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IMAP*/TBI Model Systems Newsletter

An interagency collaboration between the Departments of Veterans Affairs, Defense, and Health and Human Services

*Improved Understanding of Medical and Psychological Needs in Veterans and Service Members with TBI

Newsletter Editors: Courtney Lynn, MA and Marc Silva, PhD

Significance of Sleep

A letter from the Principal Investigator,
Risa Nakase-Richardson, Ph.D., FACRM

A special thanks to our Veterans, Service Members and their family members who give their time to participate in the VA TBI Model Systems studies at each of Polytrauma Rehabilitation Centers. The time spent answering our phone calls (each year), responding to questionnaires, and doing in-person interviews in the hospital help us better understand how people recover and age with a brain injury. To date, over 800 individuals are being followed in this study. This newsletter highlights some of the science we are creating with the information collected as part of the study.

Inside this Issue

There is no cure for brain injury. However, there is increasing focus on treating medical problems that may influence recovery and lead to more health related difficulties as people with TBI get older. This special issue focuses on improving characterization of sleep disorders to promote accurate treatment and subsequent improvement. Research has shown that poor sleep impacts the brain's ability to heal early after TBI and may play a role in accelerated aging. The exciting news is that these sleep disorders can be treated and potentially reverse or slow these negative outcomes. Our Veteran and Service Member data on sleep and TBI are featured in a special issue in the *Journal of Head Trauma and Rehabilitation*, 2016, Volume 31 (2). For our Veterans and Service Members, thank you for service and your participation in VA TBI Model Systems research. Your efforts are changing how we care for others with brain injury in both the civilian and military healthcare worlds.

What are some of the common sleep disorders?

Obstructive Sleep Apnea

Sleep apnea is when breathing is interrupted during sleep. "Apnea" refers to a pause in breathing that lasts at least ten seconds. Obstructive sleep apnea (OSA) occurs when the muscles in the back of the throat fail to keep the airway open.

SYMPTOMS

Chronic snoring is a common symptom. Many individuals with Sleep Apnea also experience drowsiness during the day, difficulty concentrating, increased irritability, memory problems, depression, and sexual difficulties. Persons with sleep apnea are more likely to fall asleep while at work, on the phone, and while driving. Take the quiz on page 3 to see if you are at risk for Obstructive Sleep Apnea.

Insomnia

Insomnia is difficulty falling asleep or staying asleep, but not due to things in the environment such as loud noises such as a ringing telephone and television. Insomnia can occur over a short period of time, called Acute Insomnia. This usually happens after a stressful event, for example, trouble sleeping after receiving bad news. Chronic insomnia occurs at least 3 nights per week and lasts 3 months or more.

SYMPTOMS

People with insomnia often feel dissatisfied with their sleep. Symptoms include sleepiness during the day, low energy, difficulty concentrating, mood changes, and decreased performance at work or at school. Take the quiz on page 3 to see if might have insomnia.

Circadian Rhythm Disorders

Circadian rhythm disorders are actually a group of sleep disorders that happen when you fall asleep at the wrong time of day. That is, the "body clock" (the body's normal pattern of falling asleep at night and waking up in the morning and staying awake all day) is disrupted. There are different types of circadian rhythm disorders. In *Delayed Sleep Phase Disorder*, you do not fall asleep until very late (often 2 a.m. or later). In *Advanced Sleep Phase Disorder*, you fall asleep very early (6 p.m. – 9 p.m.) and wake up very early (2 a.m. – 5 a.m.).

