

## VIEWPOINT

## Physical Activity and Cardiovascular Health: Practical Strategies to Reduce Sedentary Time in Adult Population

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### Introduction

Cardiovascular disease (CVD) is highly prevalent worldwide and is the main cause of death in the general population.<sup>1</sup> The practice of physical activity (PA) has emerged as a primary prevention strategy for CVD, with the potential to control risk factors, and promote a better quality of life and longer survival.<sup>2</sup>

However, despite the scientifically proven benefits, and formal recommendations for the practice of PA for adults,<sup>3</sup> (Table 1), published data on the world population are alarming. Recent estimates indicate that one in four (27.5%) adults worldwide and almost half of the population in Brazil do not follow the recommendations made by the World Health Organization (WHO).<sup>4</sup> Additionally to physical inactivity, the growing prevalence of sedentary behavior is a current concern<sup>5</sup> (Table 2).

Prolonged periods of sedentary behavior have been associated with unfavorable health outcomes. On the other hand, the practice of PA according to the WHO recommendations can attenuate or even eliminate the association between sitting time with all-cause and cardiovascular mortality risk.<sup>6</sup> These findings reinforce the importance of reducing the time of sedentary behavior and mainly practicing higher volumes of PA, particularly in individuals who cannot avoid exposure to prolonged periods of sedentary behaviour.<sup>7</sup> The current WHO Guidelines on Physical Activity and Sedentary Behavior,

an update of the previous 2010 recommendations,<sup>8</sup> in addition to encouraging physical activity practice, strongly recommends reducing the time of sedentary behaviour.<sup>3</sup> This is reinforced by the recently published Physical Activity Guidelines for the Brazilian population.<sup>9</sup>

In 2018, the WHO developed a global action plan named "More Active People for a Healthier World" aimed at reducing by 15% the overall prevalence of physical inactivity among adolescents and adults by 2030.<sup>10</sup> In line with plan, based on the available literature, we suggest simple strategies to reduce the time of sedentary behavior and increase the volume of PA.

### Physical activity-based health promotion strategies

Considering prolonged sedentary behavior can be deleterious to health, the first strategy is to interrupt these periods and to perform some PA. It has been shown that interrupting sitting position during leisure-time more frequently has a positive effect on mental health<sup>11</sup> and metabolic profile.<sup>12</sup> Besides that, some experimental studies have shown positive acute responses in vascular health and blood pressure.<sup>13,14</sup>

An accessible and free method to optimize time is using stairs instead of elevators or escalators. Although some deep-rooted habits (such as the use of escalators) can be difficult to replace, stairs are often found in different places and opportunities for climbing stairs are commonly available and do not involve monetary costs. Regarding this strategy, the available evidence points to enhancing cardiorespiratory fitness and improving the lipid profile.<sup>15</sup> In addition, a cohort study has verified a dose-response association between number of floors climbed and all-cause mortality.<sup>16</sup>

### Keywords

Cardiovascular Diseases/prevention and control; Exercise; Sedentary Behavior; Health Promotion; Activity Physical; Quality of Life; Adult.

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DOI: <https://doi.org/10.36660/ijcs.20200318>

Manuscript received October 06, 2020; revised manuscript June 30, 2021; accepted September 01, 2021.

**Table 1 – World Health Organization's recommendations****Physical Activity**

1. All adults should undertake regular physical activity<sup>a</sup>.
2. Adults should do at least 150-300 minutes of moderate-intensity aerobic physical activity; or at least 75-150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits<sup>a</sup>.
3. Adults may increase moderate-intensity aerobic physical activity to more than 300 minutes; or do more than 150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for additional health benefits<sup>b</sup>.
4. Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on two or more days a week, as these provide additional health benefits<sup>a</sup>.

**Sedentary Behavior**

1. Adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits<sup>a</sup>.
2. To help reduce the detrimental effects of high levels of sedentary behavior on health, adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity<sup>a</sup>.

