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FROM THE ALZHEIMER'S ASSOCIATION INTERNATIONAL CONFERENCE 2020

ALZHEIMER'S RISK FACTORS MAY BE MEASURABLE IN ADOLESCENTS AND YOUNG ADULTS

CHICAGO, July 30, 2020 — Risk factors for Alzheimer's dementia may be apparent as early as our teens and 20s, according to new research reported at the Alzheimer's Association International Conference® (AAIC®) 2020.

These risk factors, many of which are disproportionately apparent in African Americans, include heart health factors — such as high blood pressure, high cholesterol and diabetes — and social factors like education quality. According to the Alzheimer's Association *Alzheimer's Disease Facts and Figures* report, older African Americans are about twice as likely to have Alzheimer's or other dementias as older whites.

"By identifying, verifying, and acting to counter those Alzheimer's risk factors that we can change, we may reduce new cases and eventually the total number of people with Alzheimer's and other dementia," said Maria C. Carrillo, Ph.D., Alzheimer's Association chief science officer. "Research like this is important in addressing health inequities and providing resources that could make a positive impact on a person's life."

"These new reports from AAIC 2020 show that it's never too early, or too late, to take action to protect your memory and thinking abilities," Carrillo said.

The Alzheimer's Association is leading the U.S. Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk (U.S. POINTER), a two-year clinical trial to evaluate whether lifestyle interventions that simultaneously target many risk factors protect cognitive function in older adults who are at increased risk for cognitive decline. U.S. POINTER is the first such study to be conducted in a large, diverse group of Americans across the United States.

African American Youth At Higher Risk of Dementia

In a population of more than 714 African Americans in the Study of Healthy Aging in African Americans (STAR), Kristen George, Ph.D., MPH, of the University of California, Davis, and colleagues found that high blood pressure and diabetes, or a combination of multiple heart health-related factors, are common in adolescence and are associated with worse late-life cognition. Study participants were adolescents (n=165; ages 12-20), young adults (n=439; ages 21-34) and adults (n=110; ages 35-56). Mean age at cognitive assessment was 68.

Cognition was measured using in-person tests of memory and executive function. The researchers found that, in this study population, having diabetes, high blood pressure, or two or more heart health risk factors in adolescence, young adulthood, or mid-life was associated with statistically significantly worse late-life cognition. These differences persisted after accounting for age, gender, years since risk factors were measured, and education.

Before this report, little was known about whether cardiovascular disease (CVD) risk factors developed prior to mid-life were associated with late-life cognition. This is an important question because African Americans have a higher risk of CVD risk factors compared to other racial/ethnic groups from adolescence through adulthood.

According to the researchers, these findings suggest that CVD risk factors as early as adolescence influence late-life brain health in African Americans. Efforts to promote heart and brain healthy lifestyles must not only include middle-aged adults, but also younger adults and adolescents who may be especially susceptible to the negative impact of poor vascular health on the brain.

Early Adult BMI Associated With Late Life Dementia Risk

In what the authors say is the first study to report on the issue, higher early adulthood (age 20-49) body mass index (BMI) was associated with higher late-life dementia risk.

Relatively little is known about the role of early life BMI on the risk of Alzheimer and other dementias. The scientists studied a total of 5,104 older adults from two studies, including 2,909 from the Cardiovascular Health Study (CHS) and 2,195 from the Health, Aging and Body Composition study (Health ABC). Of the total sample, 18% were Black and 56% were women. Using pooled data from four established cohorts spanning the adult life course, including the two cohorts under the study, the scientists estimated BMI beginning at age 20 for all older adults of CHS and Health ABC.

- For women, dementia risk increased with higher early adulthood BMI. Compared to women with normal BMI in early adulthood, dementia risk was 1.8 times higher among those who were overweight, and 2.5 times higher among those who were obese. Analyses were adjusted for midlife and late life BMI.
    - They found no association between midlife BMI and dementia risk among women.
- For men, dementia risk was 2.5 times higher among those who were obese in early adulthood, 1.5 times higher among those who were overweight in mid-life and 2.0 times higher among those who were obese in mid-life, in models also adjusted for late life BMI.
- For both women and men, dementia risk *decreased* with higher late life BMI.

Adina Zeki Al Hazzouri, Ph.D. of Columbia University and colleagues found that high BMI in adulthood is a risk factor for dementia in late life. The researchers suggest that efforts aimed at reducing dementia risk may need to begin earlier in life with a focus on obesity prevention and treatment.

Quality of Early-Life Education Influences Dementia Risk
In a diverse group of more than 2,400 people followed up to 21 years, higher quality early-life education was associated with better language and memory performance, and lower risk of late-life dementia. Results were somewhat different between men and women, and between Blacks and Whites in the study.