SYMPTOMS

People with circadian rhythm disorders usually have insomnia at certain times and excessive sleepiness at other times of the day resulting in work, school, or social impairment.

www.sleepfoundation.org and www.clevelandclinic.org

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Incidence, Characterization, and Predictors of Sleep Apnea in Consecutive Brain Injury Rehabilitation Admissions

By: Erin Holcomb, PhD, Daniel Schwartz, PhD, Marissa McCarthy, MD, Bryan Thomas, MD, Scott Barnett, PhD, & Risa Nakase-Richardson, PhD

DR. HOLCOMB and colleagues recently conducted a study to look at the frequency of sleep apnea in patients with different kinds of brain injury who were admitted to a rehabilitation hospital. Patient demographics and medical problems suggesting risk for sleep apnea were also identified. Participants were separated into two groups: 1) individuals who had a traumatic brain injury (TBI) and 2) individuals who had a nontraumatic brain injury (e.g., stroke).

INCIDENCE. Eighty-six people participated in the study. Nearly half of the participants (49%) were diagnosed with sleep apnea. Of those diagnosed, a large majority (93%) were diagnosed with obstructive sleep apnea compared to 2% with central apnea and 5% with a mixed presentation. Fifty-two percent of participants had mild sleep apnea, 24% had moderate, 24% had severe disease. Of the 60 participants with TBI, 37% were diagnosed with sleep apnea and most cases were obstructive (90%) and mild (73%). Of those with nontraumatic brain injuries, 77% were diagnosed with sleep apnea. All but one case was obstructive and only 30% were mild.

RISK FACTORS. For the entire sample of participants, increasing age was linked to having sleep apnea. Though many younger patients had sleep apnea.

WHAT DOES THIS MEAN? A large number of patients on the inpatient rehabilitation unit have sleep apnea. This is a condition that should be treated and could potentially improve outcomes in brain injury patients. Additionally, traditional risk factors may not identify patients at risk for the disease. Those who suspect they may have sleep apnea should talk to your doctor for more detailed risk and evaluation.

How to Test for Sleep Disorders

POLYSOMNOGRAPHY

During this test, a piece of equipment monitors heart, lung and brain activity, breathing patterns, arm and leg movements, and blood oxygen levels while they sleep. This test may be conducted at home or in a hospital sleep laboratory.

ACTIGRAPHY

Actigraphy are devices that are placed on your wrist that monitors movement to calculate sleep-related scores. These devices can be used while you are in the hospital or at home.

QUESTIONNAIRES

Your doctor may ask you to complete paperwork that asks questions about your sleep, daytime energy, and activities.

SLEEP DIARIES

Sleep diaries allow you to track your sleep and see habits and trends that are helping you sleep or that can be improved. A sleep diary only takes a few minutes each day to complete. You record things such as the number of hours of sleep and bedtime routine. The National Sleep Foundation created a sleep diary that can be accessed at https://sleepfoundation.org/sleep-diary/SleepDiaryv6.pdf

Treatments and Contacts

COGNITIVE BEHAVIORAL THERAPY FOR INSOMNIA (CBT-I)

CBT-I is an effective treatment for individuals with sleep difficulties. There is evidence to suggest that CBT-I is as effective as some medications in the short-term and more effective than medications in the long term. CBT-I consists of such techniques as developing a sleep routine and changing thoughts surrounding sleep. Treatment length is typically 6 sessions but ranges from 4-8 sessions for most patients. The VA has created a mobile app called CBT-i Coach designed for people who are participating in CBT-i. Features include a sleep diary, tools to improve sleep, and customizable reminders to alert user to sleep hygiene and to record sleep habits. The American Boards of Sleep Medicine created a list of people trained in CBT-I. Visit http://www.absm.org/BSMSpecialists.aspx to find one near you!

STIMULUS CONTROL THERAPY

Stimulus control therapy involves a set of steps to reestablish a sleep-wake cycle. The steps include (1) going to bed only when tired, (2) getting out of bed when you cannot sleep any longer, (3) using the bed/bedroom only for sleep (no reading, watching TV, etc.), (4) waking up at the same time everyday, and (5) not taking any naps.

RELAXATION TRAINING

Relaxation training works to reduce tension or intrusive thoughts through such techniques as progressive muscle relaxation and meditation.

