

P14: Chronobiological assessment of stable elderly individuals with type I bipolar disorder

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Objectives: Evaluate the chronobiological rhythm of elderly people with type I bipolar disorder (BD), stable and without dementia, compared to controls.

Methods: A cross-sectional study was performed with 20 patients diagnosed with type I bipolar disorder, diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, and 20 controls. Actigraphic records were gathered from all participants over 7 days, besides clinical and demographic information. Non-parametric chronobiological measurements were calculated to evaluate the activity-rest cycle. Comparisons between groups were evaluated using Student's t-test or Mann-Whitney test, for data with normal and non-normal distribution, respectively. All procedures were conducted following the principles outlined in the Declaration of Helsinki.

Results: Compared to controls, patients with type I BD exhibited lower M10 values, which represent the average activity during the 10 hours of peak movement within 24 hours. Additionally, they showed increased daytime and nighttime inactivity, decreased exposure to nighttime light, and higher sleep fragmentation, as evaluated by the Hurst exponent. No differences were observed between the groups about L5 values, a parameter that indicates the average activity time in the 5 hours of least activity within 24 hours, exposure to daylight, and autocorrelation, a measure that assesses sleep synchronization.

Conclusions: Differences in chronobiological patterns were observed between elderly patients with type I BD and controls. In general, patients exhibited reduced activity levels, both during the daytime and nighttime. These findings may be related to the progression of the disease, as well as prolonged exposure to medications to treat BD, such as mood stabilizers and antipsychotics. The increased sleep fragmentation observed in patients may also be associated with these factors. To date, there is a lack of data assessing the chronobiological rhythm and sleep patterns in elderly individuals with TB, underscoring the need for further studies involving this population.

P15: Impact of perceived sleep quality and sleep aid use on mortality risk: the Brazilian Longitudinal Study of Aging.

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Objectives: Insomnia, defined by sleep initiation or maintenance difficulties, is linked to fatigue, depression, and chronic diseases. Though non-pharmacological treatment approaches are preferred, drugs like benzodiazepines and Z drugs are commonly prescribed, despite significant risks. Hypnotics, used by 9% of the general population and 11.9% of older women, can lead to severe side effects, especially among the elderly, including falls and increased mortality. This study aims to assess sleep quality, hypnotic use, and their impact on mortality among Brazilian older adults.

Methods: Using data from 8,004 cases from the Brazilian Longitudinal Study of Aging and sleep measures were collected from the first wave (2015–2016), and mortality data from the second wave (2019–2021). A cox hazard model was performed to analyze self-reported sleep quality (Likert scale from very poor to very good, and one

yes/no question evaluating whether the individual had restful sleep for the most part of the past week) and sleeping pill use (past month frequency) in relation to mortality risk. Covariates included age, sex, marital status, education, income, comorbidities, smoking, alcohol consumption, and physical activity level.

Results: We found no association between self-reported sleep quality or experiencing restful and mortality risk after 4-6 years. On the other hand, when compared to individuals who did not take sleeping pills during the past month, hazard ratios (HR) for death were, respectively, 1.79 (1.11–2.88, $p = 0.016$) and 1.31 (1.03–1.65, $p = 0.026$) for those who took medication 1–2 times a week and those who took medication 3 or more times a week. Taking sleeping pills less than once a week had no association with mortality. While the top 3 mortality causes for individuals who did not use sleeping pills were stroke, myocardial infarction and diabetes, the top 3 causes for heavy users were myocardial infarction, lung cancer and chronic obstructive pulmonary disease.

Conclusions: Insomnia must be adequately treated, but awareness of medication risks is vital. This study highlights higher mortality risk with frequent sedative-hypnotic use in older adults. Warranting non-drug treatments and careful hypnotic use could enhance health outcomes.

P16: The Efficacy of a Novel Multimodal Personalized Physical and Cognitive Training System for Neurocognitive Protection and Enhancement in Older Adults

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Summary: Age-related neurocognitive decline is often an irreversible health issue from onset. The concomitant costs could be exponential if left unchecked. There is a need to be able to delay the onset of age-related neurocognitive decline or possibly avoid it altogether. Previous studies have shown that there is a strong positive relationship between the fitness of neurocognitive function and cognitive training. Our laboratory conducted two pilot trials (Lee et al., 2013 & 2015) and one larger scale randomised controlled trial (RCT) (Yeo et al., 2018) investigating the usability and efficacy of a brain-computer interface (BCI) based attention and memory cognitive training system on older adults between ages 60 to 80. The participants across all three trials found the different iterations of our attention-memory training system to be usable and acceptable, with adherence rates surpassing 90%.

Interestingly, a growing number of studies suggest combined cognitive training and physical activity may result in a better neurocognitive outcome as compared to only cognitive training. Combining the insights from those studies and our previous trials, we developed a novel personalized multimodal BCI-based cognitive and physical training system, NeeuroCycle, for neurocognitive protection and enhancement in older adults. NeeuroCycle comprises of a stationary recumbent bicycle and a gamified cognitive training system paired with real-time frontal electroencephalogram (EEG) neurofeedback. The cognitive training program consists of six different tasks that target attention, immediate/working and delayed memory, decision-making, and visuospatial abilities. Certain parts of the gameplay are directly impacted by the participant's own real-time EEG signals. NeeuroCycle has also been designed to include locally relevant stimuli and designs for our Singaporean older adult participants. Evaluation of NeeuroCycle's efficacy is ongoing. The current study employs a three-arm RCT approach (physical-and-cognitive training [mBCI], cognitive training only [nBCI], and active control [AC] groups). We hypothesise that mBCI participants will perform significantly better on cognitive assessments compared to nBCI and AC participants. Findings of the study will be presented at the IPA Congress. If tested to be effective, we expect