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Reply to Wang: chronic disease and handgrip strength

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Reply to Wang: chronic disease and handgrip strength.

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To The Editor:

We thank Wang and Chen[1] for their comments on our work. In our recent study[2] of 6,864 community dwelling men and women, handgrip strength and body mass index were measured at baseline and at four years follow-up. Compared to participants with stable weight and grip strength, risk of all-cause mortality was significantly greater in those experiencing weight loss over 4 years and reduced handgrip strength, with the highest risk in those with both weight loss and reduced strength. The models were adjusted for age, sex, physical activity, smoking, self-reported wealth, depressive symptoms, and long standing illnesses.

Wang and Chen suggest that "The observed joint association of changes in handgrip strength and weight with mortality is very likely explained by the progress of chronic diseases or prognostic factors of health condition." We agree that this is an important issue to consider. In a population-wide study such as the English Longitudinal Study of Ageing, it is common to conduct home-based clinical assessments that involve a nurse visiting participants in their own homes.[3] This model can sometimes limit the ability to collect information on hard clinical diagnosis or disease stage. The self-reported information that is collected on disease status is, nevertheless, often found to be highly valid when compared with more objective assessments.[4,5] In the present study our main indicator of disease status was a self-reported item enquiring about the presence of long standing illnesses. Around 54% of the sample reported presence of long standing illnesses. Although relatively crude, self-reported long standing illness was associated with higher risk of all-cause mortality (age- and sex-adjusted hazard ratio=1.37, 95% CI, 1.20, 1.57) in the present study. One should also consider that successful ageing is a multidimensional phenotype and is not merely determined by the presence of clinical disease, but also incorporates freedom

from physical disability, plus preserved cognitive, affective and social functioning.[6] We endeavored to capture some of these factors in our analyses by controlling for physical activity, depressive symptoms, and wealth.

As suggested, we repeated our analyses in participants without chronic disease (see Table). The results are very similar to those presented in our original paper, showing that the highest mortality risk was observed in participants with weight loss and reduced handgrip strength (hazard ratio = 4.18; 2.16, 8.08). However, in contrast to our previous analyses, weight gain (with or without loss of strength) also appeared to be associated with mortality in this sub-sample of apparently healthy individuals at baseline.

In summary, we agree that it is important to control for underlying disease, although our sensitivity analyses suggest the observed joint association of changes in handgrip strength and weight with mortality is unlikely to be explained by existing chronic conditions. We cannot rule out other sources of residual confounding. Muscle tissue plays an important role in health and disease,[7] and the association between handgrip strength and mortality is biologically plausible.

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Table. Hazard ratios (95% CI) for the association of 4-year changes in handgrip strength and weight with mortality in participants without chronic disease at baseline (n=2,202; 93 deaths).

Weight change[1]	**Grip strength change[2]**	
	Stable	*Lost*
Stable	1.00 **(reference)**	1.61 (0.91, 2.85)
Gain	3.32 (1.27, 8.66)	2.84 (1.02, 7.89)
Lost	1.70 (0.62, 4.69)	4.18 (2.16, 8.08)

Hazard ratios adjusted for age, sex, physical activity, smoking, wealth, depressive symptoms.

[1]Weight change defined as increase or reduction in 5% of initial body mass between clinical assessment waves 2 to 4; [2]Loss of grip strength defined as reduction in 5% of initial grip measure between clinical assessment waves 2 to 4.