

## Mini Review

# A Few Good Health Reasons on Why Older Adults Should Invest in High Intensity Incidental Physical Activity

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## Abstract

**Aims:** This commentary aimed to briefly describe and discuss health reasons on why older adults should engage in high intensity incidental physical activity (HIIPA). Our intention with this initial manuscript is to start a discussion on the potential of this type of physical activity for the older adult population.

**Methods:** To demonstrate, we used the health benefits observed for the fast emerging high intensity interval training (HIIT) literature to make the case for HIIPA.

**Results:** Based on the close structural relationship between HIIPA and HIIT, as a relatively intense physical exertion type of incidental physical activity, HIIPA has the potential to improve physical and cognitive health among older adults.

**Conclusions:** It is reasonable to believe that HIIPA has the potential to engender similar physical and cognitive health benefits as to HIIT in older adults. Partaking in regular PA is a major investment in health as it provides benefits that cannot be obtained in other way. Thus, HIIPA may be a good adjunct for older adults to help this population increase their physical activity level, enabling them to acquire additional health benefits from their daily activities.

## INTRODUCTION

Successful aging, a term that gained popularity in the late 80's and it is still considered a "hot topic", involves both intrinsic genetic factors and extrinsic lifestyle factors [1]. Extrinsic lifestyle factors include physical activity (PA), diet, smoking, alcohol consumption and psychosocial aspects of aging. In terms of PA, a substantial and compelling body of evidence has accumulated regarding the close relationship between PA and successful aging [2,3]. Along with healthy diet, a physically active lifestyle may be one of the most effective means of preventing and/or postponing the onset of chronic diseases, functional decline, promoting independence, and maintaining a high quality of life later in life [2].

Currently, the growth of the US population aged 65 years and older exceeds that of the total US population under age 65. Older adults presently make up 16 percent of the US population, with this number expected to increase to about 23 percent by 2060. Natural physiological changes associated with aging (e.g., declines in the cardiovascular and neuromuscular systems) place older adults at higher risk of developing chronic diseases and other incapacitating conditions.

PA and exercise have been highly recommended for this population as key components to achieve optimal health. However, despite efforts from multiple fronts, rates of PA

participation at recommended levels are particularly, in a concerned manner, low among older adults [4].

The 2008 PA Guidelines for Americans (PAGA) heavily disseminated the message that older adults should accumulate at least 150 minutes per week of moderate intensity PA throughout the week for health benefits. The updated 2018 PAGA addresses two highly important emerging topics that have been shown to significantly influence health in different populations, including older adults: sedentary behavior (sitting time) and high intensity interval training (HIIT). Perhaps the most important update observed in the 2018 PAGA relates to the fact that the guidelines for adults no longer requires PA to occur in bouts of at least 10 minutes for health benefits. Now, every minute seems to count for health as bouts, or episodes, of moderate-to-vigorous PA may be included in the accumulated total volume of PA [5]. According to Stamatakis et al. [6], this is important as it opens new opportunities to promote health through PA in those who are at higher risk to develop lifestyle-related conditions, such as older adults, by capitalizing on sporadic, incidental in nature, PA.

## High Intensity Incidental Physical Activity

HIIT is defined as "near maximum" efforts generally performed at high intensity, normally ( $\geq 80\%$ ) of maximal heart rate [7]. The high intensity stimulus are normally short in duration (few seconds to few minutes) and are followed by similar or equal periods of low intensity activity or rest

[7]. Further, HIIT is generally performed at specific settings (e.g., gyms, recreational centers) using specific equipment (e.g., treadmill, cycle-ergometer). Conversely, High Intensity Incidental Physical Activity (HIIPA) serves as an umbrella term to describe any type of relatively intense physical exertion that occurs episodically as one goes through normal everyday life activities [6], requiring no specific setting or equipment, and it is completed without supervision. To this end, the idea of HIIPA is to translate the key principles of HIIT into everyday life in order to help different populations, such as older adults, to achieve current PA recommendations, and ultimately, improving health and quality of life.

Thus, due to the aforementioned relationship between HIIT and HIIPA, this commentary will very briefly describe and discuss the rationale (reasons) as to why older adults should invest in HIIPA using the HIIT literature as framework. Our intention with this initial manuscript is to start a discussion on the potential of this type of physical activity for this particular subgroup, which is at higher risk for inactivity and sedentary behavior.

