

BMI exhibited twice the risk of low cognitive functioning,  $b = -.49$  ( $SE = .08$ ),  $p < .0001$ , compared to women with normal BMI,  $b = -.24$  ( $SE = .06$ ),  $p = .0001$ . Inflammation and BMI are modifiable factors that may prevent or slow down abnormal cognitive decline. Understanding the potentially sex-dependent role of adipose tissue in the impact of inflammation on cognitive function may be critical to understanding the pathogenesis of cognitive impairment late in life as well as identifying efficacious intervention targets.

#### INTERACTIONS BETWEEN PLASMA AMYLOID AND AGING MARKERS TO DETERMINE CLINICALLY MEANINGFUL COGNITIVE DECLINE

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**Background:** Brain amyloidosis is a well-known pathological hallmark of Alzheimer's disease (AD) and can be early identified by measuring plasma amyloid- $\beta$  ( $A\beta$ ) status. Growing evidence implicates the biological mechanisms of aging, including chronic inflammation, mitochondrial dysfunction and neurodegeneration, in AD pathogenesis. This study aims to investigate the interactions between plasma  $A\beta$  status and aging markers on clinically meaningful cognitive decline. **Methods:** This secondary analysis from Multidomain Alzheimer Preventive Trial (MAPT) enrolled 401 community-dwelling older adults (mean age  $\pm$  SD: 76.7  $\pm$  4.6 years) who had clinical dementia rating (CDR) scale as 0 or 0.5, and who had their plasma biomarkers measured: amyloidosis:  $A\beta_{42/40}$  ratio; inflammatory: tumor necrosis factor receptor type 1 (TNFR-1), interleukin-6 (IL-6), monocyte chemoattractant protein-1 (MCP-1), C-reactive protein (CRP); mitochondrial dysfunction: growth differentiation factor 15 (GDF-15); neurodegeneration: neurofilament light chain (NfL). Cognitive decline was determined by diagnosed dementia and worsening CDR status. Cox regression and moderation modeling were applied to examine the interrelationships between biomarkers and risk of cognitive decline. **Results:** Among 401 participants, 43.9% were cognitive normal (CDR=0) and 56.1% were mild cognitive impairment (CDR=0.5) initially. After 3.3  $\pm$  1.1 years of follow-up, 7.0% of population evolved dementia and 34.2% had worsening CDR status. GDF-15 and NfL presented prospective associations with incident dementia. However, risk of dementia associated with plasma  $A\beta$  did not change after considering the serum level of GDF-15 and NfL. **Conclusion:** The markers of mitochondrial dysfunction and neurodegeneration did not partially explain the associations between plasma  $A\beta$  status and cognitive decline in older adults.

#### LONGITUDINAL ASSOCIATION OF EXECUTIVE FUNCTION AND BALANCE IN COMMUNITY-DWELLING OLDER ADULTS

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Declines in Executive Function (EF) are associated with balance in community-dwelling older adults with Mild Cognitive Impairment (MCI). While this has been examined in cross-sectional studies, no longitudinal studies describe change over time. The purpose of this study was to examine how performance on the components of the Short Physical Performance Battery (SPPB) are associated with EF in community-dwelling older adults who transition into MCI. This secondary data analysis employed eight years of data from the National Health and Aging Trends Study dataset (2011 – 2018) with 1,225 participants in all eight waves (balanced). EF was measured with the Clock Drawing Test and SPPB balance tests included side-by-side, semi-tandem, full tandem, and single leg stance with eyes open or closed. Longitudinal ordered logistic regression was used to examine associations between each balance measure and EF while controlling for comorbidity, function, depression, gender, age, and ethnicity. EF was significantly associated with tandem, semi-tandem, and single leg stance after controlling for covariates. One point increase in SPPB can reduce the risk of EF impairment by 8.2% (Odds Ratio (OR)=0.918,  $p < 0.001$ ). Among SPPB components, semi-tandem (OR=0.468) and side-by-side (OR=0.472) were the strongest predictors of EF impairment. Declines in both EF and balance performance occurred over an eight-year period in adults. This may reflect common neural processes shared between the cognitive and motor areas of the central nervous system. Best practice suggests screening both balance (tandem, semi-tandem, or single leg stance) and EF in the clinical assessment of community-dwelling older adults.

#### LONG-TERM VISIT-TO-VISIT BLOOD PRESSURE VARIABILITY AND COGNITION: A SYSTEMATIC REVIEW OF OBSERVATIONAL STUDIES

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Existing literature suggests that in comparison to a single blood pressure (BP) measurement, or the mean of multiple recordings, BP variability (BPV) may reflect dysfunction in cardiovascular regulatory mechanisms, leading to compromised cognitive health. No systematic review has yet synthesized observational reports examining the association between cognition and long-term visit-to-visit BPV. In response, a comprehensive literature search was executed in December, 2019, and updated in December, 2020. Methodological approach was pre-registered (<https://osf.io/vmnuq/>). Of 1385 reports, 27 met eligibility criteria. Most executed secondary analyses using existing longitudinal datasets of older adults (N=21). Intervals between measurement occasions ranged from 30 days to four years, and follow-up ranged from 0.5-25 years. Most studies computed more than one index of BPV (range=1-6), and all included at least three BP recordings (range=3-12). Given extensive between-study variability in analytic approach (e.g., BPV and cognition treated as continuous and/or categorical variables; number of covariates

ranged 0-18), our team determined that meta-analyzing the results would be inappropriate. Despite heterogeneity in study characteristics, the majority (85.2%) reported that systolic BPV (sBPV) was negatively associated with cognition; specifically, higher sBPV was associated with cognitive impairment (N=9), cognitive decline (N=6), and/or risk of dementia (N=5). Four studies also revealed higher sBPV in individuals with dementia compared to controls. Three studies reported no association, while one reported a positive significant association between BPV and cognition. Results were similar for diastolic BPV. Despite considerable heterogeneity in study characteristics, greater variability in visit-to-visit BP appears to be consistently associated with adverse cognitive outcomes.

