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ASSOCIATION BETWEEN CHRONOTYPE AND SUBJECTIVE COGNITIVE FUNCTIONING: POPULATION-BASED STUDY

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Introduction: Increasing research suggests that subjective cognitive decline (SCD) in the absence of objective cognitive dysfunction may be a forerunner of non-normative cognitive decline and eventual progression to dementia. We investigated the association between chronotype and subjective cognitive functioning in the representative sample of the adult population.

Methods: We included subjects who participated in a nationwide cross-sectional survey of sleep and headache in 2018 in the Republic of Korea. A total of 2136 subjects (age 19-92, mean 48.3 ± 16.5 years old, 1062 male) was included in the analysis. To assess subjective cognitive functioning, we adopted the Mail-In Cognitive Function Screening Instrument (MCFSI). The MCSFI is a brief, self-administered potential outcome measure developed by the Alzheimer's Disease Cooperative Study (ADCS) to detect early changes in cognitive and functional abilities in individuals without clinical impairment. MCFSI scores ≥5 were considered abnormal for this study. As an indicator of chronotype, we adopted the "midpoint of sleep on free days corrected for sleep extension on free days (MSFsc)." MSFsc was calculated as follows: MSFsc = midpoint of sleep on free days − 0.5 × (sleep duration on free days − [5 × sleep duration on workdays + 2 × sleep duration on free days]/7). Participants whose MSFsc occurred before 04:00 AM, between 04:00 and 04:59 AM, and after 05:00 AM were classified as early, intermediate, and late chronotype, respectively. The associations between chronotype and subjective cognitive functioning were analyzed with logistic regression models adjusted for potential confounders.

Results: Subjective cognitive functioning was abnormal in 381 subjects (17.8%). A late chronotype was significantly associated with abnormal subjective cognitive functioning compared with an early chronotype independent of age, sex, average sleep duration, alcohol, smoking, regular exercise, anxiety, depression, body mass index (BMI), education years, and income status (OR 1.619, 95% CI 1.03 - 2.55, p=0.038). Abnormal subjective cognitive functioning was significantly associated with older age, female sex, lower education, higher BMI, anxiety, and depression.

Conclusion: This survey cohort results provide evidence at the population level that late chronotype is associated with abnormal subjective cognitive functioning.

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COVID-19 LOCKDOWN POLICIES ACROSS 20 COUNTRIES MODULATE SLEEP AND RESTING HEART RATE MEASURES

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Introduction: Lockdowns imposed to stem the spread of COVID-19 have disrupted the lifestyles of many worldwide, but studies to date are mostly confined to observations within a limited number of countries, based on subjective reports and survey from a narrow time window. In the present study, we investigate associations between the severity of lockdown policies and objective sleep and resting-heart rate measures.

Methods: Data from 113,000 users of a consumer sleep tracker across 20 countries were gathered between Jan–Jul 2020 and compared with an equivalent period in 2019 as a control for naturally occurring seasonal fluctuations. Lockdown stringency was derived using scores from the Oxford Government Response Tracker. Multilevel growth curve models were used to quantify the effect of lockdown stringency on changes to sleep patterns (midsleep time and midsleep variability) and resting heart rate changes, and to predict changes in resting heart rate from changes to sleep patterns.

Results: Lockdown severity modulated the size of shifts in sleep midpoint and regularity during this period. Midsleep times were delayed in all countries during strict lockdowns, particularly on weekdays, while midsleep variability reduced. The largest shifts in midsleep time (+0.09 to +0.58 hours), midsleep variability (–0.12 to –0.26 hours) and resting heart rate (–0.35 to –2.08 bpm) occurred in April and May - when most countries imposed their strictest lockdown measures. In addition, multilevel modelling revealed that for each unit increase in stringency index, midsleep time was delayed by 0.96 min, midsleep variability decreased by 0.46 min and resting heart rate decreased by 0.06 bpm. Finally, in models predicting changes in resting heart rate from changes to sleep patterns, midsleep variability was shown to be the strongest predictor of resting heart rate, wherein an hour increase in the standard deviation of midsleep variability predicted a 5.12 increase in bpm, while an hour increase in midsleep time only predicted a 1.25 decrease in bpm.

