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**EPI21 News Release**

**Presentation #MP24**

**Embargoed until 10 a.m. CT/ 11 a.m. ET, Thursday, May 20, 2021**

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MPS05 - Brain Health and Aging   (Presentation #MP24; Speaking Time: 5/20/2021 2:15:00 PM - 5/20/2021 2:20:00 PM)

**Title - Sedentary Behavior (SB) In Mid-life And Structural Brain Magnetic Resonance Imaging (MRI) Markers Of Cerebrovascular Disease And Neurodegeneration In Late-life: The Atherosclerosis Risk In Communities Neurocognitive Study (ARIC-NCS)**

**Abstract Content**

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| **Introduction:** Few prospective studies have examined the associations of SB on brain MRI markers. We tested the hypotheses that higher levels of, and persistence of mid-life television viewing, a cognitively passive SB, are associated with structural brain MRI markers in late-life, and that these associations are independent from physical activity (PA). **Methods:** ARIC participants (n=1,601, mean age: 76.2 years, 60.5% female, 27.2% Black) with reported television viewing at visits 1 (1987-89) and 3 (1993-95), and brain MRI in 2011-13 were included. Participants were categorized as low [never/seldom], medium [sometimes], or high [often/very often] television viewing. Persistent pattern of television viewing was quantified as the same frequency of reported television viewing at visits 1 and 3 (n=971). Imaging using 3T brain MRI quantified the presence of cerebrovascular lesions, white matter microstructural integrity and disease, and grey matter volumes using a standardized protocol. Models were adjusted for age, race-center, sex, education, APOE-ɛ4, smoking status, and total intracranial volume in volumetric analysis. Sampling weights were included to generalize MRI sample to the visit 5 cohort. Interactions by meeting (or not) 2018 PA guidelines were tested. **Results:** Compared to low television viewing, medium and high television viewing in midlife was significantly associated with smaller deep grey matter volumes in late-life after multivariable adjustment; associations were stronger for persistent television viewing (**Table**). All other associations of midlife, or persistent midlife, television viewing with structural brain MRI markers were statistically null. Interactions with meeting PA guidelines were also non-significant. **Conclusions:** Findings suggest an inverse association of mid-life television viewing with later-life deep grey matter volumes. Studies examining the associations of daily accumulated SB, and differences by SB type (active versus passive), with brain MRI markers are needed.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | | Table. Weighted adjusted association of midlife (Visit 3) and persistence in midlife (Visit 1 to Visit 3) television viewing with late-life (Visit 5; 2011-13) measures of cerebrovascular lesions, standardized white matter microstructural integrity and white matter disease, and standardized grey matter volumes | | | | | |  | **Television Viewing, Visit 3 (1993-95), n=1,601** | | |  | |  | **Lown=288** | **Mediumn=782** | **Highn=531** | **P-trend** | | ***Cerebrovascular Lesions (Odds Ratio (95% CI))*** | | | | | | **Cortical infarcts** | 1 (Ref) | 1.30 (0.72, 2.34) | 1.06 (0.57, 1.96) | 0.976 | | **Lacunar Infarcts** | 1 (Ref) | 1.27 (0.84, 1.93) | 0.88 (0.55, 1.40) | 0.361 | | **Subcortical Microhemorrhage** | 1 (Ref) | 1.25 (0.81, 1.91) | 0.99 (0.63, 1.55) | 0.741 | | ***Per Standard Deviation White Matter Microstructural Integrity and White Matter Disease [Beta (95% CI)]*a** | | | | | | **Mean Fractional Anisotropya** | 0 (Ref) | -0.13 (-0.27, 0.02) | -0.09 (-0.24, 0.07) | 0.403 | | **Mean Diffusivitya** | 0 (Ref) | 0.07 (-0.04, 0.19) | 0.05 (-0.08, 0.18) | 0.517 | | **log (WMH volume)a** | 0 (Ref) | 0.05 (-0.10, 0.20) | 0.05 (-0.12, 0.21) | 0.615 | | ***Per Standard Deviation Grey Matter Volume [Beta (95% CI)]a*** | | | | | | **Total Corticala** | 0 (Ref) | -0.03 (-0.11, 0.05) | 0.01 (-0.08, 0.10) | 0.726 | | **Temporal Lobe Meta ROIa** | 0 (Ref) | -0.005 (-0.10, 0.09) | 0.02 (-0.08, 0.13) | 0.612 | | **Deep Gray Mattera** | 0 (Ref) | **-0.14 (-0.25, -0.03)\*** | **-0.16 (-0.27, -0.06)\*** | **0.004** | |  | **Persistence in Television Viewing, Visit 1 (1987-89) to Visit 3 (1993-95), n=971** | | |  | |  | **Stable Lown=161** | **Stable Mediumn=490** | **Stable Highn=320** | **P-trend** | | ***Cerebrovascular Lesions [Odds Ratio (95% CI)]*** | | | | | | **Cortical infarcts** | 1 (Ref) | 1.68 (0.70, 4.01) | 1.30 (0.54, 3.18) | 0.769 | | **Lacunar Infarcts** | 1 (Ref) | **1.98 (1.11, 3.56)\*** | 1.07 (0.56, 2.02) | 0.601 | | **Subcortical Microhemorrhage** | 1 (Ref) | 0.97 (0.56, 1.73) | 0.67 (0.37, 1.23) | 0.123 | | ***Per Standard Deviation White Matter Microstructural Integrity and White Matter Disease [Beta (95% CI)]b*** | | | | | | **Mean Fractional Anisotropyb** | 0 (Ref) | -0.10 (-0.29, 0.08) | -0.02 (-0.22, 0.18) | 0.971 | | **Mean Diffusivityb** | 0 (Ref) | 0.03 (-0.11, 0.18) | -0.03 (-0.19, 0.13) | 0.550 | | **log (WMH volume)b** | 0 (Ref) | 0.10 (-0.08, 0.28) | 0.09 (-0.13, 0.30) | 0.513 | | ***Per Standard Deviation Grey Matter Volume [Beta (95% CI)]b*** | | | | | | **Total Corticalb** | 0 (Ref) | -0.06 (-0.16, 0.04) | -0.001 (-0.11, 0.11) | 0.810 | | **Temporal Lobe Meta ROIb** | 0 (Ref) | -0.01 (-0.13, 0.11) | 0.01 (-0.12, 0.14) | 0.825 | | **Deep Gray Matterb** | 0 (Ref) | **-0.16 (-0.30, -0.02)\*** | **-0.17 (-0.31, -0.03)\*** | **0.029** | | CI=Confidence Interval; Ref=Reference; ROI=Regions of Interest; WMH=White Matter HyperintensityAdjusted for age, race-center, sex, education, APOE-ɛ4, smoking status (ever vs. never), intracranial volume in volumetric analyses \* Bolded estimates indicate p<0.05**a**1 standard deviation= Total Cortical: 42.20 cm3; Temporal Lobe Meta Regions of Interest (ROI): 6.88 cm3; Deep Gray Matter: 4.25 cm3; log (WMH Volume): 0.88; Mean fractional anisotropy: 0.020374; Mean diffusivity: 0.0000529**b**1 standard deviation= Total Cortical: 40.93 cm3; Temporal Lobe Meta Regions of Interest (ROI): 6.64 cm3; Deep Gray Matter: 4.22 cm3; log (WMH Volume): 0.90; Mean fractional anisotropy: 0.0206098; Mean diffusivity: 0.000053 | | | | | |

