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The importance of exercise and physical activity in older adults with HIV

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People with HIV (PWH) are living longer because of the ongoing improvements in highly active antiretroviral therapy (HAART) [1,2]. Naturally, a longer lifespan brings about the development and accumulation of comorbidities over time [3]. Anecdotally, it appears that PWH exhibit comorbidities and geriatric syndromes prematurely at younger ages than one might expect. Questions as to whether or not the aging process may be accelerated or accentuated in PWH have been posed [4]. Rickabaugh *et al.* [5] studied age-associated methylation patterns in PWH and estimated that HIV accelerated aging by approximately 14 years. Thus, with an accelerated aging process in PWH, one would expect to see the earlier onset of geriatric syndromes related to aging (such as falls, frailty, cognitive impairment, and depression) in PWH [6].

Both HIV and aging are associated with increased abdominal adiposity [7–10], which may lead to increased cardiovascular risk, especially if the abdominal adiposity is caused by visceral fat accumulation [11]. The only formally indicated pharmacologic intervention to reduce visceral adiposity in PWH is tesamorelin [12], which has been shown to lead to an 18% reduction of visceral adipose tissue (VAT). The use of glucagon-like peptide-1 receptor agonists (GLP-1RAs) [13] and other pharmacologic obesity treatments are gaining interest but are now currently being studied in PWH. Nonpharmacologic interventions, such as diet and exercise, are officially recommended for PWH who gain greater than 5% body weight [14]. However, there is a general lack of studies using nonpharmacologic interventions in the medical

literature. This is, in part, not only because of the difficulty to carry out these interventions in a controlled fashion, but also because of the lack of funding for these types of interventions. Reeds *et al.* [15] performed a study evaluating the use of a low-calorie diet (1000 kcal/day) in women with HIV and demonstrated a 14% reduction in VAT. A pilot study [16] evaluating the effect of exercise on body fat showed that exercise training may reduce trunk fat mass in men with HIV. Due to the increasing prevalence of aging-related conditions in PWH, such as frailty and sarcopenia, there has now been more interest in studying the effect of exercise in PWH [17–19].

In this issue of *AIDS*, Weibel *et al.* [20] evaluated the relationship between objectively measured physical activity (via use of an accelerometer) and abdominal adiposity in PWH. The authors recruited participants in the PROSPER-HIV cohort from the Centers for AIDS Research (CFAR) Network of Integrated Clinical Systems (CNICS), which is a 'large, heterogeneous, contemporary sample of aging PWH in the United States'. The average age of participants was 58 years, and 77% were taking an integrase-inhibitor-based antiretroviral therapy regimen. Measures of adiposity included waist circumference, hip circumference, and waist-to-hip ratio. Physical activity was measured using an accelerometer, which participants were instructed to wear during waking hours (minimum of 10 h per day for at least 4 days including 1 weekend day) for 7–10 consecutive days on their nondominant hip. A total of 419 participants met the wear time criteria and were included in the analysis. There were three primary exercise endpoints: time spent

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in moderate-to-vigorous physical activity (defined as a minimum of 2690 counts per minute), number of steps per day, and sedentary time per day (defined as 10 or more minutes with 100 or fewer counts per minute). The majority (88%) of participants had excess abdominal adiposity based on waist circumference or waist-to-hip ratio. Accelerometry data revealed that 229 (55%) of the participants met the DHHS Physical Activity Guidelines [21] of 150 min of moderate-to-vigorous physical activity or 75 min of vigorous physical activity per week. Webel *et al.* [20] also reported that more steps per day was associated with a smaller waist circumference whereas sedentary behavior was associated with a larger waist circumference. Time spent in moderate-to-vigorous physical activity, however, was not associated with waist circumference.

Webel *et al.* [20] addressed three important gaps of knowledge in the field of aging in PWH. First of all, a previous meta-analysis that described physical activity levels in PWH did so subjectively (via self-reports) with 50.7% meeting physical activity guidelines [22]. Instead, Webel *et al.* [20] objectively measured physical activity using accelerometry data to show that 55% of PWH met DHHS Guidelines. The use of accelerometry-based activity monitors to measure physical activity has become increasingly popular in research studies because of the ease of wearing these devices and because physical activity data can be collected continuously for extended periods of time [23]. Second, the majority of prior studies looking at the prevalence of abdominal adiposity occurred during the early days of HAART and included the use of older legacy antiretroviral medications, which are rarely used today. Webel *et al.* [20] demonstrated the extremely high prevalence of abdominal adiposity (at 88%) in PWH during the contemporary era of the newer integrase-strand transfer inhibitors. The high prevalence may be because of the obesogenic environment of resource-rich countries [24]. However, this may suggest that there might be a true relationship between INSTIs and weight gain [25]. Third, Webel *et al.* [20] demonstrated the inverse relationship between physical activity (as measured by the number of steps) and adiposity (as measured by waist circumference) in PWH. Thus, if PWH engage in more physical activity, this can translate to a reduction in abdomen size. This is an important and critical message for all HIV healthcare providers and PWH to hear – that exercise (in any form) can help to reduce adiposity.

By increasing exercise and reducing adiposity, PWH may be able to delay the onset of other comorbidities often tied to weight gain, such as the development of hypertension, diabetes, and cardiovascular disease. In addition, building muscle mass and improving endurance may help PWH remain physically capable to perform desired activities and maintain independence as they age successfully. Given the potential for accelerated aging in

PWH, it may be advisable to encourage PWH to start developing an exercise routine perhaps at a younger age (around age 40 years) to proactively counter the ongoing effects of HIV and its treatment on the aging process.

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Conflicts of interest

There are no conflicts of interest.

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