

Research

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Sitting Less: An Important Ingredient in our Recipe for Health

Summary

This article examines research from Australia that suggests we may be sitting our way to poor health. The research shows that prolonged sitting time is a significant health risk independent of too little exercise.

Key Terms

Accelerometer is a matchbox-sized electronic device worn on the hip. It measures movement and allows researchers to examine patterns of physical activity and sedentary behaviour.

Type 2 diabetes involves insulin resistance. This means muscles have an impaired capacity to take up glucose (sugar), and thus blood glucose levels become elevated.

Metabolic syndrome is a clustering of metabolic risk factors including abdominal obesity (a large waist circumference), high levels of blood fats and sugar, and high blood pressure.

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As practitioners and advocates for physical activity, we routinely refer to our national governments' physical activity guidelines.

These guidelines are based on solid scientific evidence. Their main focus is on regular participation in moderate to vigorous physical activity (typically walking), which is recognized as a major contributor to disease prevention and better health. We no longer have to justify the importance of physical activity, and we feel confident in making the case for programs that help people to be more active.

However, we should not be complacent, nor too confident that we have all the data we need on the health benefits of physical activity. Research findings in our field should constantly prompt us to reflect upon what we might take to be certainties and to consider how we might do things differently in the light of new evidence.

Here we provide an overview of recent evidence that identifies *too much sitting* as an important ingredient of the physical activity and health equation.

In this article, we present a brief overview of new research on the health impacts of prolonged sitting. We argue that the impacts of *too much sitting* need to be considered in addition to our established concerns about *too little exercise*.

What We Found out from the AusDiab Study: Too Much Sitting is a Health Risk

In the mid-1990s, professor Paul Zimmet from the International Diabetes Institute in Melbourne initiated the first national Australian study on the prevalence of diabetes and its risk factors: AusDiab, the Australian Diabetes, Obesity and Lifestyle study.

Included in AusDiab's detailed biomedical, behavioural and lifestyle assessment protocol was a question regarding television viewing time.

A team led by associate professor David Dunstan used the data from this question to explore whether people's television viewing time was related to their metabolic health.

It turned out that prolonged television viewing time, particularly more than four hours a day, was associated with higher blood sugar levels, higher blood fat levels, larger waist circumference, and higher risk of metabolic syndrome. *(Continued on page 2)*



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Importantly, the strong relationship of these biomarkers of metabolic health with television viewing time remained significant regardless of how much moderate to vigorous physical activity people did. Indeed, these detrimental associations between television viewing time and metabolic health were observed even in adults who met the criteria for Australia's physical activity guidelines.

A subsample of the AusDiab participants also wore accelerometers. Accelerometer data provide objective measures of both physical activity and sedentary time. Using the accelerometer data, we confirmed what we had previously found in regards to television viewing time—those who spent long periods of time moving very little were more likely to have poor metabolic health.

Additionally, we showed that people who interrupted their sedentary time more frequently (e.g., got up to get a drink, stood up to answer the phone) were better off in their metabolic health compared to those whose sitting time was mostly uninterrupted.

The accelerometer data also suggested that the average person spends more than half of their waking hours (about nine hours) in sedentary behaviours, primarily prolonged sitting. The remainder of the day is mostly spent doing light physical activity, with only 4-5% of the day spent in moderate to vigorous physical activity.

Importantly, participation in light activities (e.g., housework, shopping, standing and moving about in office environments) was associated with lower (healthier) blood sugar levels and smaller waist circumferences.

What are the Implications?

Prolonged sitting has been engineered into our daily lives. Cars, computers and television are some of the main culprits. Unfortunately, our research in Australia suggests that we may be sitting our way to poor health.

What Can We Do?

An important step is starting to recognize that prolonged sitting can be a health risk. Just as we promote regular participation in moderate physical activity, we can also recommend that people reduce their sitting time.