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**EPI21 News Release**

**Presentation #P149**

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P29 - Physical Activity and Sedentary Behavior (Presentation #: P149)

**Title - Sedentary Behavior In Mid-life And Risk Of Change In Global Cognitive Function And Incident Dementia: The Atherosclerosis Risk In Communities Neurocognitive Study (ARIC-NCS)**

**Abstract Content  
Introduction:** Sedentary behavior (SB) has emerged as a risk factor that may exert health effects independent from moderate-to-vigorous intensity physical activity (PA). However, the role of SB on cognitive health and its interaction with PA has not been widely examined prospectively. We tested the hypotheses that higher levels of, and persistence of mid-life television viewing, an established proxy measure of leisure-time SB, are associated with faster rates of cognitive decline and greater incidence of dementia, and that these associations are attenuated by meeting/not meeting the 2018 PA guidelines. **Methods:** ARIC participants (n=10,700, mean age: 59 years, 44% male, 19% Black) with self-reported assessments of television viewing at visits 1 (1987-1989) and 3 (1993-1995) were included. Participants were categorized as low [“never”/“seldom”], medium [“sometimes”], or high [“often”/“very often”] television viewing. Persistence in television viewing was quantified as the same reported television viewing at visits 1 and 3 (n=6,462). Cognitive tests of working memory, language, and executive function were administered at visits 4 (1996-1998) and 5 (2011-2013), and a factor analysis was used to derive a global cognition factor score. Dementia diagnoses were based on a battery of cognitive tests and expert adjudication. Additional cases were identified through hospital discharge codes and diagnostic codes from death certificates. Linear mixed models estimated the associations of SB categories with change in global cognition. Time to dementia was estimated using Cox proportional hazards regression models. Models were adjusted for age, education, race-ARIC field center, and APOE-ɛ4. Interactions with PA, categorized as meeting/not meeting PA guidelines, were tested. **Results:**Over a median follow-up of 17.4 years, 1,063 dementia cases were observed. In unadjusted models, high vs. low television viewing was associated with higher incident dementia (hazard ratio [95% CI], 1.42 [1.18, 1.71]); however, this association was no longer significant in multivariable adjusted models (1.09 [0.90, 1.32]). Significantly faster rates of decline in global cognition were observed for participants with high (-0.04 standard deviation (SD) difference [-0.08, -0.002]) or medium (-0.04 SD difference [-0.08, -0.004]) vs. low television viewing in multivariable adjusted models. These associations were stronger when measured as persistent mid-life television viewing (stable high vs. stable low: -0.06 SD difference [-0.11, -0.01]). The interaction of television viewing with PA guidelines on change in global cognition was statistically null. **Conclusions:**TV viewing, aproxy SB measure, is associated with cognitive decline, but not incident dementia. Longitudinal studies with device-based measures are needed to test the associations of accumulated daily SB on cognition and dementia outcomes.

