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Application Number / Title: 21893 - The association between grip strength, lean mass and morbidity and mortality across the glycaemic spectrum

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Keywords provided by the Applicant PI to describe the research project:
Gripstrength, mortality, diabetes, ethnicity, gender, age

Application Lay Summary:
1a: Aims:
1. Determine the cross sectional association between grip strength (muscle quality) and lean mass (muscle quantity) in key subgroups such as the elderly, people with diabetes and minority ethnic groups.

2. Determine the longitudinal association between grip strength and morbidity and mortality outcomes overall, and by our key subgroups, and the role of lean mass and other clinical covariates in accounting for any associations observed.

3. Explore how grip strength and lean mass change over a 5 year period, and whether this differs by age and diabetes.

4. Explore how changes in these muscle measures predict outcomes.

5. To examine whether grip strength or muscle mass interacts with obesity (as measured by BMI or waist hip ratio (WHR)), and whether this differs by subgroups of the population.

6. Use Mendelian Randomisation (MR) to investigate whether any observed associations in the above analysis of grip strength and outcomes are likely to be causal.

Previous research has identified a strong association between reduced muscular strength, major disease outcomes and mortality. Importantly, these have not been well studied in the elderly and ethnic minority subgroups, who may have some degree of sarcopenia, with variable effects on grip strength and thus on outcomes. We will investigate the predictive value of grip strength for individuals with and without diabetes in these populations. UK By defining the role of grip strength in cardiovascular disease outcomes and mortality, we aim to improve the prevention and diagnosis of these diseases, in line with UKB's core goals. This will be a prospective cohort study examining time to all-cause mortality, cardiovascular mortality, non-cardiovascular mortality, and a range of CVD end points in a competing risks framework, where death is considered to have precluded the risk of any other non-fatal endpoint occurring. The primary predictor will be grip strength. We intend to use the full dataset of approximately 500,000 people. The study population will be drawn from all UKB participants with a grip strength measurement at baseline.

The population will be stratified according to the presence of diabetes mellitus (both type 1 and type 2) at baseline. 501,721 have had their diabetes status recorded at baseline, of whom 22,887 have had diabetes recorded by a doctor (4.6%)

Project extension aims:
1. Determine the cross sectional association between grip strength (muscle quality) and lean mass (muscle quantity) in key subgroups such as the elderly, people with diabetes and minority ethnic groups.

2. Determine the longitudinal association between grip strength and morbidity and mortality outcomes overall, and by our key subgroups, and the role of lean mass and other clinical covariates in accounting for any associations observed.

3. Explore how grip strength and lean mass change over a 5 year period, and whether this differs by age and diabetes.

4. Explore how changes in these muscle measures predict outcomes.

5. To examine whether grip strength or muscle mass interacts with obesity (as measured by BMI or waist hip ratio (WHR)), and whether this differs by subgroups of the population.

6. Use Mendelian Randomisation (MR) to investigate whether any observed associations in the above analysis of grip strength and outcomes are likely to be causal.

7. Contrast the causal effects of central and general adiposity on grip strength using Mendelian randomisation.