SLEEP AND NEUROCOGNITION IN ADOLESCENTS WITH ADHD: A POLYSOMNOGRAPHIC STUDY

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Introduction: Sleep disturbances are common among adolescents with ADHD; however, few studies have characterized the nature of ADHD-related sleep problems using the gold-standard sleep measure, polysomnography (PSG), in adolescence. Additionally, although similar cognitive deficits are common across ADHD and sleep-disordered populations, the potential role of sleep in contributing to cognitive impairment in adolescent ADHD is unknown. This study investigates differences in PSG-measured sleep among adolescents with ADHD versus healthy controls without psychiatric disorders (HC) and associations with cognition.

Methods: Sixty-two adolescents aged 13-17 (31 ADHD, mean age=15.3, 50% female) completed a psychiatric evaluation and 3 nights of ambulatory PSG. Following the third night, participants completed the Cambridge Neuropsychological Test Automated Battery (CANTAB). Sleep variables were averaged over 3 nights. Linear regressions controlling for age and sex examined group differences in a range of traditional PSG and spectral EEG indices as well as relationships between PSG/spectral indices and cognition (two summary scores derived from CANTAB: response accuracy and response time) within the ADHD group.

Results: Adolescents with ADHD displayed reduced SWS% (F(3,51)=9.67, p=.003), increased N2% (F(3,51)=10.35, p=.002), increased relative sigma (F(3,47)=6.55, p=.01) and beta (F(3,47)=4.10, p=.05) power, and a trend toward reduced relative delta power (F(3,47)=2.95, p=.09) compared to HC. Within the ADHD group, greater REM% (r=.43), reduced N2% (r=-.55), greater relative delta power (r=.52), higher delta power peak (r=-.56), steeper delta decline overnight (r=-.56), and reduced relative theta (r=-.53), beta (r=-.74), and gamma (r=-.67) power were associated with better response accuracy (p≤.05). Greater relative delta (r=-.51), and reduced relative theta (r=.55) and beta (r=.63), power were associated with faster response times.

Conclusion: Although adolescents with ADHD did not differ from HC on traditional PSG measures (TST, WASO), they exhibited abnormalities in sleep stage distribution and non-REM EEG frequency spectral indices, including reduced SWS and low frequency power and increased stage 2 sleep and high frequency power overnight. Notably, similar parameters were associated with impaired cognition, suggesting sleep may contribute to cognitive deficits in ADHD. Future studies may clarify whether sleep plays a causal role in cognitive impairments in adolescent ADHD and if sleep treatments result in improved cognition in this population.

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INCREASED ADHERENCE TO LIGHT THERAPY AND PSYCHOSOCIAL OUTCOMES IN ADOLESCENTS AND YOUNG ADULTS WITH CANCER

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Introduction: Adolescent/young adult (AYA) oncology patients consistently report fatigue as one of the most distressing symptoms during treatment. Bright white light (BWL) has been demonstrated to improve the symptoms of cancer-related fatigue in adults, and our prior research demonstrated feasibility, acceptability, and preliminary efficacy of BWL in AYA with cancer. As part of the trial examining the feasibility and acceptability of BWL in AYA, we explored whether adherence affected patient outcomes in the BWL group.

Methods: Twenty-seven participants were randomized to receive BWL using LiteBook® (retrofitted with adherence monitors) for 30 minutes upon waking daily for eight weeks. Study team members met with patients weekly for the duration of the intervention to download adherence data from the monitors, administer questionnaires, and discuss barriers to adherence if necessary. Participants completed mood, quality of life, and fatigue measures at every other research visit (5 times over the duration of the study).

Results: Adherence was characterized by total number of days that participants used the light device while on study. Multivariate regression was used to examine the predictive relationship between adherence and patient outcomes. Adherence significantly predicted parent-reported physical functioning [β=1.45, p= 0.0079], emotional functioning [β=0.87, p=0.0137], and total health-related quality of life [β= 0.76, p= 0.0218]. Adherence did not predict any of the self-reported patient outcomes.

Conclusion: BWL is a promising treatment to improve cancer-related fatigue in AYA, and adherence is essential to treatment success. Although adherence did not predict any participant self-reported outcomes, participants with better adherence had improved parent-reported emotional and physical functioning and overall quality of life. Individually tailored interventions, including sleep hygiene psychoeducation and motivational interviewing, may be used to increase adherence to light therapy to improve patient outcomes. Measures to monitor and foster adherence should be included in future light therapy trials.

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SLEEP PATTERN CHANGES TWO YEARS AFTER PARTICIPATING IN THE MAKOS SLEEP STUDY: THE EFFECT OF EXTENDING TOTAL SLEEP TIME AND WEIGHTED BLANKETS ON TEENAGE SWIMMERS PERFORMANCE

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Introduction: The initial Makos study was conducted in 2019, studying the effect of extending total sleep time and the use of weighted blankets (ETST+WB) on teenage swimmers’ performance. In it, we found a significant improvement of 100-free style race time in teenage swimmers after ETST+WB. The aim of the
Parents from the Phoenix metropolitan area with a...  