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**EPI21 News Release**

**Presentation #MP67**

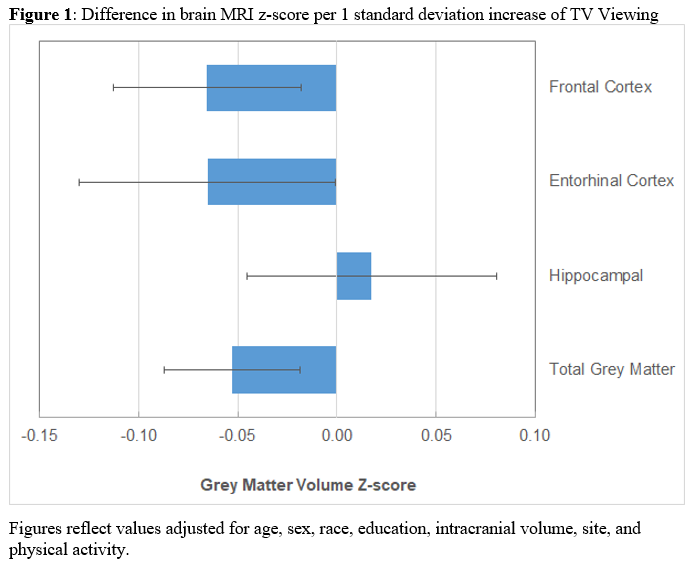
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MPS12 - Novel CVD Risk Factors  (Presentation #: MP67; Speaking Time: 5/21/2021 2:25:00 PM - 5/21/2021 2:30:00 PM)

**Title - Long-term TV Viewing Is Associated With Grey Matter Brain Volume In Midlife: The Coronary Artery Risk Development In Young Adults (CARDIA) Study**

**Abstract Content**

***Introduction:*** While it is generally accepted that a physically active lifestyle is important for overall health,sedentary behavior has become a public health focus due to evidence that it may impart unique risk for chronic diseases. The purpose of this study was to examine the association between 20-year television (TV) viewing patterns, as a proxy for sedentary behavior, with grey matter volume in midlife. We hypothesized that greater TV viewing in early to mid-adulthood would be associated with lower grey matter volume at midlife, independent from physical activity. ***Methods:*** We evaluated 599 participants (306 female, 264 black, mean age 30.3±3.5 at baseline and 50.2±3.5 years at follow-up and MRI) from the prospective CARDIA study. We assessed TV patterns with repeated interviewer-administered questionnaire spanning 20 years. Structural MRI (3T) measures of grey matter were assessed at year 20 during midlife. We used multivariable linear models to examine the association between long-term TV viewing (mean hours) and frontal cortex, entorhinal cortex, hippocampal, and total grey matter volumes, adjusting for demographics, intracranial volume, and study site. ***Results:*** Over the 20 years, participants reported viewing an average of 2.5±1.7 hours of TV per day (range: 0-10 hours). After multivariable adjustment, greater TV viewing was negatively associated with grey matter volume in the frontal (β= -0.773; *p*= 0.01) and entorhinal cortex (β= -23.8; *p*= 0.05) as well as total grey matter (β= -2.089; *p*= 0.003) but not hippocampus. These results remained unchanged after additional adjustment for physical activity. For each one standard deviation increase in TV viewing, the difference in grey matter volume z-score was approximately 0.06 less for each of the three regions (*p<* 0.05; Figure 1). ***Conclusions:*** Among middle-aged adults, greater TV viewing in early to mid-adulthood was associated with lower grey matter volume. Sedentariness or other facets of TV viewing may be an important risk factor for brain aging even in middle age.  
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