Methods: We used data from the National Health and Nutrition Examination Survey (n=4,277 adults; 2013-2014). Participants (≥ 18 years old) wore an actigraph that collected 24-hour sleep/wake and light data for 7 consecutive days. Objective measurements in our analyses included sleep duration (valid minutes) and light exposure (lux). To determine the associations between light exposure and sleep duration, a weighted mixed-effects linear model was estimated controlling for age, sex, family income to poverty ratio, education, employment, marital status, homeownership status, birthplace, household size, vitamin D, smoking, physical activity, sedentary lifestyle, health status, body mass index, depression, chronic conditions, and time in days. A product term between lux and race/ethnicity was included in a second regression model.
Results: Participants had a mean sleep duration of 468.2 minutes. On average, White adults had the longest sleep duration (mean=478.8), followed by other/multiple races (mean=458.6), Asians (mean=449.1); Blacks (mean=445.0), and Hispanics (mean=444.7). Overall, light exposure was negatively associated with sleep duration (= -0.08 lux; p<0.001). Black slept significantly less than did Whites (= -37.1 p<0.001) followed by Asians (= -26.5; p<0.01) and Hispanics (= -24.6; p<0.01). The association between light exposure and sleep duration did not significantly differ across all race/ethnic groupings, except for Blacks (= -0.05; p<0.01).
Conclusion: To our knowledge, this is the first study that used national data to assess racial/ethnic disparities in objectively measured light exposure. Future research is needed to shed more light on racial/ethnic disparities in the light-exposure-sleep-duration link.
Support (If Any): R01HL142066, R01HL095799, RO1MD004113, R01HL152453, R25HL105444

0616

RETROSPECTIVE PAIN REPORTS IN OBSTRUCTIVE SLEEP APNEA PATIENTS RELATE TO AGE, SEX, BMI, INSOMNIA AND DEPRESSION SCALES, NOT TO POLYSOMNOGRAPHIC MEASURES OF SLEEP AND RESPIRATION

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Introduction: OSA was found to alter pain experience, presumably due to apnea-related hypoxia and sleep disturbance. However, types of pain measures, demographic and subjective variables, such as mood, may influence pain experience in OSA. Presently, retrospective pain reports of patients referred for OSA evaluation were analyzed as a function of PSG measures, demographic variables, and self-reported mood and insomnia symptoms.
Methods: On the evening of a diagnostic in-lab PSG, patients reported pain intensity in the preceding 6 months (PI, rage 0-10, Chronic Pain Grade Scale), symptoms of depression (Center for Epidemiologic Studies Depression Scale-Revised, CESDR) and insomnia (Insomnia Severity Index, ISI). PI was regressed on age, sex, BMI, total sleep time (TST), sleep stage percentages, sleep efficiency, WASO, awakenings, respiratory arousal index, AHI, SpO2% nadir, time below SpO2 90%, desaturation index, CESDR and ISI using a stepwise entry.
Results: A total of 1293 patients with ≥2 hours of PSG-defined sleep completed the questionnaires; 3% Asian, 42% black, 5% Hispanic, 32% white; 62% women; 66% had OSA (AHI≥5); Mage=58.7±13.8, MBMI=33.8±7.3, MPI=3.5±3.1; MISI=12.9±6.9; MCESDR=14.7±13.1, MAHI=17.6±22.9, MSpO2%nadir=84.9±9.0. Higher PI was associated with female sex (p<0.001, R2=2.6%), older age (p<0.001, R2=3.7%), higher BMI (p<0.001, R2=2.5%), higher ISI (p<0.001, R2=4.5%), higher CESDR (p<0.001, R2=2.3%) and longer TST (p=0.028, R2=0.4%). No other sleep or respiratory variables related to PI. No significant interactions with AHI≥5 were present. No differences between OSA (AHI≥5) and no-OSA groups were present on PI, ISI or CESDR after controlling for age, sex and BMI.
Conclusion: Retrospective reports of pain intensity were unrelated to PSG measures of sleep and respiratory disturbance. Female sex, older age and higher BMI related to higher PI regardless of the OSA diagnosis and collectively accounted for 8.8% of the PI variance. Symptoms of insomnia and depression related to higher PI independently of OSA, accounting for 4.5% and 2.3% of the PI variance, respectively. As in prior research OSA was associated with insomnia and depression, these variables may mediate the relationship between OSA and pain.
Support (If Any): None