**Methods**: Using an open-label prospective approach, the study investigated swimmer’s event time changes, total sleep time, day-time sleepiness, and other sleep measures after 2 years of the initial changes during the first study. 8 healthy swimmers on the Makos swim team filled follow-up questionnaires and participated in a 100-yard freestyle race. Descriptive statistics, frequency distributions, and correlation using SPSS 14.

**Results**: Eight (6F; 2M) of the initial nine seasonal teen swimmers participated (age 13-17). Four swimmers reported headaches and one reported sore throat in the morning. Three (37.5%) reported feeling sleepy during the day and 3 reported falling asleep when riding in a car. Two reported leg movements during the night. In two years after the initial study, 100-free race time significantly improved (65.01±5.38 vs 59.32±5.43 *p=0.003), but the positive effect of ETST+WB on recorded sleep time was lost and returned to baseline. There was a clear trend, but no significant difference in total sleep time among the 3 groups: (initial 8:45±0:32; after ETST+WB 9:17±0:32; after 2 years 8:08±0:30).

**Conclusion**: The improvement of total sleep time with weighted blankets and encouragement during the initial study correlated with improvement of 100 free race time in seasonal teen swimmers. This improvement in total sleep time was lost and returned back to baseline after 2 years follow up.

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**0502**  

**HARMONY IN THE SLEEP LAB: A FOCUS ON RECOGNITION OF HYPOVENTILATION AND DIRECT FEEDBACK IMPROVES QUALITY OF PEDIATRIC TITRATIONS**

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**Introduction**: Over 350 pediatric polysomnogram titrations (T-PSGs) are performed each year at the Sleep Laboratory at Children’s Hospital of Philadelphia in three locations by 24 different polysomnography technologists (PSGTs) on a diverse patient population, typically performed as outpatient procedures and occasionally at the bedside as inpatients. PSGTs are responsible for titration of continuous or bilevel positive airway pressure based on flow, work of breathing, arousals, and/or gas exchange. PSGTs have varying degrees of experience; thus, maintaining quality of T-PSGs is challenging. We hypothesized that a quality improvement (QI) approach to reviewing T-PSGs with interdisciplinary education and regular feedback would improve T-PSGs. Our goal was to have >/= 80% of titrations of optimal quality.

**Methods**: Each T-PSG record was reviewed by a sleep physician for cannula use, illness, or external signal interference. Titration QI (T-QI) comments were reviewed by the sleep lab QI team bi-weekly to plan feedback. Improvement interventions for PSGTs included didactic education: lectures, presentations, and cases focusing on recognition of hypoventilation; direct feedback with teaching points by sleep physician and small group sessions with clinical supervisors to review areas for improvement; and communication of specific titration goals. Satisfaction surveys regarding recognition/titration for OSA/hypoventilation, transcutaneous CO2 signal integrity, and documentation were administered to sleep physicians.

**Results**: From September 2020-November 2021, PSGT education included: 1 synchronous and 2 asynchronous didactic presentations; 1:1 review of didactics with each night PSGT (n=24); T-QI feedback (2/week); and small group review sessions (4/week). 408 titrations were completed; 42 (10.3%, 2.8/month) were excluded; 366 (89.7%, 24.4/month) were reviewed for T-QI. 54.8% [50,71%] were deemed optimal during the first three months (pre-intervention) vs. 80.1% [63,96%] during the intervention period. QI satisfaction survey showed improvement in 3 of 4 domains.

**Conclusion**: Quality of T-PSG is enhanced by QI review of each titration, highlighting teaching points and areas for improvement via direct feedback and small group review. Education and communication among physicians, supervisors and technologists is important to support development which can result in better titrations and satisfaction.

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**0503**  

**THE RELATIONSHIPS BETWEEN THE IMPACT OF COVID-19 PANDEMIC, PARENT INSOMNIA, INFANT TEMPERAMENT, AND INFANT SLEEP: A PATH ANALYSIS**

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**Introduction**: Increased sleep problems in adults have been repeatedly reported during the COVID-19 pandemic. However, infant sleep was understudied. We aimed to examine the relationships between the impact of the COVID-19 pandemic, parent insomnia, infant temperament, and infant sleep during the COVID-19 pandemic.

**Methods**: Parents from the Phoenix metropolitan area with a full-term healthy infant (<1 year) were recruited through social media from 2/27/2021 to 8/7/2021. A sample of 70 parents (baby age 5.5±3.5mo; parental age: 31.7±5.0y) completed the COVID-19 Exposure and Family Impact Survey Part 2 (CEFIS-Part 2, range: 12-60), a measure of the impact of the COVID-19 pandemic.

**Results**: 8 healthy swimmers on the Makos swim team filled follow-up questionnaires and participated in a 100-yard freestyle race. Descriptive statistics, frequency distributions, and correlation using SPSS 14.

**Conclusion**: Quality of T-PSG is enhanced by QI review of each titration, highlighting teaching points and areas for improvement via direct feedback and small group review. Education and communication among physicians, supervisors and technologists is important to support development which can result in better titrations and satisfaction.

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