We still need evidence from future studies, particularly from controlled intervention trials regarding just how much or how little time we should be sitting. But, based on this new evidence, we argue that future editions of physical activity and health guidelines should consider sitting time. Potentially, there could be specific recommendations on reducing and breaking up the prolonged sitting time that now characterizes the lifestyles of many people. ↻

References for this article are available at: <http://www.centre4activeliving.ca/publications/research.html>

About the Authors and the Organizations

Dr. **Neville Owen** and Dr. **Geneviève Healy** conduct research on the unique health consequences of sedentary behaviours (*too much sitting*, which is distinct from *too little exercise*).

Their research is part of a collaborative program in Australia between the School of Population Health's **Cancer Prevention Research Centre (CPRC)** and the School of Human Movement Studies at the **University of Queensland** in Brisbane; the Baker IDI Heart and Diabetes Institute in Melbourne; and the Prevention Research Collaboration in the School of Public Health at the University of Sydney.

Neville is director of the CPRC and a professor of health behaviour within the School of Population Health at the University of Queensland. He is also a research affiliate of the Alberta Centre for Active Living. Geneviève is a National Health and Medical Research Council/Heart Foundation research fellow with the Baker IDI Heart and Diabetes Institute and CPRC.

CPRC's research program focuses on understanding the health consequences and determinants of physical activity and sedentary behaviour. This includes studies on how the walkability of neighbourhoods may influence adults' walking habits as well as the time they spend sitting in cars and in front of televisions and computers.

Some of CPRC's most exciting studies are on interventions to increase physical activity and reduce sedentary sitting time. Led by CPRC deputy director and associate professor Elizabeth Eakin, these studies examine the effects of telephone-delivered advice about physical activity, sitting time and healthier eating on weight control and metabolic health for adults with Type 2 diabetes and breast cancer survivors.



Osteoporosis: Improving Screening and Management Strategies

Summary

This article highlights an upcoming SPHERU study in which researchers will focus on the bone health of populations in rural and urban areas. The aim: to improve the diagnosis, management and prevention of osteoporosis, which is both preventable and treatable.

Key Terms

BMD (bone mineral density) is a measure of bone density reflecting the strength of bones as represented by mineral content. The BMD test is a useful tool for detecting osteoporosis.

DXA (dual-energy X-ray absorptiometry) measures the density of bones. This procedure helps diagnose osteoporosis and predict the risk of bone fractures.

Osteoporosis is characterized by the loss of normal bone density. The disease leads to fragile, porous bones that are compressible like a sponge rather than dense like a brick. People with osteoporosis are more likely to break their bones, especially bones in the spine, hips and wrist.

QUS (qualitative ultrasound) is an ultrasound technique for assessing bone mineral density. Its main advantage is the complete absence of radiation.

Shanthi Johnson, PhD, Professor, University of Regina Faculty of Kinesiology and Health Studies, Saskatchewan Population Health and Evaluation Research Unit (SPHERU) Faculty Researcher

This article highlights an upcoming study by the Saskatchewan Population Health and Evaluation Research Unit (SPHERU) that will help health professionals improve their strategies for detecting and treating osteoporosis.

These strategies will be particularly helpful to people in rural and remote areas who may have osteoporosis or who have already been diagnosed with the disease.

An Overview of Osteoporosis

Osteoporosis is a debilitating bone disease that affects about 1.4 million women and men in Canada (Osteoporosis Canada, 2009).

The disease causes bones to become thin and brittle, which increases the risk of broken bones in the wrist, spine and hip. It is a silent disease, and in many cases, it is diagnosed only after an individual suffers a fracture. It can often lead to disability or even death (Brown & Josse, 2002).

The cost of treating osteoporosis and the fractures it causes is considerable. Hospital, long-term and chronic care account for the majority of these costs, which amount to about \$1.3 billion each year in Canada. These costs are expected to rise as our population ages (Goeree et al., 1996).

Osteoporosis also carries a human cost. It is known to reduce quality of life. People who have osteoporosis often suffer disfigurement as a result of weakness and fractures. They also often experience lowered self-esteem, reduced mobility, and a decrease of independence in their daily lives (National Osteoporosis Foundation, 2008).

Fortunately, osteoporosis is preventable and treatable (Brown & Josse, 2002), which makes this study timely and all the more important. Early detection, evaluation and diagnosis are key for developing effective and efficient prevention and management programs.

