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Current research regarding grip strength highlights the robustness of grip strength as a predictor of morbidity and mortality. The aim of this study was to evaluate the association of grip strength over four years with functional limitations among racially/ethnically diverse older adults. We analyzed National Health and Aging Trends Study (NHATS) data 2010-2014. Our sample included 4,413 adults > 65 years old. Functional limitation was defined as a sum of difficulty performing eight ADL/IADLs (range 0-8) at each wave. Grip strength was measured using a digital hand dynamometer and readings were recorded in kilograms (kg) (maximum of 32 kg for men and > 20 kg for women). We estimated stratified linear regression models by race/ethnicity and age, and adjusted for BMI, education, and gender. The majority of the sample was between 65-79 years of age (64%), 55.1% were female and the average BMI was 27.5. We found that differences in ADL/IADL limitations increased and grip strength decreased over the four year period of observation. We also found racial/ethnic differences between waves 1 and 4 with greater ADL/IADL limitations for Hispanics with lower grip strength scores compared to non-Hispanic whites. There were racial/ethnic differences in the association between grip strength and ADL/IADL over time in Non-Hispanic blacks and Hispanics when compared to Non-Hispanic whites. This is an important issue to address since loss of muscle strength in older adults may lead to several negative outcomes such as limited activities of daily living which may affect older adults differentially based on race/ethnicity.

#### ASSOCIATION BETWEEN FRAILTY AND DEVELOPMENT OF COGNITIVE IMPAIRMENT: EVIDENCE FROM THE HEALTH AND RETIREMENT STUDY

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Research has shown there is currently an increasing prevalence of cognitive impairment and dementia in older adults. To date, there remains a paucity of research to explain this increase and research on early markers and risk factors are warranted. This study aims to assess the association of cognitively normal older adults who are frail and the development of cognitive impairment four years later. Data from the Health and Retirement Study – a nationally representative sample of older US adults – was used from 2004-2008 for individuals 65 and older (n=8,377). Frailty was categorized by using Fried's phenotype model: individuals were grouped into frail, pre-frail, and robust. Cognitive impairment – a composite score that assessed memory recall and global mental status – was classified as scoring eight or less on a 35-point scale. After restricting to cognitively healthy individuals, logistic regression with weights was used to assess the association between frailty status and the development of cognitive impairment four years later. The model was adjusted for baseline age, gender, race, education years, smoking status, and chronic health issues (high blood pressure, diabetes, cancer, lung disease, heart disease,

stroke, psychiatric problems, and arthritis). Frail individuals, compared to those who were robust, had increased odds of cognitive impairment (OR=1.74; 95% CI: 1.48-2.16), after fully adjusting. Evidence from this study suggest that frail individuals are more likely to become cognitively impaired over time. This provides a potential pathway of intervention to help delay or prevent the development of cognitive impairment in older US adults.

#### IMPACT OF HIGH BODY MASS INDEX ON FRAILTY AND MORTALITY IN MIDDLE-AGED AND OLDER ADULTS

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Obesity is associated with higher risk of metabolic diseases. How body mass index (BMI) relates to mortality across frailty levels is controversial. We investigated the association of high BMI with frailty, and their effects on mortality. We included 36,583 participants aged ≥50 years from the 1999-2006 National Health and Nutrition Examination Survey (NHANES) cohorts (7,372) and 29,211 participants aged ≥50 years from wave 1 (2004) of Survey of Health Ageing and Retirement in Europe (SHARE). BMI was categorized as: normal: 18.5-24.9 kg/m<sup>2</sup>, overweight: 25-29.9, obese I: 30-34.9 and obese II+III: >35. A frailty index (FI) was constructed excluding nutrition-related items using 36 items for NHANES and 68 items for SHARE. Mortality data were obtained until 2015. All analyses were adjusted for educational, marital, working and smoking status. In participant aged 50-65 years, higher BMI was associated with greater frailty. Being obese level II+III increased mortality risk in male participants aged 50-65 years with FI≤0.1 [NHANES (hazard ratio (HR) 2.10, 95%CI 1.17-3.79); SHARE (2.35,1.14-4.87)]. In males aged >65 years with FI>0.3, being overweight and obese (any level) decreased mortality risk. In females aged 50-65 years, higher BMI was not associated with mortality across all frailty levels. BMI and frailty were cross-sectionally associated. The subsequent mortality impact differed by age, sex, and frailty. Obesity was not associated with mortality in middle-aged females, regardless of the degree of frailty. In males, obesity was harmful in those who were fit in middle age and protective in moderately/severely frail older ones.

#### AN INNOVATIVE PLATFORM BASED ON WEARABLE SENSOR TO QUANTIFY FRAILTY PHENOTYPES

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This study evaluated an innovative wearable sensor based platform (instrumented trail-making task, iTMT) to quickly quantify frailty phenotypes, without the need of walking test. 61 older adults (age=72.8 ± 9.9years, BMI=27.4±4.9kg/m<sup>2</sup>) were recruited and assessed by Fried Frailty Criteria to determine frailty phenotypes. All subjects participated the iTMT test