SLEEP HYGIENE EDUCATION

Sleep hygiene education includes information about normal sleep as well as guidelines for healthy sleep practices. The American Academy of Sleep Medicine (AASM) offers the following tips on how to get a good night's sleep:

- Follow a consistent bedtime routine.
- Establish a relaxing setting at bedtime.
- Get a full night's sleep every night.
- Avoid foods or drinks that contain caffeine, as well as any medicine that has a stimulant, prior to bedtime.
- Do not bring your worries to bed with you.
- Do not go to bed hungry, but don't eat a big meal before bedtime either.
- Avoid any rigorous exercise within six hours of your bedtime.
- Make your bedroom quiet, dark and a little bit cool.
- Get up at the same time every morning.

No More Sleepless Nights by Peter Hauri, Ph.D., Shirley Linde, Ph.D. is a self-help book which combines many of the techniques listed above such as education, relaxation, and developing a sleep schedule.

Insomnia Symptoms and Behavioural Health Symptoms in Veterans 1 Year After Traumatic Brain Injury

By: Leah Farrell-Carnahan, PhD, Scott Barnett, PhD, Gregory Lamberty, MD, Flora Hammond, PhD, Tracy Kretzmer, PhD, Laura Franke, PhD, Meghan Geiss, PhD, Laura Howe, PhD, & Risa Nakase-Richardson, PhD

DR. FARRELL-CARNAHAN and colleagues published a paper in the journal, *Brain Injury*, that reported how common insomnia, a sleep disorder, was after brain injury. The relationship between insomnia and other problems such as depression, anxiety, nightmares, headache, and substance misuse were in Veterans who experienced a traumatic brain injury (TBI) one year prior.

FINDINGS. The study included 112 Veterans with TBI ranging in severity from concussion (mild TBI) to moderate to severe TBI. Almost a third (29%) of the Veterans had insomnia. Those with mild TBI were more likely to have trouble falling and/or staying asleep compared to those with moderate to severe TBI. In fact, almost half of those with mild TBI (43%) experienced insomnia while only 22% of those with moderate to severe TBI experienced insomnia. The study also found Veterans who had a TBI in the past year were likely to experience symptoms of depression and anxiety which contributes to sleep problems. Those with mild TBI were more likely to have headaches and nightmares than those with moderate to severe TBI. These problems also contribute to poor sleep.

WHAT DOES THIS MEAN? We found that one third of veterans who sustained a mild to moderate TBI experienced insomnia within one year after their injury. Those with mild TBI that had insomnia, also frequently reported symptoms of depression, anxiety, headaches, and nightmares. It would be beneficial to screen for these additional concerns to improve sleep problems.

Insomnia Self Test

1. Does it take you more than 30 minutes to fall asleep? Or, do you wake up during the night and have trouble returning to sleep? Or, do you wake up	Yes	No
2. Do you have daytime symptoms such as fatigue, moodiness, sleepiness or reduced energy?	Yes	No
3. Do you give yourself enough time in bed to get at least 7 hours of sleep each night?	Yes	No
4. Do you go to bed in a safe, dark and quiet environment that should allow you to sleep well?'	Yes	No

If you answered "yes" to all these questions, then you may have insomnia.

**This quiz cannot be used to diagnose sleep apnea, insomnia, or other sleep disorders. If you suspect you have one of these conditions, please see a medical professional.

If you suspect you may be at risk for insomnia or other sleep disorder, seek a medical professional. You can contact the sleep clinic at your local Polytrauma Rehabilitation Center, VA Medical Center, or other hospital.

STOP-BANG Sleep Apnea Questionnaire

(Chung et al., 2008)

STOP		
Do you **S**NORE loudly (louder than talking or loud enough to be heard through closed doors)?	Yes	No
Do you often feel **T**IRED, fatigued, or sleepy during the daytime?	Yes	No
Has anyone **O**BSERVED you stop breathing during your sleep?	Yes	No
Do you have or are you being treated for high blood **P**RESSURE?	Yes	No
BANG		
BMI more than 35kg/m2?	Yes	No
AGE over 50 years old?	Yes	No
NECK circumference >16 inches?	Yes	No
GENDER: Male?	Yes	No

High risk of OSA: Yes 5-8
Intermediate risk of OSA: Yes 3-4
Low risk of OSA: Yes 0-2

If you suspect you may be at risk for OSA, seek a medical professional. You can contact the sleep clinic at your local Polytrauma Rehabilitation Center, VA Medical Center, or other hospital.

