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Obesity in the Older Adult: Special Issue

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Adiposity is associated with adverse effects across the lifespan, including an increased risk of morbidity, mortality¹, diminished quality of life² and physical function³. Recent National Health and Nutrition Examination Survey (NHANES) data highlights that high rates of obesity extend into older adulthood⁴. Few high quality trials exist in high-risk, older adult populations with obesity⁵. With our changing demographics, gaining an understanding of the elements that could alter the trajectories in persons with obesity such as early life-course factors or underlying inflammatory mediators, could promote novel and specific intervention strategies.

This special issue of the *Journal of Nutrition in Gerontology and Geriatrics* provides an opportunity to provide the readership with manuscripts addressing such aspects. We not only present research evaluating early lifespan factors that could negatively impact distal outcomes, but outline early pilot clinical trials that, if successful, could potentially provide opportunities to alter future clinical care. Gaining a thorough understanding of current observational literature in the form of reviews provides an incentive and overview for future investigators to conduct intervention-based studies. A major impetus in collecting this set of articles was to highlight the translational nature of such research.

Our issue begins with an evaluation of data from the National Epidemiologic Survey on Alcohol and Related Conditions evaluating the relationship between childhood adverse experiences or maltreatment beyond young/middle age adults and obesity in subsequent years⁶. Increasingly, the National Institute of Health is focusing on the importance of early life factors that could potentially influence health and wellness in older adults. While recognizing that major deficits exist in our understanding of ethnic disparities in obesity

research, Vasquez et al.⁶ found the different prevalence rates of racial discrimination in childhood led to increased body mass index, particularly in Hispanics. This study suggests the importance of how such negative perceptions could be associated with weight gain, extending the work observed in younger adults⁷. Ethnicity and early childhood experiences provide a foundation as to how weight and physical function can be impacted during the life course and specifically in older adults.

Lohman et al.⁸ used the cross-sectional NHANES dataset to evaluate the association and interaction between obesity, diet-related inflammation and physical frailty. Frailty is a harbinger in the disability spectrum that is strongly associated with systemic inflammation⁹. This study provides an opportunity to evaluate the impact of the differential effects of fat-mass induced inflammation using a novel dietary inflammatory index derived from the 24-hour dietary recall. A robust, independent relationship between obesity and inflammation was found; a similar one was observed between inflammation and this dietary index. There was a statistically significant negative interaction effect between obesity, pro-inflammatory mediators and dietary index. These preliminary findings have important implications as self-reported dietary recall is affordable and can circumvent the need for complex laboratory analyses that can be costly within usual care settings. Yet, future work should confirm this relationship within the scope of longitudinal studies.

The impact of obesity reduction on systemic inflammatory markers was explored in a randomized controlled intervention trial conducted by Porter Starr et al.¹⁰. The intervention group used a weight loss regimen with high-quality protein supplementation throughout the day, while the control group followed a weight loss regimen with RDA-level protein. Both groups lost weight and demonstrated significant changes in inflammatory markers. For markers of inflammation, group differences were minimal, with the exception of adiponectin levels, which trended towards a better improvement in the protein supplemented group. The authors appropriately concluded that protein supplementation with lean red meat had no detrimental effect on systemic markers of inflammation. In older adults with sarcopenic obesity, anabolic signaling, is potentially dampened and inflammation promoted¹¹. There is a need for further study on using protein supplementation during weight loss efforts. Al-Nimr's systematic literature¹² review of randomized controlled trials from 2003–2018 fills this gap by providing formative evidence that the source, timing and impact of types of protein could mechanistically be helpful in improving functional and metabolic outcomes, including body composition. Her review clearly demonstrates the lack of well-design clinical trials evaluating physical function and the importance of understanding underlying biological mechanisms.

While pharmacological therapy is not FDA approved in the management of obesity in older adults¹³, bariatric surgery is an under-recognized therapeutic approach that can be considered in appropriately selected, older adult populations¹⁴. A major barrier to surgical success is cognitive status. Understanding the importance and consequences of cognition in the peri-operative period is important; yet, the impact of weight loss on cognitive enhancement has not been well described. Roth *et al*¹⁵ summarize the current understanding of the relationship between obesity and cognition, and its effect after weight loss. The findings of these investigators show how obesity therapies can improve neuropsychological

functioning and underscore the importance of considering cognitive status during obesity interventions in this population. The need for well-designed studies and potential research directions is fully described.

Long-term weight maintenance continues to be a priority in all age groups. Houston *et al*¹⁶ conducted a weight loss study of 60 individuals with 87% follow-up and a mean of 3.5 years following completion of a randomized controlled trial. While participant weight regain occurred, it occurred at a lesser degree when combined with exercise. Interestingly, there were different effects on the maintenance of physical function – gains were not maintained in the 400m walk, but were observed in SPPB. These results also demonstrated that the reductions in fat mass did not necessarily translate to changes or maintenance effects in physical function. All such reasons require additional study.

Weight loss in older adults is safe and effective. However, both medical and surgical weight loss efforts lead, not only to fat mass loss, but also to loss of fat-free and bone mass. Loss of bone mass in randomized controlled trials occurs with unopposed steroid use, physical inactivity or immobility, and can occur in all age groups following weight-loss surgery¹¹. Jiang provides a comprehensive overview of the inherent dangers of weight loss for bone health¹⁷, which are often evaluated in large-scale trials. The focus on how obesity impacts bone mass and quality and the underlying potential mechanisms is of great importance to clinicians and researchers alike. Weight-loss induced osteoporosis is a major consequence that ultimately can lead to an increased risk of fracture. This review discusses the identification of modalities to counter fracture risks in older adults participating in weight loss interventions.

This series of articles raises to the forefront the importance of obesity as a public health crisis in aging. We provide preliminary answers to important research questions and offer strategies needed to advance the field. Additional studies are critically needed to evaluate early life determinants in the older adult with obesity, how markers of inflammation could impact future declines in physical function, and how interventions can be structured and augmented to ensure short- and long-term maintenance, not only of weight, but physical function. Understanding the known risks of weight loss is key goal for both researchers and clinicians working with older persons who are obese. While integration of such research efforts within a clinical environment require additional investigation, these future approaches could be implemented to ensure sustainability of evidence-based interventions in health care and community-based settings, with the ultimate goal of improving the health of this population.

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