Session 4035 (Symposium)

CHRONOBIOLOGICAL FACTORS RELATED TO SLEEP AND NEUROPSYCHIATRIC SYMPTOMS IN PERSONS LIVING WITH DEMENTIA

Chair: Nancy Hodgson
Co-Chair: Fanghong Dong

Circadian rhythm disturbances (CRD) are commonly seen in people living with dementia. A clear understanding of the role of CRD in dementia etiology will be beneficial by exploring the exogenous factors (externally influence the duration of sleep hours, such as light/dark cycles) and endogenous factors (internal biological rhythm, such as diurnal cortisol pattern). This symposium will apply a chronobiological approach to study exogenous and endogenous factors that influence circadian rhythm and their effects on sleep and neuropsychiatric symptoms in persons living with dementia (PLWD). Four paper presentations will use secondary data analysis of data from the Healthy Patterns Clinical Trial (NCT03682185), a randomized controlled trial of a home-based activity intervention designed to improve circadian rhythm disorders in PLWD. We will first describe the circadian rhythm pattern reflected by endogenous factors (salivary cortisol), then examine salivary cortisol (endogenous) and white light intensity (exogenous) and on subjective sleep and neuropsychiatric symptoms (including depression) in PLWD, respectively. In session 1, we will present cortisol diurnal rhythm pattern in PLWD using a cross-sectional design. In session 2, we will discuss the relationship between salivary cortisol indicators and depressive symptoms. In session 3, we focus on the association between diurnal cortisol slope and neuropsychiatric symptoms using the baseline data. In session 4, we describe the association between evening white light exposure and subjective sleep. The discussant will describe how these findings build on our understanding the nature of circadian rhythm disturbance in dementia and inform future research and treatment approaches.

BEDTIME SALIVARY CORTISOL AND DEPRESSIVE SYMPTOMS IN OLDER ADULTS LIVING WITH DEMENTIA

Fanghong Dong,[1] Miranda McPhillips,[2] Darina Petrovsky,[3] Liming Huang,[4] Adriana Adriana,[4] and Nancy Hodgson,[5]
1. UPenn, Philadelphia, Pennsylvania, United States, 2. University of Pennsylvania, University of Pennsylvania, Pennsylvania, United States, 3. Rutgers University, Philadelphia, Pennsylvania, United States, 4. University of Pennsylvania, Philadelphia, Pennsylvania, United States, 5. University of Pennsylvania, School of Nursing, philadelphia, Pennsylvania, United States

The dysregulation of cortisol has been associated with depressive symptoms in older adults. To date, no prospective longitudinal studies have examined whether salivary cortisol is a risk factor for depressive symptoms in persons living with dementia (PLWD). With a sample of 123 PLWD, baseline salivary cortisol was collected at awaking, 30 minutes after awaking, and bedtime. Depressive symptoms were assessed at baseline and the four-week follow-up. Cortisol indicator were centered. Baseline bedtime cortisol level was significantly associated with depressive symptoms in a curvature style while controlling age, gender, and baseline depressive symptoms (β=3.76 for linear term and β=-1.57 for quadratic term, both ps<0.04). No other baseline cortisol measures were significant prospective predictors. Our results suggest the bedtime cortisol was a significant risk factor for depressive symptoms in PLWD. These findings suggest that bedtime cortisol may play a role in the etiology of depressive symptoms in PLWD.

SALIVARY CORTISOL PATTERNS IN PEOPLE LIVING WITH DEMENTIA

Darina Petrovsky,[1] Fanghong Dong,[2] Liming Huang,[3] Subhash Aryal,[4] G. Adriana Perez,[5] and Nancy Hodgson,[6]
1. Rutgers University, Philadelphia, Pennsylvania, United States, 2. UPenn, PHILADELPHIA, Pennsylvania, United States, 3. University of Pennsylvania, Philadelphia, Pennsylvania, United States, 4. University of Pennsylvania School of Nursing, Philadelphia, Pennsylvania, United States, 5. University of Pennsylvania School of Nursing, Phildelphia, Pennsylvania, United States, 6. University of Pennsylvania, School of Nursing, philadelphia, Pennsylvania, United States

