How did we get so sedentary?

Sedentary behaviours among Canadian adults

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Introduction

It is now widely accepted that higher levels of physical activity are associated with numerous positive health outcomes including reduced risk of chronic disease, disability and overall mortality, as well as improved cardiometabolic health and increased longevity and quality of life. The Canadian Physical Activity Guidelines recommend that adults accumulate 150 minutes per week of moderate- to vigorous-intensity physical activity. Unfortunately, few Canadians are meeting these guidelines. Further, we are also spending on average almost 10 hours per day completely sedentary. This “excessive sitting time” has now been identified as a distinct construct from physical inactivity, with health consequences that persist even among otherwise “active” individuals.

With modern times and advancing technology, we have continued to inadvertently engineer physical activity out of our daily lives. As a species, we seem rather determined to find ways to stay seated, rather than exert ourselves to accomplish required daily tasks. How did we as humans evolve into such a sedentary and inactive species, and specifically, what does this sedentary behaviour look like among Canadian adults?

Evolution of the sedentary human

Human evolution has taken us from a nomadic hunting-and-gathering lifestyle, through the more settled Neolithic or Agricultural revolution, the Industrial and Technological revolution, and now finally into the Digital revolution and Information Age. Through each historical transition, the human species has become increasingly sedentary and inactive, requiring less and less physical activity for daily survival.

In prehistoric times, physical activity patterns followed food availability patterns. Our primary driver of physical activity was our need for food and to escape from predators, requiring high energy expenditures for our basic survival in the physical environment. Our human biochemistry and physiology were designed to function optimally under those conditions. In fact, this link between caloric intake and caloric expenditure existed for the majority of human history, compared to our much shorter evolution into the 21st century with vastly different circumstances of human existence.
Today that existence has become increasingly automated — no longer are we exerting ourselves to escape predators, nor hunting and gathering our food to ensure our survival. That historical relationship between eating and physical exertion no longer exists. Not only has automation and mechanization taken over the occupational and survival aspects of our lives, but even our recreation time has been taken over by computers, video games, TV, Internet and sport spectating rather than participation. Our 21st century environment seems intent on eliminating every possible need for movement out of our chairs and couches. Not only is food availability ubiquitous, but we no longer even need to walk through a grocery store; delivery to our door is available at the touch of a smart phone screen.

The problem? Our genes still exist as adapted for conditions when survival-of-the-fittest was a concern. Our genetic makeup is completely discordant with our modern sedentary lifestyles. Humans were simply not created to be so inactive and sedentary.

So how are we to reconcile the needs of our adaptive human biology, with the fact that physical activity is no longer a requirement for survival in our modern living environments? In fact, our unique ability as humans to shape our natural and social environment has allowed us to forcibly reduce any required activity, without regard for the health consequences. It is now up to us to deliberately and voluntarily adopt physically active lifestyles — for no other reason than the activity itself (and its vital health benefits). Also in an equal or greater challenge, we have come to realize our health and wellbeing also depends on finding ways to interrupt our long daily periods of sedentary behaviour.

Sedentary behaviour? Not the same as physical inactivity

Over the past decade, we have come to view sedentary behaviour as a distinct entity from physical inactivity. The Canadian Physical Activity Guidelines recommend at least 150 minutes per week of moderate- to vigorous-intensity physical activity for adults, and at least 60 minutes per day for children and youth. But what of the other 23-23.5 hours? Certainly what we do with that large majority of our day might be equally important to our overall current and long-term health.

Sedentary behaviour refers to any waking behaviour with a low energy expenditure while in a sitting or reclining posture. Screen time (TV viewing, video game playing, leisure time computer use) is a common sedentary behaviour, while other behaviours include time spent sitting, reading or in passive transportation. Excessive sedentary time is associated with negative health and mortality outcomes, even for those individuals achieving health benefits by meeting the physical activity guidelines.
Sedentary behaviours among Canadian adults

Using data from the Canadian Community Health Survey, we have recently published a comprehensive assessment of how different self-reported sedentary behaviours vary across Canada and across specific characteristics of the Canadian adult population.10

Overall, 44% of adults report more than 5 hours per week of leisure computer use, 31% report more than 2 hours per day of TV/video viewing, 18% report at least 1 hour per week in video game playing, and 40% report more than 5 hours per week in reading time. However, there are some notable differences: males are more likely to report high computer use and video game playing time, while females are more likely to report high reading time, with no difference for TV viewing time (see Fig. 1). Computer use has increased substantially over time among both men and women, while TV time has remained relatively stable.11 However, this may reflect a shift to viewing TV content online rather than solely by traditional TV. Over 60% of adults report more than 2 hours per day in total screen time.