*Strong recommendation, moderate certainty evidence<sup>a</sup>*

*Conditional recommendation, moderate certainty evidence<sup>b</sup>*

*Source: Authors. Adapted from WHO Guidelines on Physical Activity and Sedentary Behaviour. Geneva: World Health Organization; 2020.*

**Table 2 – Key concepts****Sedentary Behavior**

Any waking behavior characterized by an energy expenditure  $\leq 1.5$  metabolic equivalents (METs) while sitting, reclining, or lying<sup>3</sup>.

**Physical Activity**

Any bodily movement produced by skeletal muscles that requires energy expenditure<sup>3</sup>.

**Physical Inactivity**

An insufficient physical activity level to meet current physical activity recommendations<sup>3</sup>.

*Source: Authors. Adapted from WHO Guidelines on Physical Activity and Sedentary Behavior. Geneva: World Health Organization; 2020.*

Regarding these potential benefits, another pragmatic strategy is active commuting (for example, walking and cycling), taking the opportunity to practice PA on the pathway between home, school, or work. A prospective study has demonstrated that people who cycled as transportation to work, spending on average three hours per week, had a significant reduction of approximately 30% in risk of mortality.<sup>17</sup> Other studies also have shown the association between walking and cycling with reducing the incidence of chronic non-communicable diseases. Thus, this simple, ecologic, and economic strategy could be a relevant measure to be encouraged in concomitance with safety precautions when commuting.<sup>18</sup>

Using technology to promote PA is a smart strategy. There are many useful tools designed to encourage people to exercise: automatic monitoring devices, applications, social media, video games and other software programs. These involve planned, group or individual activities, that may be performed independently of weather conditions, and combine virtual and real environments.<sup>19</sup>

In this scenario, wearables and smartphone applications appear to be a trend in health care. These instruments are effective in promoting PA in adults<sup>20</sup> and could assist in setting goals, motivating and monitoring different health behaviours.<sup>21</sup> Considering that these devices enable self-monitoring and data sharing (allowing supervision

**Table 3 – Summarized strategies****Active breaks**

Active interruptions of the sedentary period to perform some PA.

**Climbing stairs**

Using stairs instead of elevators or escalators.

**Active commuting**

Active displacement, practicing PA on the way between home and school or work.

**Technological tools**

Use of technological tools that stimulate PA.

*Source: Authors. PA: physical activity*

and guidance of health professionals), the combination of these strategies seems to be ideal.<sup>20</sup> Furthermore, the Köhler effect has been reported in virtual scenarios, i.e., when people compare different performance outcomes with each other, which increases their motivation.<sup>22</sup>

Another interesting technology-based strategy to replace sedentary behavior with movement is using active video games. In addition to increasing PA, evidence points to benefits in several subpopulations and outcomes, including: improvement of physical function and cognition, reduction of depression and body weight. However, evidence suggests that less physically active users are more likely to abandon the use of these devices and return to old sedentary routine over time. Then, the main challenge is to improve adherence of these users<sup>19</sup> (Table 3).

## Conclusion

For the general population, reducing prolonged periods of sedentary behavior and increasing the volume of PA is primordial. Performing some physical activity, even at lower volumes and intensity than recommended, is better than performing none and will have an impact on health. The measurements and strategies proposed in this article, including active breaks, climbing stairs, active commuting and use of technological tools, are evidence-based behavioral, practical changes to promote the health of the adult population.

## Author contributions

The conception and design of the research was performed by all authors. JBL has written the introduction and about active pauses, SS, JD and JBL about active displacement and KBAM about using technology to promote physical activity. The article translation from Portuguese to English was performed by KBAM and SS. There was no new acquisition of data, analysis and interpretation of new data nor statistical analysis. There was no financial support. Critical revision of the manuscript for intellectual content was performed by all authors. The final version of the manuscript was approved by all authors.

## Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

## Sources of Funding

There were no external funding sources for this study.

## Study Association

This study is not associated with any thesis or dissertation work.

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