Salivary cortisol has a well-documented circadian pattern in older adults. Yet, the pattern of salivary cortisol in persons living with dementia (PLWD) due to circadian rhythm disturbances is unknown. This study examined diurnal salivary cortisol patterns in 176 PLWD (mean age 73.6±8.8, 33.3% male, clinical dementia rating >=0.5) by collecting saliva at waking (AM1), 30 minutes after waking (AM2) and bedtime (PM) over two consecutive days. Cortisol awakening response (CAR) was calculated as the change between AM2 and AM1 cortisol levels. The mean baseline salivary cortisol levels (ug/dl) were 0.35 (SD:0.3) at AM1, 0.40 (SD:0.39) at AM2, and 0.19 (SD:0.4) at PM. On average, cortisol levels decreased from morning to evening, with 58% exhibiting a positive CAR (mean 0.05; SD:0.34). There were no significant associations between cortisol levels with age, sex, obesity, and comorbidities. The findings demonstrated that diurnal cortisol rhythms are maintained in PLWD with a flattened CAR.

RELATIONSHIPS BETWEEN SALIVARY CORTISOL SLOPE AND NEUROPSYCHIATRIC SYMPTOMS IN PERSONS LIVING WITH DEMENTIA

Yeji Hwang,[1] Fanghong Dong,[2] G. Adriana Perez,[3] and Nancy Hodgson,[4] *1. University of Pennsylvania, School of Nursing, Philadelphia, Pennsylvania, United States, 2. UPenn, Philadelphia, Pennsylvania, United States, 3. University of Pennsylvania School of Nursing, Philadelphia, Pennsylvania, United States, 4. University of Pennsylvania, School of Nursing, Philadelphia, Pennsylvania, United States*

While a flatter diurnal cortisol slope has been related to poor health outcomes in healthy populations, little is known about this relationship in persons living with dementia (PLWD). The purpose of this study was to examine the association between diurnalcortisol slope and neuropsychiatric symptoms in PLWD. Secondary data analysis was conducted using baseline data from the Healthy Patterns Study (N=168). Diurnal cortisol slope was calculated using the difference between changes in salivary cortisol from 30 minutes after awakening to bedtime. Spearman rho coefficients were used. Flatter cortisol slope was associated with the presence of symptoms of agitation (r=-0.191, p=0.013) and disinhibition

(r=-0.168, p=0.03). Steeper cortisol slope was related to a more severe level of anxiety symptoms (r=0.36, p=0.009) and higher frequency of insomnia (r=0.292, p=0.011). We found that cortisol slope was associated with neuropsychiatric symptoms in PLWD. Future research is needed to examine the mechanisms underlying the relationships.

ASSOCIATION BETWEEN EVENING LIGHT EXPOSURE AND SUBJECTIVE SLEEP MEASURES AMONG PEOPLE LIVING WITH DEMENTIA

Miranda McPhillips,[1] Yeji Hwang,[2] Sonia Talwar,[2] and Nancy Hodgson,[3] *1. University of Pennsylvania, University of Pennsylvania, Pennsylvania, United States, 2. University of Pennsylvania, School of Nursing, Philadelphia, Pennsylvania, United States, 3. University of Pennsylvania, School of Nursing, philadelphia, Pennsylvania, United States*

Excessive light exposure before bedtime can disrupt one's circadian rhythm and can lead to poor sleep. The purpose of this study was to describe the relationship between evening light exposure and subjective sleep measures in people living with dementia (PLWD). We conducted secondary data analysis using the baseline data from Healthy Patterns Clinical Trial (N=137). We used Actiwatch Spectrum Plus to collect light data over three consecutive days. We defined evening light exposure as the average white light intensity for 4 hours before sleep. Sleep measures included Epworth Sleepiness Scale and PROMIS Sleep-Related Impairment. We used univariate regression analysis. We found that that greater evening intensity of light exposure was associated with higher daytime sleepiness (β=0.209, p=0.015) and more sleep impairment (β=0.228, p=0.014). The results of our study suggest that exposure to bright light during evening can disturb nighttime sleep and increase daytime sleepiness in PLWD.