Condcordance of Actigraphy with Polysomnography in Traumatic Brain Injury Neurorehabilitation Admissions

By: Joel Kamper, PhD, Jeffrey Garofano, MA, Daniel Schwartz, MD, Marc Silva, PhD, Jamie Zeitzer, PhD, Mo Modarres, PhD, Scott Barnett, PhD, & Risa Nakase-Richardson, PhD

DR. KAMPER and colleagues recently published a study in the *Journal of Head Trauma Rehabilitation* examining whether actigraphy (ACG) is a good way to measure sleep in inpatient TBI populations. Fifty participants with TBI were given ACG and polysomnography (PSG).

FINDINGS. ACG and PSG estimates for both total sleep time (TST) and sleep efficiency (SE) were nearly the same. There were no differences in ACG and PSG across patients with different characteristics including initial injury severity, current level of functioning, presence or absence of sleep apnea, and presence or absence of spasticity.

WHAT DOES THIS MEAN? Results of this study suggest that ACG is a valid way to monitor sleep in TBI populations across levels of injury severity and other comorbidities. In rehabilitation settings where access to PSG as standard of care is not feasible, the use of ACG represents a valid first-line method to screen patients with TBI who could benefit from further sleep testing (i.e. PSG). Additionally, ACG is a valid way to monitor sleep status over prolonged intervals for evaluation of other sleep-based disorders and to evaluate response to treatment.

Meet the Staff

Courtney Lynn, MA

Courtney Lynn is a third year doctoral student in the School Psychology Program at the University of South Florida. She is the co-editor for the IMaP/TBI Model Systems Newsletter and helps with follow-up interviews. She initially started working on this project because she was interested in the needs of individuals with chronic health conditions. Although still an interest, what she has enjoyed most is getting to talk with all of the Veterans and Service Members and seeing how our hard work at the VA is impacting their lives.

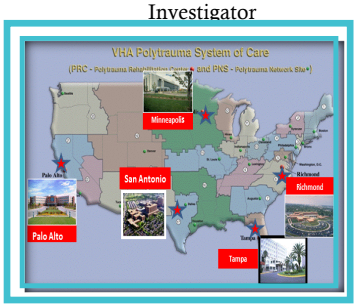
Jeffrey Garofano, MA

Jeffrey Garofano is a PhD candidate from University of South Florida's School Psychology program and served as a research assistant on IMaP and helps abstract data from the medical records for the TBI studies. He has enjoyed learning from cutting edge researchers, especially Dr. Nakase-Richardson, and contributing to the care of Veterans and Service Members recovering from moderate and severe TBI. For his career, Jeff hopes to take the TBI-related experiences and training he has gained through the VA and translate them to younger populations, specifically children and adolescents who have suffered a brain injury. For his dissertation he is looking at predictors of disrupted high school graduation for adolescents who have suffered a serious brain injury.

Second year neuropsychology fellow, Dr. Erin Bailey, recently received a Blue Ribbon Award for best research submission to American Psychological Association Division 40-Society for Clinical Neuropsychology for her project titled "Supervision needs following Veteran and Service Member traumatic brain injury: A VA TBIMS Study." This important project describes the predictors of supervision needs at one-year post-injury for those with moderate to severe TBI. These findings are important for helping to inform the chronic rehabilitation needs of Veterans and Service Members with TBI.

Who's Who in VA PRC TBI Model System?

Minneapolis Polytrauma Rehabilitation Center Gregory Lamberty, PhD Principal Investigator



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