Conclusion: Our findings demonstrate the utility of large-scale data from consumer wearables in providing population-level insights into how lockdown severity directly impacts sleep health during this pandemic period.

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COVID STRESS AND SLEEP DISTURBANCE AMONG A RACIALLY/ETHNICALLY DIVERSE SAMPLE OF ADOLESCENTS: ANALYSIS FROM THE NESTED STUDY

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Introduction: Using data from the Nationwide Education and Sleep in TEens During COVID (NESTED) study (N=6,578), we investigated if race/ethnicity (64.6% were White and 35.4% identified as a racial/ethnic minority, mixed, or "other") and community social vulnerability affected the association between COVID stress and sleep disturbance.

Methods: Data on sociodemographic factors (age, race, sex, grade, zip code [for neighborhood social vulnerability index, SVI]), COVID-related stress, depression, anxiety, instructional format (online, in-person, or hybrid), and sleep disturbance (PROMIS Pediatric Sleep Disturbance) were captured through an online survey. Descriptive and inferential analyses (Hierarchical Binary Logistic Regression (HBLR), SPSS v. 25) in 4171 adolescents examined associations between sleep disturbance and COVID-related stress, adjusting for race, sex, SVI, grade level, learning format, household density, and mental health factors.

Results: Sleep disturbance was prevalent among adolescents (89% above average, T-score >50); about two-thirds (64.4%) reported greater stress due to the pandemic. Compared to White (88.5%) adolescents, sleep disturbance was more common in Black (91.2%), Hispanic (90.5%), American Indian/Alaska native (95.1%), and Mixed (92.3%) and less common in Asian (83.9%) adolescents. Chi-square analysis indicated that both race/ethnicity ($\square 2$ = 14.96, p<.05) and SVI ($\square 2$ = 8.34, p<.05) had an effect on sleep disturbance. HBLR analysis indicated that compared to pre-pandemic, adolescents reporting "little stress" (OR=.70, 95% CI= .49-.99, p=.04) or "the "same amount of stress" (OR=.64, 95% CI= .47-.89, p=.007) had lower odds of sleep disturbance. Higher depression (OR=1.06, 95% CI=1.04-1.07, p<.001) and anxiety (OR=1.05, 95% CI=1.04-1.07, p<.001) symptoms increased odds of sleep disturbance, while male gender lowered odds of sleep disturbance (OR=.11, 95% CI=.015-.86, p<.05). Overall, race/ethnicity (p=.44) and SVI (p=.45) did not independently predict sleep disturbance. Race/ethnicity stratified analyses indicated that for Black and Hispanic adolescents, being in grades 11/ 12 and depression predicted sleep disturbance; and for Asian adolescents SVI and anxiety predicted sleep disturbance.

Conclusion: COVID-related stress and symptoms of depression and anxiety are associated with sleep disturbance. We observed differences in sleep disturbance across racial/ethnic groups and neighborhood social vulnerability strata, for specific racial/ethnic groups.

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COVID-19 RELATED WORRIES AND SLEEP DISTURBANCES IN PATIENTS PREVIOUSLY HOSPITALIZED WITH COVID-19 ILLNESS

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Introduction: In patients hospitalized for COVID-19 illness, sleep disturbances after discharge may impact quality of life and prognosis. We examined the relationship of COVID-19-related worries with sleep disturbances in patients three months after COVID-19 hospitalization.