Session 4040 (Symposium)

CONTRIBUTION OF SENSORY FUNCTION TO PRECLINICAL INDICATORS OF PHYSICAL AND COGNITIVE FUNCTIONING WITH AGING

Chair: Yuri Agrawal
Co-Chair: Jennifer Schrack
Discussant: Bonnielin Swenor

There are well established associations between sensory loss and physical and cognitive deficits with aging, but gaps remain in our understanding of the associations between sensory function and early preclinical indicators of physical and cognitive decline. This symposium will present data from the Baltimore Longitudinal Study of Aging (BLSA) on a series of studies investigating the links among sensory function, motor function, and physical and cognitive outcomes in older adults. In the first study, Dr. Gross will present an operational definition of early cognitive impairment (ECI) based on a combination of two cognitive measures – the Card Rotations test and the California Verbal Learning Test Immediate Recall – to predict progression to MCI/AD. In the second study, Dr. Cai will evaluate the relationship between multisensory impairment (in vision, hearing, olfaction, proprioception and vestibular function) and the algorithmic definition of ECI. In the third study, Dr. Armstrong will evaluate the association between multisensory impairment and another biomarker of ECI or preclinical AD, specifically PET-PiB deposition. In the fourth study, Dr. Schrack, will present the joint contribution of multisensory (hearing and vision) impairment and motor function (gait speed) on risk of incident MCI/AD in longitudinal analyses. Finally, Dr. Martinez Amezcua will present the longitudinal association between hearing and vestibular function and decline in higher level physical function and endurance performance. Taken together, these studies present compelling data about the contribution of sensory function to preclinical indicators of physical and cognitive functioning with aging.

DERIVATION AND VALIDATION OF AN ALGORITHMIC CLASSIFICATION OF EARLY COGNITIVE IMPAIRMENT

Alden Gross,[1] Yang An,[2] Frank Lin,[3] Luigi Ferrucci,[4] Jennifer Schrack,[1] Yuri Agrawal,[5] and Susan Resnick,[4] *1. Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States, 2. NIA, Baltimore, Maryland, United States, 3. Johns Hopkins University, Johns Hopkins University, Maryland, United States, 4. National Institute on Aging, Baltimore, Maryland, United States, 5. Otolaryngology, Baltimore, Maryland, United States*

The long prodromal period for dementia pathology demands valid and reliable approaches to detect cases before clinically recognizable symptoms emerge, by which time it may be too late to effectively intervene. We derived and compared several algorithms for early cognitive impairment (ECI) using longitudinal data on 1704 BLSA participants. Algorithms were based on cognitive impairment in various combinations of memory and non-memory tests, and the CDR. The best-performing algorithm was defined based on 1SD below age-and race-specific means in Card Rotations or California Verbal Learning Test immediate recall, two tests that in prior work show the earliest declines prior to dementia onset. While this ECI algorithm showed low concordance with concurrent adjudicated MCI/dementia (AUC: 0.63, sensitivity: 0.54, specificity: 0.73), it was among the best predictors of progression to MCI/dementia (HR: 3.65, 95% CI: 1.69,7.87). This algorithm may be useful in epidemiologic work to evaluate risk factors for early cognitive impairment.

SENSORY IMPAIRMENT AND ALGORITHMIC CLASSIFICATION OF EARLY COGNITIVE IMPAIRMENT IN MIDDLE-AGED AND OLDER ADULTS

Yurun Cai,[1] Yuri Agrawal,[2] Jennifer Schrack,[1] Alden Gross,[1] Nicole Armstrong,[3] Eleanor Simonsick,[4] and Susan Resnick,[5] *1. Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States, 2. Otolaryngology, Baltimore, Maryland, United States, 3. Warren Alpert Medical School of Brown University, Providence, Rhode Island, United States, 4. National Instute on Aging/NIH, Baltimore, Maryland, United States, 5. National Institute on Aging, Baltimore, Maryland, United States*

Sensory function has been linked to cognitive impairment and dementia, but the link between multiple sensory impairments and early cognitive impairment (ECI) is unclear. Sensory function (vision, hearing, vestibular, proprioception, and olfaction) was measured in 390 BLSA participants (age=75±8 years; 57% women; 69% white) from 2012 to 2018 over a mean