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Dietary selenium intakes and their association with muscle strength and function in ≥ 85 year old adults: the Newcastle 85 + Study

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Abstract

Selenium is an essential micronutrient with biochemical and cellular effects through activities of 25 selenocysteine-containing selenoproteins. Selenoproteins are anti-inflammatory and have antioxidant properties. Severe selenium deficiency causes muscle weakness and atrophy in humans however the effects of moderate selenium deficiency are unclear. The aims of this study are twofold: 1) to determine dietary selenium intakes and contributing food sources in very old adults and; 2) to determine whether dietary selenium intakes are associated with 5-year trajectories of muscle function: hand-grip strength (HGS) and Timed-Up-and-Go (TUG).

Cross-sectional (baseline) and prospective (1.5, 3 and 5-year follow-up) analyses of 845 participants aged 85 years from the Newcastle 85 + study were assessed for HGS and TUG performance using standardized protocols (Antoneta et al. 2016). Baseline dietary intakes were assessed using 24-hour multiple pass recall methods on two separate days (Mendonça et al. 2016). The top selenium food contributors (~90%) and the adequacy of intakes were determined i.e. those with intakes < LRNI, between the LRNI and RNI and > RNI. Linear mixed models explored the associations between selenium intake categories and time on the prospective, 5-year change in HGS and TUG in all participants, males and females.

Median intakes of selenium were 39, 48 and 35 µg for all participants, males and females, respectively. Selenium intakes were below the LRNI in 51% of participants (median 27 µg) whilst 15% had intakes \geq the RNI (median 85 µg). Only 13.3% of females and 16.9% of males met the RNI. The top selenium contributors were cereals (46%), meat (22%), fish (10%), milk (6%), eggs (4%) and potatoes (3%) making up 91% of selenium intakes. Those with the lowest intakes had 2.72 kg lower HGS and 2.36s slower TUG compared to those with higher intakes ($P < 0.005$). There was no association between selenium intake in HGS or TUG, but time had a significant effect on the rate of change over 5-years in both parameters ($P < 0.001$).

Overall these results show that poor dietary selenium intakes are common in very old adults and that cereal and cereal products are major sources of selenium in this population. Whilst low selenium intakes are associated with worse HGS and TUG performance in the cross-sectional analysis, no significant associations were observed in the prospective analyses.

Conflict of Interest

There is no conflict of interest.