

Letter to the Editor

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Corresponding author:

Lincheng Duan;
Email: lincheng@stu.cdutcm.edu.cn

Zhongxing Liu and Mengzhe Tian have contributed equally to this work and share first authorship

Enhancing the understanding of dietary total antioxidant capacity and skeletal muscle mass: addressing key limitations and future directions

Zhongxing Liu^{1,2}, Mengzhe Tian³ and Lincheng Duan² 

¹Dujiangyan Traditional Chinese Medicine Hospital, Chengdu, Sichuan, People's Republic of China; ²Chengdu University of Traditional Chinese Medicine, Chengdu, Sichuan, People's Republic of China and ³Chengdu Sport University, Chengdu, Sichuan, People's Republic of China

To the Editor:

We have carefully read the article by Zhang et al., titled “Dietary Total Antioxidant Capacity is Closely Associated with Skeletal Muscle Mass: A Cross-Sectional Study”⁽¹⁾, published in *The British Journal of Nutrition*. This study provides valuable insights into the association between dietary total antioxidant capacity (TAC) and skeletal muscle mass, particularly among middle-aged individuals, through large-scale data analysis. It offers important implications for dietary interventions. However, we believe that certain aspects of the study design and analysis warrant further discussion and refinement.

First, while the authors accounted for multiple confounding factors, such as age, sex, race and socio-economic status, some critical variables might have been overlooked. For example, chronic conditions (e.g. diabetes, cardiovascular diseases, or chronic inflammatory disorders) and associated medication use (e.g. statins or anti-inflammatory drugs) could significantly influence the relationship between TAC and skeletal muscle mass^(2–4). Chronic diseases are often associated with heightened oxidative stress, while medications might directly or indirectly modulate antioxidant status and muscle metabolism. Future studies should incorporate these variables to minimise potential bias.

Second, the exclusion of individuals with incomplete demographic, dietary or questionnaire data reduced the sample size from over 39 000 to 4009 participants. Although this approach ensured data completeness, it may have introduced selection bias, especially if the missing data were not missing at random. We recommend using multiple imputation and sensitivity analyses to handle missing data, which would help retain a larger sample size and improve the generalisability of the findings⁽⁵⁾.

Third, while the study adjusted for overall physical activity levels, it did not explore the differential effects of various exercise types and intensities on the relationship between TAC and skeletal muscle mass. Evidence suggests that resistance training and aerobic exercise have distinct mechanisms of action in muscle preservation and oxidative stress reduction^(6–8). Stratified analyses by exercise type could elucidate the moderating role of physical activity in this relationship.

Additionally, the stronger association observed between TAC and skeletal muscle mass in women raises questions about the role of sex hormones. For instance, the regulatory effects of oestrogen on the antioxidant system might explain the pronounced association in postmenopausal women^(9–11). Similarly, declining testosterone levels in men are closely linked to muscle mass loss^(12,13). Incorporating hormonal data in future studies could provide deeper insights into the mechanisms underlying sex differences.

In conclusion, this study establishes a critical foundation for understanding the potential benefits of dietary TAC in middle-aged populations. Addressing the influence of chronic conditions and medications, optimising data handling methods and stratifying analyses by physical activity and hormone levels in future research could further elucidate the mechanisms of TAC and enhance the translational value of the findings.

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