

Nutrition Society Congress 2024, 2–5 July 2024

The associations of n-3 fatty acid intake with handgrip strength and muscle mass indices in older adults: a cross-sectional study from UK Biobank

A. Alsowail^{1,2}, C. Celis-Morales¹, M. Guerrero-Wyss¹, F. Ho³ and S. Gray¹¹School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow G12 8TA, UK²Physical Therapy Department, Faculty of Medical Rehabilitation Sciences, Taibah University, Madinah, Saudi Arabia³School of Health and Wellbeing, University of Glasgow, Glasgow, UK

There is strong evidence that low muscle strength and muscle mass are associated with an increased the risk of mortality and morbidity.⁽¹⁾ Muscle mass and strength progressively decline from around the fourth decade⁽²⁾, a process known as sarcopenia, for which there is no effective pharmacological treatment.⁽³⁾ Current literature indicates that resistance exercise and/or supplementation with n-3 fatty acids can be beneficial for muscle strength and mass in older adults.⁽⁴⁾ However, the sample sizes in these studies are relatively small and are restricted to only resistance exercise. The relationship between dietary n-3 fatty acid intake, rather than supplements, and general physical activity, rather than resistance exercise, and muscle strength and mass remain unknown. The aim of the current study, therefore, was to investigate the associations of n-3 fatty acid intake with handgrip strength and muscle mass indices in older adults. A secondary aim was to investigate whether these associations differed by physical activity status.

Analyses included 53,994 participants from the UK biobank study (25,773 men and 28,221 women). Participants were aged 60 years or older with complete data for outcome, predictor and covariate variables. Multivariable linear regression analyses were performed to explore the associations between n-3 fatty acid intake and grip strength index (kg/m²) and muscle mass index (kg/m²) in three separate models. All analysis were performed stratified by sex and physical activity status (active/inactive). Model 1 was adjusted for age, ethnicity, deprivation index and month of assessment. Model 2 was also adjusted for total energy intake and model 3 was also adjusted for multimorbidity count.

In model 3 there were positive associations between n-3 fatty acid intake and grip strength index in women with a 0.03 kg/m² (95% CI 0.00 to 0.06 kg/m²) higher grip strength index seen in those who were active and a 0.04 kg/m² (95% CI 0.00 to 0.08 kg/m²) higher grip strength index in those who were inactive for each additional gram of n-3 fatty consumed per day, with no associations in active (p = 0.355) or inactive (p = 0.186) men. In model 3, no association between n-3 fatty acid and muscle mass index were seen in men who were active (p = 0.981) or inactive (p = 0.331) and in women who were active (p = 0.843) or inactive (p = 0.058).

Although n-3 fatty acid intake was significantly associated with grip strength index in older women, regardless of their activity status, the magnitude of this association was very small and unlikely to be clinically relevant. Additionally, n-3 fatty acid was not associated with muscle mass index. Therefore, manipulation of n-3 fatty acid intake within the normal dietary range is unlikely to be an effective strategy to prevent and/or treat sarcopenia and n-3 fatty acid supplements are likely required.

References

1. Celis-morales C, Welsh P, Lyall D *et al.* (2018) *BMJ* **361**, k1651.
2. Dodds R, Syddall H, Cooper R *et al.* (2014) *PloS One* **9**, 12 e113637.
3. Cruz-jentoft A & Sayer A (2019) *Lancet* **393**, 2636–2646.
4. Fyfe J, Hamilton D & Daly R (2022) *Sports Med* **52**, 463–479.