0617

ASSOCIATION BETWEEN GREEN, BLUE, AND OPEN SPACES AND SLEEP HEALTH IN A BLACK POPULATION: AN ANALYSIS OF THE METSO DATASET

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Introduction: Blacks have a high burden of poor sleep health outcomes. Environmental determinants, such as green space or open environments, represent an underexplored contributor to sleep burden among Blacks. The extent these environmental factors affect sleep health outcomes within this population has not been adequately explored. To fill this gap in the literature, we investigated associations between environmental factors and sleep outcomes among Blacks in a large urban city. Objectives included (1) examine if zip-code derived open spaces (defined as proportion of open space in residential area,) green spaces (defined as open tree coverage of the ground) and blue spaces (proportion of water space) sleep apnea risk, and insomnia symptoms; (2) Examine if open, blue, and green spaces predict sleep outcomes independent of sex, age, and education level.
Methods: Our study used data from the Metabolic Syndrome Cohort Study (2009-2014), a studythat examined behavioral intervention methods to improve sleep apnea outcomes among Blacks. Sleep Apnea was assessed with the ARES (apnea risk) scale and insomnia status was collected through self-report ("Do you have difficulty staying/falling asleep or waking up?") in a subset of 344 participants. Logistic regression analyses were performed to predict the effect green, blue, and open spaces had on sleep outcomes. To account for within zip-code correlation, mixed effects models (unadjusted and adjusted) account for sex, age, and education were considered.
Results: We found that none of the green, blue, or open space variables predicted sleep outcomes in the unadjusted model. In adjusted models, green space predicted sleep apnea risk scores, (OR=1.03, P<.05), but not insomnia.
Conclusion: Our study examined the extent which green, blue, and open spaces predicted insomnia and sleep apnea in urban blacks. We found that only green spaces were associated with sleep apnea, and none of our environmental variables predicted insomnia. Given the large amount of literature detailing a complex and multifactorial process on how environment affects sleep outcomes, our findings suggest that the link between urban environments, green spaces, and sleep outcomes may not be as

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definitive as they seem. Further research should explore the differential effect environment has on diverse populations' sleep outcomes.
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0618

ASSOCIATION BETWEEN AMBIENT LIGHT EXPOSURE, RACE/ETHNICITY, AND VITAMIN D AMONG ADULTS IN THE UNITED STATES: ANALYSIS OF THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY

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Introduction: The prevalence of vitamin D deficiency (VitD) in the United States is 41 percent, with the highest rate among Blacks 82 percent. Vitamin D deficiency has been linked to chronic diseases. The extent to which the association between light exposure and vitamin D serum levels can vary by individual's race/ethnicity of which has not been studied at a national level. We aim to explore the associations of ambient light exposure between race/ethnicity and vitamin D.
Methods: The study used data from the National Health and Nutrition Examination Survey (2013-14). For detection of 25-hydroxyvitamin D3 and 25-hydroxyvitamin D2 nmol/L, ultra-high-performance liquid chromatography-tandem mass spectrometry was performed based on serum samples from adults aged ≥ 18 years. Light levels (lux) data were gathered using 24-hour actigraphic monitoring over /a 7day period. Weighted generalized linear models were fitted examining association between light exposure and VitD adjusting for age, sex, family income/poverty ratio, education, employment, house tenure, marital status, birthplace, number of people in household, smoking, physical activity, and sedentarity. To compare this association across race/ethnicity, a product term between lux and race/ethnicity was included in adjusted models.
Results: Among 4,251 participants, White adults had the highest levels of VitD (mean=76.0; se=1.3), then other/multiple races (mean=65.1; se=2.2), Asians (mean=62.5; se=1.4); Hispanics (mean=57.4 nmol/L; se=1.6), and Blacks (mean=50.1; se=1.4). Regression analysis revealed estimated mean VitD of 64.9 nmol/L and positive association between light exposure and VitD (0.020). Blacks had significantly lower VitD levels (-19.3) followed by Asians (-12.1) and Hispanics (-12.6) (all p-values <0.001). The association between light exposure and VitD depended on participant's race/ethnicity
Conclusion: To our knowledge, this is the first study showing associations between objectively measured light exposure and VitD serum levels using a large representative sample of the US population. Although the study revealed racial/ethnic disparities in VitD levels, light exposure was associated with VitD even when race/ethnicity was adjusted for in the model. Further research on racial/ethnic differences in VitD is warranted.
Support (If Any): R01HL142066, R01HL095799, RO1MD004113, R01HL152453, R25HL105444