The study included 2,446 Black and White men and women, age 65 and older, enrolled in the Washington Heights/Inwood Columbia Aging Project who attended elementary school in the United States. A school quality variable based on historical measures included: mandatory school enrollment age, minimum dropout age, school term length, student-teacher ratio, and student attendance.

People who attended school in states with lower quality education had more rapid decline in memory and language as an older adult. Black women and men and White women who attended schools in states with higher quality education were less likely to develop dementia. According to the scientists, the results were explained, in part, because people who attend higher quality schools end up getting more years of school.

Justina Avila-Rieger, PhD, a postdoctoral research scientist at Columbia University Irving Medical Center and colleagues say the findings provide evidence that later life dementia risk and cognitive function is influenced by early-life state educational policies.

About the Alzheimer's Association International Conference (AAIC)
The Alzheimer's Association International Conference (AAIC) is the world's largest gathering of researchers from around the world focused on Alzheimer's and other dementias. As a part of the Alzheimer's Association's research program, AAIC serves as a catalyst for generating new knowledge about dementia and fostering a vital, collegial research community.

- AAIC 2020 home page: www.alz.org/aaic/
- AAIC 2020 newsroom: www.alz.org/aaic/pressroom.asp
- AAIC 2020 hashtag: #AAIC20

About the Alzheimer's Association
The Alzheimer's Association is a worldwide voluntary health organization dedicated to Alzheimer's care, support and research. Our mission is to lead the way to end Alzheimer's and all other dementia — by accelerating global research, driving risk reduction and early detection, and maximizing quality care and support. Visit alz.org or call 800.272.3900.

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- Kristen George, PhD, MPH, et al. Cardiovascular risk factors in adolescence and adulthood and late-life cognition: Study of healthy aging in African Americans (STAR). (Funder(s): U.S. National Institute on Aging)
- Adina Zeki Al Hazzouri, PhD, et al. Association of early life BMI with dementia risk: Findings from a pooled cohort analysis. (Funder(s): U.S. National Institute on Aging)
- Justina Avila-Rieger, et al. Relationship between state-level administrative school quality data, years of education, cognitive decline, and dementia risk. (Funder(s): U.S. National Institute on Aging)

*** AAIC 2020 news releases may contain updated data that does not match what is reported in the following abstracts.

Cardiovascular risk factors in adolescence and adulthood and late-life cognition: Study of healthy aging in African Americans (STAR)
Proposal ID: 47974, O1-09-04

Thursday, July 30, 2020, 2:45 pm CT
VFairs, Session Chatroom B

Background: Mid-life cardiovascular disease (CVD) risk factors are associated with late-life cognition, but it is unknown whether CVD risk factors before mid-life affect cognition. African Americans develop CVD risk factors at younger ages compared to other racial/ethnic groups. We examined the relationship between CVD during adolescence and adulthood (early through mid-life) with late-life cognition in the Study of Healthy Aging in African Americans (STAR).

Method: STAR evaluated cognitive aging in African Americans (N=676) and enrolled approximately equal proportions of participants ages 50-64 and 65+. Participants were long-term Kaiser Permanente Northern California members and completed Multiphasic Health Check-ups (MHC) from 1964-1985 at which body mass index (BMI), blood pressure, blood glucose, and serum total cholesterol were measured. At STAR baseline (2019), education, income, and cognition were assessed. Cognitive domains of verbal episodic memory, semantic memory, and executive function were measured using the Spanish and English Neuropsychological Assessment Scales (SENAS). Domain scores were z-standardized and averaged to create a global z-score. We used linear regression to analyze the association between adolescent and adulthood CVD risk factors with cognition, adjusted for age, gender, and education.

Result: At MHC, participants were adolescents (N=333; ages 14-25) and adults (N=343; ages 26-56). Mean age at cognitive assessments was 68 (SD=9) years. Being overweight/obese did not predict late-life cognition regardless of age at MHC. Hypertension [pooled β=-0.18 (-0.33, -0.03)] and diabetes [pooled β=-0.69 (-1.15, -0.24)] were associated with worse cognition among both MHC age groups. Hypercholesteremia was associated with worse cognition in adults at MHC, but not adolescents [Adults β=-0.22 (-0.40, -0.05) vs. Adolescents β=0.02 (-0.16, 0.21); interaction p=0.03]. Having 2+ cardiovascular risk factors predicted worse cognition for both MHC age groups [pooled β=-0.24 (-0.40, -0.08)]. Looking at cognitive domains separately, associations were consistent for executive function and verbal memory, but non-significant for semantic memory.