### **Reason 1: Physical Health**

A growing number of studies have examined the effects of HIIT on numerous health-related physiological parameters in older adults. These physiological parameters include cardiorespiratory fitness and fat oxidation [8], insulin resistance [9], heart rate variability [10], glucose metabolism in muscle [11], and glycemic control [12]. In all listed studies, the results demonstrated that the HIIT exercise program employed was superior in improving the parameters investigated compared to moderate intensity continuous exercise programs. The HIIT protocols involved treadmill or cycle-ergometer stimulus ranging from 1-4 minutes that were followed by similar amounts of recovery periods.

### **Reason 2: Cognitive Health**

A recent study examined the impact of different aerobic exercise intensities on memory and other cognitive abilities in older adults [13]. The authors observed that HIIT induced 30% improvement in memory performance compared to moderate intensity continuous exercise. The HIIT protocol, in the previous study, was based on walking using a motor-driven treadmill where participants performed 4, 4-minutes intervals interspersed with 3-minutes active recovery.

Taken together the physical and cognitive health benefits of HIIT described above, it is reasonable to believe that performing short duration activities such as brisk walking, cycling, stairs climbing followed by HIIPA mode (i.e., higher physical exertion) while go through daily activities few times during the day would translate into relatively similar physical and brain health benefits as to HIIT.

### **From HIIT to HIIPA**

As a type of Incidental PA, HIIPA is related to any activity performed during everyday life. However, individuals must voluntarily apply more intensity to it in order to reach a higher intensity level. Importantly, we are referring to activities that are not performed with the specific purpose of recreation. Different from traditional HIIT routines, such types of activities require no sacrifice of discretionary time. Incidental PA includes but is not

limited to: a) walking or cycling, b) climbing stairs, c) carrying heavy shopping bags and, d) performing house chores/cleaning. One of the advantages of incidental PA lies in the fact that it does not face the multitude of barriers frequently reported by older adults for structured exercise [14].

As previously mentioned, HIIT is a type of structured exercise that is supervised. Thus, it may be challenging to translate its benefits to an unsupervised incidental PA (i.e., HIIPA). Participation in HIIPA may be as difficult to perform for older adults as is participation in HIIT in this population, with the rationale being that HIIT programs are quite physically taxing, sometimes even unfeasible for younger individuals not used to be physically active. Nevertheless, it is beneficial to translate the key components of HIIT (stimuli and rest) into a HIIPA, thereby providing the reader a better picture as to what we are trying to portray in this manuscript.

The studies presented in this commentary paper comprised HIIT protocols that were based on high intensity stimuli using a treadmill or a cycle ergometer, ranging from 1-4 minutes that were followed by similar periods of recovery/rest. To this end, older adults could, for example, increase the pace above to their normal walking speed for one/two blocks (more vigorous exertion/high intensity stimuli) that would be followed by one/two blocks of normal pace walking (recovery/rest). This particular sequence of brief relative high intensity physical activity to brief low intensity physical activity/rest would be repeated multiple times during the day.

Similarly, this sequence of brief high intensity physical activity followed by rest/low intensity physical activity could be done with other modalities such as stair climbing. In this case, older adults would go up one flight of stairs in a faster pace (in order to increase heart rate) while resting for the next one or two flights (reducing the pace). The design of these HIIPA activities closely mimics in time and duration to those observed in structured HIIT programs.

Consequently, one may surmise that HIIPA, if performed using the above description, may have the potential to be as effective as HIIT in acquiring similar health benefits observed in the older adult population.

### **FINAL CONSIDERATIONS**

Partaking in regular PA is a major investment in health as it provides benefits that cannot be obtained in other way. This is especially true for the older adult population. Although it is reasonable to think that HIIPA would translate into similar benefits relative to HIIT, as a new concept, HIIPA needs to be scientifically tested. A group of researchers recently tested what they call "exercise snacking" [15], an idea that helps reinforce the potential of HIIPA in engendering similar benefits as to HIIT for older adults. The authors from this study verified that performing 3-bouts per day of vigorous ascending 3-flight stairwell (60 steps) separated by 1-4 hours of recovery, 3 days per week for 6 weeks was enough to elicit moderate improvements in cardiorespiratory fitness in young sedentary adults. Nevertheless, HIIPA may be a good adjunct for older adults to help this population increase their PA level, enabling them to acquire additional health benefits from their daily activities. This is important as older adults present

with low rates of PA participation at recommended levels are at higher risk for developing a large array of chronic diseases and conditions. However, if HIIPA proves to deliver the benefits herein described, challenges related to the dissemination of this message (i.e., HIIPA) will have to be addressed by public health professionals. Stamatakis and his group [6] believe that on top of "move more and sit less", public health and health professionals could emphasize messages analogous to "huff and puff regularly" in order to highlight the importance of performing daily life activities in such way as to make breathe harder and our heart beat faster than normal.

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