



## Editorial

### Evidence-based exercise enhances healthy aging



As the global population continues to age, an urgent question arises: how can we improve the quality of life for older adults while reducing the burden of age-related diseases and disabilities? A growing body of evidence suggests that evidence-based exercise, used as both preventive and therapeutic medicine, may hold the key to extending healthy longevity, preventing chronic conditions, and preserving physical and cognitive function. The "Global consensus on optimal exercise recommendations for enhancing healthy longevity in older adults (ICFSR)" emphasizes the importance of integrating tailored exercise regimens into geriatric care, positioning exercise not only as preventive medicine but also as a therapeutic cornerstone in managing age-related decline. The updated consensus document introduces several advancements that distinguish it from the previous consensus published a few years ago. It emphasizes more personalized, evidence-based exercise prescriptions that align with individual health profiles and conditions, moving beyond generic activity guidelines. One of the most notable updates is the focus on creating a tailored and structured exercise prescription sequence for older adults. This includes an initial holistic older adult assessment to identify specific needs and capabilities, followed by a planned approach for sequencing, progression, specificity, patient preference, and individualization to improve adherence. The document highlights the importance of patient preferences, individualized plans to enhance adherence, and cognitive and social support strategies. It also underscores functional training that prioritizes balance and fall prevention, ensuring safety while promoting mobility and reducing risk factors. Additionally, the document emphasizes the importance of multicomponent exercise programs that integrate cognitive tasks to enhance physical and mental resilience, offering a comprehensive approach to mitigating frailty. Among the key additions are extensive guidelines for implementing high-intensity progressive resistance training (PRT), power training, and high-intensity interval training (HIIT), which have shown promising results in maintaining cardiovascular and muscular health in older adults. New sections also explore the integration of exercise and pharmacotherapy in geriatric care, addressing polypharmacy concerns and medication-exercise interactions to optimize physical function. Economic evaluations featured in the updated consensus highlight the cost-effectiveness of exercise over conventional medical treatments, underlining its value in healthcare resource allocation. Additionally, the document introduces sections on modern methodologies, such as the effectiveness of mobile applications in prescribing and monitoring exercise, reflecting the integration of technology in promoting adherence and healthy aging. Lastly, it calls for greater integration of structured exercise into clinical practice as a core component of geriatric care, shifting the paradigm from supplementary to essential treatment.

Exercise is particularly effective in targeting syndromes of disuse and decelerating the trajectory of decline, notably in conditions such as Parkinson's Disease, chronic obstructive pulmonary disease, and cardiometabolic disorders, among many others. Exercise's ability to target specific disease-related abnormalities makes it a valuable complement to pharmacological treatments. Regular physical activity and structured exercise programs have also been shown to reduce the risk of age-related conditions such as cardiovascular disease, type 2 diabetes, and dementia. Health organizations, including the World Health Organization (WHO), recommend at least 150 min of moderate-intensity exercise per week for older adults, highlighting its role in reducing morbidity and mortality.

The ICFSR consensus provides further evidence that physical activity (PA) has significant dose-response benefits, where even moderate increases in activity can improve longevity and reduce disease burden. Exercise combats cellular aging by reducing oxidative damage, inflammation, and mitochondrial dysfunction, while boosting brain-derived neurotrophic factor (BDNF), which enhances both physical and cognitive resilience. There are also modality-specific benefits critical for healthy aging. In particular, the ICFSR consensus highlights the evidence that PRT can improve functional independence, reduce fall risk, and address bone health, thus enhancing the quality of life for frail populations via specific adaptations unique to this modality of exercise.

Beyond prevention, exercise is a powerful tool for treating frailty and sarcopenia—two of the most debilitating conditions associated with aging. Progressive resistance training, in particular, has proven to be effective in maintaining or increasing muscle mass, strength, and function in older adults. Despite its efficacy, inconsistencies remain in exercise prescriptions, with non-evidence-based intensities and volumes often recommended. Suboptimal exercise prescriptions, like inadequate medication dosages, reduce treatment effectiveness. In pharmacology, the "placebo" effect is not considered sufficient as a rationale for treatment with a drug, yet in contrast, many exercise prescriptions for older adults still utilize non-evidence-based, low-intensity, non-progressive routines which do not produce measurable physiologic or psychological adaptations. This inconsistency underscores the urgent need for rigorous exercise standards to ensure optimal outcomes for older adults, both fit and frail.

Given the significant benefits and minimal risks of exercise for older adults, it is crucial to establish optimal exercise recommendations as a standard part of healthcare. These recommendations should be tailored to each individual's functional abilities and incorporated into routine care settings, including hospitals, clinics, and aged care facilities. Expanding this approach to community programs, public health policies, medical

insurance coverage, and societal initiatives can promote active lifestyles and enhance the quality of life and independence for older adults.

In an aging population, managing polypharmacy and chronic diseases presents a critical challenge that profoundly affects health outcomes. The synergy between medication and PA/exercise offers an effective solution for improving the well-being of older adults. Integrating exercise prescriptions with pharmacotherapy can improve vitality and functionality while reducing the likelihood of adverse drug reactions. Exercise can be used to substitute for, augment the benefits of, and/or address the side effects of medications. This combined approach not only addresses physical and cognitive decline but also helps mitigate the significant iatrogenic risks associated with polypharmacy. Such an approach requires specific education of physicians, pharmacists, and other allied health professionals in drug-exercise, drug-nutrient, and exercise-disease interactions, as detailed in the Consensus.

The cost-effectiveness of exercise interventions adds to their societal value. The economic burden of aging-related diseases—such as frailty, dementia, and cardiovascular diseases—is projected to rise significantly in the coming decades. Evidence-based exercise programs could help alleviate this burden by reducing hospitalizations, long-term care needs, and reliance on pharmaceutical treatments. Furthermore, PA fosters social engagement, mental well-being, and a sense of autonomy, addressing the psychosocial challenges often experienced by aging populations.

However, integrating exercise into mainstream geriatric healthcare remains a challenge. Many healthcare professionals are not adequately trained to prescribe exercise as a core treatment for older adults. Expanding education for healthcare providers and developing infrastructure for community-based exercise programs could generate significant societal benefits.

In conclusion, using evidence-based exercise as preventive and therapeutic medicine offers a powerful approach to promoting healthy aging, preventing age-related diseases, and treating conditions like frailty and sarcopenia. The broader implications for society include not only reduced healthcare costs but also enhanced quality of life and functional independence for older adults. It is time to make exercise a central component of geriatric care, integrating it into healthcare systems to

enhance the healthspan and well-being of future generations. This consensus advocates for tailored, evidence-based exercise programs that adapt the needs and abilities of older adults, with the ultimate goal of improving quality of life, regardless of age or initial state of fitness or frailty. Frailty is not a contraindication to robust exercise, but rather, one of the most important reasons to prescribe it.

#### Declaration of competing interest

Authors declare no conflict of interest.

#### Acknowledgement

Prof. Mikel Izquierdo was supported in part by «Proyectos de I + D + i» de los Programas Estatales de Generación de Conocimiento y Fortalecimiento Científico y Tecnológico del Sistema de I + D + i Orientada a los Retos de la Sociedad, en el marco del Plan Estatal de Investigación Científica y Técnica y de Innovación 2017-2020 (PID2020-113098RB-I00) and by the European Union and Ministerio de Ciencia e Innovación, Agencia Estatal de Investigación (AEI), Unión Europea NextGenerationEU/PRTR with number PLEC2021-0080171 and by EU Funded H2020-DIABFRAIL-LATAM (H2020-SC1-BHC-825546).

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