Conclusion: Hypertension, diabetes, or a combination of multiple cardiovascular risk factors at adolescence and adulthood were common and associated with worse late-life cognition. Hypercholesteremia in adulthood, but not adolescence, was associated with worse cognition. Results suggest that cardiovascular risk as early as adolescence may influence late-life brain health in African Americans.

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Association of early life BMI with dementia risk: Findings from a pooled cohort analysis
Proposal ID: 37958

Thursday, July 30, 2020, 12:00 am CT
Posters: Public Health

Background: The evidence about the timing and influence of some key cardiovascular risk factors, such as Body Mass Index (BMI), on the risk of Alzheimer disease and other dementias remains debatable. Studies have shown that high midlife BMI increases the risk of dementia, while high late life BMI may be protective; however, relatively little is known about the role of early life BMI on the risk of Alzheimer Disease and other dementias.

Method: We studied 5,104 older adults from two studies, the Cardiovascular Health Study (CHS, n=2,909) and the Health, Aging and Body Composition study (Health ABC, n=2,195) study. For CHS-Health ABC older adults, we imputed early and midlife BMI, beginning at age 18, using linear mixed models applied to a pooled cohort which also included young and middle-aged adults from CARDIA and MESA. BMI was then summarized by time-weighted averages in early (ages 20-49), mid (ages 50-69), and late life (ages 70-89). In CHS, dementia was adjudicated by an expert committee following a detailed neuropsychological test battery and neurological examination. In Health ABC, dementia diagnosis was determined based on hospitalization ICD codes, dementia-related drugs and decline on the Modified Mini Mental State Examination. All analyses were sex stratified.

Result: CHS-Health ABC participants had a mean age of 72.6 years (SD=4.2) at enrollment, 18% were black and 56% were women. For women, dementia risk increased with higher early life BMI: it was 1.8 times higher among those who were overweight (OR=1.8; 95% CI=1.31-2.54) and 2.5 times higher among those who were obese (OR=2.45; 95% CI=1.47-4.06), from pooled logistic regression models adjusted for midlife and late life BMI. For men, dementia risk increased with higher early life (Obese OR=2.47; 95% CI=1.46-4.19) and mid life BMI (Overweight OR=1.51; 95% CI=1.11-2.05 and Obese OR=2.00; 95% CI=1.16-3.42), in models also adjusted for late life BMI. For both women and men, dementia risk decreased with higher late life BMI.

Conclusion: Our study is the first to report heightened dementia risk with higher early life BMI, for both women and men. Accounting for early life BMI, we found no effect for midlife BMI on dementia risk among women.

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Relationship between state-level administrative school quality data, years of education, cognitive decline, and dementia risk
Proposal ID: 47971, O1-09-01

Thursday, July 30, 2020, 2:00 pm CT
VFairs, Session Chatroom B

Background: We examined indicators of state-level administrative school quality as predictors of cognitive decline and dementia risk in later life across racial/ethnic by sex/gender groups.

Method: Participants included 2,446 men and women enrolled in the Washington Heights/Inwood Columbia Aging Project (WHICAP) who attended elementary school in the U.S., including 858 non-Hispanic Whites (NHWs) and 1,588 non-Hispanic Blacks (Blacks) followed up to 21 years. Cognitive outcomes were memory and language trajectories. A school quality indicator was created using U.S. census microsample data to combine historical measures of state compulsory schooling (mandatory enrollment age, minimum drop out age, and minimum work permit age) and school quality (term length, student-teacher ratio, and percent attendance) on a scale corresponding to years of education via regression. The school quality indicator values were linked to WHICAP individual data via birth state, birth year, sex/gender, and race/ethnicity (black or NHW). Multiple-group growth curve modeling and multiple-group Cox regressions analyses were used to examine associations between school quality, cognitive decline, and dementia risk across racial/ethnic by sex/gender groups.

Result: After adjusting for age, childhood SES, and state of childhood residence, higher quality of early-life education was associated with level and change in language performance across groups, level of memory performance in Black women, and change in memory for NHWs and Black women. Higher quality of education was associated with lower risk of dementia for NHW women, Black men and women. Quality of education was not associated with dementia risk for NHW men after accounting for covariates. When years of education was included in the models, the influence of school quality on dementia risk and level and change in memory and language performance was fully attenuated for Black men and partially attenuated for NHWs and Black women.

Conclusion: Quality of early-life education positively impacts cognitive outcomes and dementia risk later in life. Our results suggest an indirect relationship of school quality to late-life cognitive outcomes through enabling additional years of educational attainment. Associations also varied across racial/ethnic by sex/gender groups. These findings provide evidence that later life brain health is influenced by early-life state educational policies.

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