Methods: Patients hospitalized for COVID-19 illness completed a survey three months post-discharge (n=153). We measured COVID-19-related worry along two domains: worry directly related to the disease (COVID-illness worry) and worry related to the socioeconomic impact of the pandemic (COVID-impact worry). COVID-illness worry included worry regarding: 1) getting COVID again, 2) dying from COVID, 3) family members getting COVID, 4) losing a loved one to COVID, 5) unknowingly infecting others with COVID, 6) having significant financial burdens because of COVID. COVID-impact included worry regarding: 1) employment loss, 2) not having enough food, 3) not having access to medical care/medications, 4) not having access to mental health care/medications, 5) reduction in interactions with other people, 6) separation from family members, 7) being lonely. Patients rated how much they worried about each item on a 4-point scale (not at all, a little, moderately, extremely). Scores on each domain were summed to reflect overall severity. Past month sleep was assessed for insomnia symptoms (none, mild, moderate, severe, very severe) and self-reported sleep duration. Binary logistic regression was used to evaluate the association of COVID-illness worry and COVID-impact worry, separately, with sleep measures, adjusting for age, sex, race/ethnicity, and presence of persistent COVID-related symptoms.

Results: The prevalence of insomnia (moderate, severe, or very severe symptoms) and short sleep duration (<6 h/day) was 47.0% and 39.2%, respectively. COVID-illness worry severity was significantly associated with presence of insomnia (OR: 1.91, 95% CI: 1.13-3.23, p=0.016) and short sleep (OR: 2.20, 95% CI: 1.25-3.86, p=0.006). In a separate model, COVID-impact worry severity was significantly associated with presence of insomnia (OR: 1.98, 95% CI: 1.23-3.19, p=0.005) and short sleep (OR: 2.11, 95% CI: 1.26-3.55, p=0.005).

Conclusion: Sleep disturbances are common among patients previously hospitalized with COVID-19 illness, and COVID-19 related worries are associated with insomnia and short sleep. Additional research is needed to determine whether addressing COVID-19 related worries reduces sleep disturbance, which in turn may promote post-COVID recovery.

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SLEEP QUALITY DURING THE CORONAVIRUS PANDEMIC IN A BRAZILIAN FAMILY-BASED COHORT

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Introduction: Early in the COVID-19 pandemic, Brazil adopted measures to minimize the spread of the virus, including quarantine orders where people only left home for essential business. This practice could negatively impact sleep by reducing exposure to daylight and physical activity. We examined subjective sleep quality in Baependi, a small rural town in Brazil during the COVID-19 quarantine order.

Methods: This sample is from the Baependi Heart Study, a family-based cohort of adults. Participants (n=800, 71% women, mean age 51.6±15.6 years) completed the Pittsburgh Sleep Quality Index (PSQI) early in the COVID pandemic (April-May, 2020). They were also asked about their compliance to the quarantine order (yes/no). We compared sleep between quarantined (QT) and not-quarantined individuals (NQT). Longitudinal data was obtained from a subsample of 417 individuals who also completed a pre-COVID PSQI between January, 2010 and September, 2014.

Results: Individuals compliant with the quarantine had worse sleep quality than non-quarantined individuals [QT PSQI= 6.1 (±3.9), NQT PSQI= 5.0 (±3.5), p<0.01]. Stratified analysis showed that differences in PSQI scores between QT and NQT was greater for women [QT = 6.4 (±4), NQT = 5.2 (±3.7), p<0.01] and older people [QT = 6.6 (±0.1), NQT = 5.5 (±3.3), p=0.02]. Associations were attenuated after adjusting for age and gender. PSQI components demonstrated a higher sleep latency for the QT group in the full sample (p=0.02), women (p<0.01) and young (<50 years, p=0.03). Sleep duration was shorter in the QT young subsample (p=0.03). QT women also reported lower sleep efficiency (p=0.01) and greater use of sleep medication than NQT women (p<0.01). In the longitudinal subsample, PSQI scores were significantly higher during COVID than pre-pandemic [COVID= 5.7 (±3.8), pre-COVID= 5 (±3.3), p<0.01]. The significant change in PSQI was only observed in the QT participants [COVID= 5.9 (±3.7), pre-COVID= 5.2 (±3.4), p<0.01] and not NQT [COVID= 5 (±3.7), pre-COVID= 4.5 (±3), p=0.12].

Conclusion: Individuals who quarantined during COVID-19 had worse sleep quality than individuals who did not quarantine. Longitudinal comparison demonstrated that participants who quarantined had worse sleep quality during COVID compared to before to the pandemic.

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