting nighttime and daytime hyperarousal.
The Impact of Weekend Medication Holidays on Sleep for Children with ADHD

Brandi M. Walker, PhD

Background: Worldwide, 6-8% of children are diagnosed with ADHD and nearly 70% of their parents report they endure moderate to severe sleep problems. This study focused on how medication scheduling affects the sleep of ADHD children, ages 6-11. Sleep parameters studied included bedtime onset latency (BOL), perceived sleep onset latency (PSOL), whole routine (WR), total sleep time (TST), sleep obstacles (SO), sleep disturbances (SD), and morning irritability (MI). Three groups were differentiated by frequency of ADHD medication [i.e., continuously medicated (CM) everyday (n=34), partially-medicated (PM) (n=20) only Monday-Friday, and no medication (UN) (n=8)], and compared to a Non-ADHD control group (n=52). This poster focuses on the 20 PM children.

Methods: Data collection occurs online (via Qualtrics secured site) in two phases. Phase 1 consists of parents completing a consent form and (4) questionnaires (20-25 minute administration). Phase 2 requires parents to track their child’s sleep for (4) days (Saturday-Tuesday) via our online sleep diary.

Results: We found no significant improvements in sleep quality or quantity when parents chose not to medicate on the weekends. PM children actually had significantly more sleep problems across several sleep-related variables under study (BOL, PSOL, WR, TST, SO, SD, and MI/MT) than continuously medicated children and the control group, potentially attributable to irregularity in brain chemistry.

Conclusion: PM children, continuously restarting and stopping stimulant medication, may actually be at risk for more contextual and behavioral sleep problems than other ADHD children.