With regards to computer use, as might be expected, younger adult Canadians are far more likely to report high computer use than those aged 75+. Higher computer use is also found among recent immigrants and visible minorities, as well as for single/never married, higher educated, and higher income individuals. Alberta and BC residents are most likely to report high computer use and Québec residents least likely. High video game playing time is also much more common among younger adults, single/never married individuals, non-immigrants and Manitoba and Alberta residents.

By contrast, TV viewing for more than 2 hours per day increases with age and is most common among Canadians aged 75+. High TV viewing is also more common among single/never married, less educated, lower income and non-immigrant individuals. Nova Scotia, New Brunswick and Territory residents report the highest TV viewing time, while Alberta and BC residents report the lowest.

Lastly, high reading time is also most likely among Canadians aged 75+, as well as single/never married, higher educated, and recent immigrant individuals. High reading time is most likely to be reported in PEI, Ontario, BC and the Territories, and least likely in Québec.

Figure 1. Prevalence (%) of high reported sedentary behaviours among Canadian adults, by gender and by age.

*** p<0.001 for difference between males and females.
How do these findings relate to our health and other health behaviours?

Overweight and obesity among Canadians are most strongly associated with high TV time, but also with high video game playing time. In numerous other research studies, TV viewing has also previously been strongly associated with weight status. By contrast, Canadians with an overweight BMI are least likely to report high reading time. Indeed, previous research had also suggested that higher reading time is not associated with increased risk of overweight or obesity.

Compared to those who have never smoked, daily smokers report higher sedentary behaviours, with the exception of computer use. Other research has also shown an association between TV time and unhealthful dietary patterns. Canadians eating fewer than five servings per day of fruit and vegetables are also more likely to report high computer use, video game playing and TV viewing, while those consuming more than 10 servings per day are most likely to report high reading time. Interestingly, more active Canadians are more likely to report high reading time, while inactive Canadians were most likely to report high TV time. Other research has also shown that mentally active sedentary behaviour is associated with higher physical activity, while passive TV and sitting time are associated with lower physical activity.

Conclusion and practical implications

While our evolutionary biology as humans dictates that we should be a highly active and non-sedentary species, modern times have transformed the human way of life and eliminated the previously obligatory link between food, survival and physical activity. Instead we now have little reason to get up out of our chairs and off our couches — other than for our long-term health, of course. Currently, many Canadian adults report high levels of TV viewing, computer use and reading time. Computer use has increased substantially over time, while TV time and reading time seem to have remained more stable.

Individual sociodemographic characteristics, health behaviours and health outcomes differ depending on the specific type of sedentary behaviour in question. The strongest factor across all sedentary behaviours is age. Other characteristics which should be considered include gender, marital status, education, income, immigrant status, race/ethnicity, and province of residence. Weight status, smoking, diet, and physical activity levels also vary by sedentary behaviour levels. While screen-based behaviours are associated with negative health behaviours and health outcomes, the opposite appears true for reading time.

It is therefore important for public health interventions targeting sedentary behaviour to be tailored not only to specific types of behaviour, but also to the needs of the specific population segment of interest. Both practitioners and public health interventions should also make efforts to distinguish between harmful and non-harmful sedentary behaviours, both on a population level and when counselling individual patients or clients.
References


ABOUT THE AUTHOR

Katya M. Herman, PhD, is an Assistant Professor and Director of the Physical Activity Epidemiology Lab in the Faculty of Kinesiology and Health Studies at the University of Regina. Her research focuses on physical activity and sedentary behaviour across the lifespan, including associations with cardiometabolic and health-related quality of life outcomes. Her current interests include seasonal variations in physical activity as well as occupational sitting time.

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