#### MANIFESTATIONS OF AGING IN VIRTUAL REALITY IMPLEMENTATION OF ROD AND FRAME TEST

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Senior adults' reliance on the visual frame of reference for spatial orientation is a manifestation of an age-related shift in cognitive style from field independence to field dependence. We implemented a virtual reality rod and frame test (VR-RFT) to assess visual field dependence (VFD) in n=39 young adults (20-30 years old) and n=43 seniors (60 years old and above). The subjects were asked to determine subjective visual vertical (SVV) for 19 angles of frame tilt (ranging from -45 degrees to 45 degrees in steps of 5 degrees). The strong VFD of seniors was manifested not only by the increased error in the determination of SVV (SVVE) but also in its distribution. For small and large frame tilt angles, seniors' SVVE skewness and kurtosis were greater than those of young adults. The SVVE median dependence on frame tilt may be accounted for with a phenomenological model whose two parameters describe the strengths of primary (P) and secondary (S) visual attractors which subjects use to infer SVV: the edges of the frame and its imaginary diagonals. For young adults, these parameters were: PY=14.91 and SY=12.51. For seniors, we observed an over 50% increase in the strength of the primary attractor PS=26.31 while the strength of the secondary one was only weakly affected by aging: SS=13.74. We demonstrate that the asymmetry between the strength of attractors significantly contributes to SVVE made by seniors at large frame tilts. We hypothesize that a variant VR-RFT may be used in rehabilitation to reduce excessive VFD.

#### PREDICTING QUALITY OF LIFE WITH PHYSICAL AND COGNITIVE FUNCTIONING AMONG OLDER ADULTS WITH COGNITIVE IMPAIRMENT

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Purpose: Older adults experience abnormal declines in physical and cognitive functioning that increase their risk of dependence, subsequently quality of life. This study aims to explore the relationship between physical and cognitive

functioning, and to predict quality of life among older adults with mild cognitive impairment. Methods: Survey was conducted with older adults registered at dementia support centers. Seventy-four older adults signed the consent form and participated in the study. Physical functioning consisted of grip strength, balance (OLS), Timed up and go, and activities of daily living. Cognitive functioning was measured by K-MOCA. SF-12 was used to assess quality of life. Results: The participants was 76 years old on average, more women (75.4%), and mostly elementary or less education level (60.9%). Physical functioning explained 22.1% of variance in cognitive functioning after controlling for age and gender (F change=4.789, p=.002). Balance (OLS: t=2.304, p=.024) and grip strength (t=2.207, p=.031) was significant predictors. Physical and cognitive functioning explained 36.7% of variance in quality of life after controlling for age and gender (F =5.466, p<.001). Indicators of physical functioning, TUG (t=-3.252) and grip strength (t=-2.633), were the most significant predictors of quality of life, while cognitive function explained additional 3.1% of variance in quality of life (F=3.216, p=.078). Conclusion: Physical functioning were significant predictors of cognitive functioning, subsequently to quality of life among older adults with cognitive impairment. Health promoting strategies should focus on improving physical functioning of this population to maintain or prevent cognitive declining, and to promote quality of life.

#### RELATIONSHIP BETWEEN TYPE 2 DIABETES CONTROL AND COGNITION IN OLDER ADULTS: FINDINGS FROM NHANES

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Cognitive health has emerged as an important public health concern for America's aging population. Type 2 Diabetes (T2D) may be associated with an exacerbated decline in cognitive performance. This study aimed to examine the relationship between T2D control and cognitive performance in older adults (≥60 years) using the 2013-2014 National Health and Nutrition Examination Surveys. Participants who completed the following cognitive assessments were included: 1) Consortium to Establish a Registry for Alzheimer's Disease Word List (CERAD-WL), 2) Animal Fluency (AF), 3) Digit Symbol Substitution Test (DSST) (higher scores associated with better cognition). Participants were stratified by four groups: no T2D (N=557), treated/controlled T2D (controlled; N=41), treated/uncontrolled T2D (uncontrolled; N=120), untreated T2D (N=86), based on self-reported T2D treatment, fasting plasma glucose, and hemoglobin A1c. Logistic regression was used to examine the relationship between T2D control and cognition. We observed that those with uncontrolled and untreated T2D each had ~15% lower DSST than those with no T2D (P<0.01). CERAD-WL and AF were similar across all groups. Unadjusted analyses showed that individuals with 1) lower CERAD-WL were more likely to have controlled and untreated T2D, 2) lower AF were more likely to have controlled