0619

THE RELATIONSHIP BETWEEN SLEEP DISTURBANCE AND INFLAMMATORY MARKERS IN INDIVIDUALS WITH 22Q11.2 COPY NUMBER VARIATIONS

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Introduction: The 22q11.2 locus contains genes critical for brain development. Individuals with copy number variations (i.e. a deletion or duplication; CNV) at this locus have greatly increased risk of developmental neuropsychiatric disorders, as well as immune dysfunction and sleep problems. However, it remains unknown if sleep disturbance and immune dysfunction are related to each other in this population, as they are in typically developing individuals.
Methods: We examined the relationship between self-reported sleep disturbance and blood cytokine levels in 22q11.2 deletion (22qDel; n= 40, Mage = 17.5±8.4 years, 45% males) and duplication (22qDup; n=28, Mage =16.8±12.9 years, 45% males) carriers. Blood plasma samples were obtained to measure interlukein-6 (IL-6), interlukein-10 (IL-10), interleukin-8 (IL-8), tumor necrosis factor-alpha (TNF) and interferon-gamma (IFN) using a MesoScale Discovery multiplex immunoassay. We also measured levels of C-reactive protein (CRP) using an ELISA. Subjects were classified as either good or poor sleepers based on the sleep disturbance score on the Structured Interview of Psychosis-Risk Symptoms (SIPS). Linear regression models were used to test the effect of sleep disturbance, subject group (22qDel vs. 22qDup), and a group-by-sleep interaction on each cytokine level while controlling age, sex, body mass index, and collection time. We corrected for multiple comparisons using False Discovery Rate (FDR) correction.
Results: Overall, 22qDup carriers had higher levels of IL-8 ($q<0.001$) and TNF ($q<0.001$) relative to 22qDel. Across CNV groups, poor sleepers had higher levels of IL-8 ($p=0.046$) and IFN ($p=0.028$), but these effects did not survive FDR correction ($q>0.18$). There was a group-by-sleep interaction for IL-8 ($p=0.013$), TNF ($p=0.048$), and IFN ($p=0.034$) such that sleep disturbance had a greater effect on cytokine levels in the 22qDel group, but only the interaction for IL-8 survived as a trend towards significance after FDR correction ($q=0.076$).
Conclusion: Our findings suggest that poor sleep may contribute to immune dysfunction in 22q11.2 CNV carriers. Further, there may be differential impacts of sleep on immune function, depending on gene dosage at the 22q11.2 locus. Future research in larger samples is required to determine if immune disruption and sleep problems are related to elevated psychiatric symptoms in 22q11.2 CNV carriers.
Support (If Any): RO1MH085953; U01MH10171

0620

IS SVI A RISK FACTOR FOR SLEEP AND CARDIOMETABOLIC HEALTH AMONG BLACKS?

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Introduction: The Social Vulnerability Index (SVI) is a novel metric that incorporates a multitude of population factors to predict the susceptibility of communities to deleterious effects of disaster, natural hazards, and environmental insult. Studies show

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