What We Will Be Doing

This study will focus on two areas related to assessing and improving bone health: investigating other technologies and understanding the care gap.

Investigating Other Technologies

The screening process for osteoporosis currently involves measuring bone mineral density (BMD) with dual-energy X-ray absorptiometry (DXA). DXA is considered the gold standard of testing.

However, access to this technology is limited, especially amongst the rural residents of Saskatchewan. With a high percentage of rural population in Saskatchewan, and only three government-funded machines located in urban centres, there is an opportunity to look at how screening for bone health can be improved.

We plan to assess the effectiveness of qualitative ultrasound (QUS) in screening individuals at risk for osteoporosis. While QUS is not likely to replace DXA, we hope to determine its level of usefulness in the screening process.

Understanding the Care Gap

Research shows that many people who experience fractures from brittle bones do not receive treatment for osteoporosis to help prevent future problems. *(Continued on page 4)*

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We plan to assess this care gap as it relates to the prevention and management strategies that people choose on their own or that are recommended by their physicians.

Part of this assessment will include reviewing risk checklists and determining how they can be used more effectively.

For example, these checklists ask about the presence of risk factors such as family history and previous fractures. Based on this checklist information, we can categorize patients as low-, medium- or high-risk. This will aid in more effective evaluation of patients early on in the diagnosis process, which will lead to more effective prevention and management strategies.

How We Will Conduct this Research

Supported by a two-year grant from the Saskatchewan Health Research Foundation, this study will recruit about 300 people over the age of 65 who have not been diagnosed with osteoporosis and who are being sent for a bone density test by their doctor. Recruitment will be accomplished through ads in physician's offices and radiology departments.

Once recruited, the participants will receive initial testing at the Faculty of Kinesiology and Health Studies at the University of Regina.

Throughout the study, participants will receive QUS tests and fill out risk checklists. They will also provide information about health practices such as their vitamin D and calcium consumption. This information will allow us to calculate their actual intake of vitamin D and calcium and look at patterns in their eating such as types of food sources.

Follow-ups conducted at six and twelve months will enable us to see what clinical practice guidelines individuals have adopted either on their own or based upon advice from their health care providers.

Practical Implications

Numerous studies have noted that, in spite of best practices, many who experience the debilitating effects of osteoporosis are not receiving management strategies for the prevention of future fractures (Giangregorio, Papaioannou, Cranney, Zytaruk, & Adachi, 2006; Papaioannou et al., 2004; Papaioannou et al., 2008).

However, very few studies to date have examined the post-screening management strategies that people choose on their own or that are recommended by their physicians after a bone health assessment.

Examining the role of innovative alternative technologies and understanding the care gap are essential steps for improving the bone health of populations in both rural and urban areas. Research is needed to address indications that the current service capacity for osteoporosis screening may not be adequate. This research provides the opportunity to conduct investigations that will lead to improvements in osteoporosis diagnosis, management and prevention. ↻

References for this article are available at: <http://www.centre4activeliving.ca/publications/research.html>

About the Author

Shanthi Johnson, PhD, is a professor at the Faculty of Kinesiology and Health Studies at the University of Regina and an adjunct professor at the Canadian Centre for Activity and Aging at the University of Western Ontario. She was previously an assistant professor at the School of Nutrition and Dietetics at Acadia University in Nova Scotia. A registered dietitian, she has been awarded fellow status with the Dietitians of Canada as well as the American College of Sports Medicine. She is also a recipient of the Canadian Institutes of Health Research career award.



Dr. Johnson's research interests include health promotion and falls prevention among older adults. Specifically, she has been examining the role of nutrition and exercise in improving functional capacity and reducing falls among seniors. She has also been involved in research in the areas of population health, rural health, health services research, and global health.

About the Organization

The **Saskatchewan Population Health and Evaluation Research Unit (SPHERU)** is run by the University of Regina and the University of Saskatchewan. SPHERU engages in population health research, which is the study of social factors that contribute to the well-being of various groups within the population. Working across various disciplines, SPHERU researchers collaborate with communities, other academics, and policy-makers to undertake this critical research.



Bonnie Zink, SPHERU communications and knowledge exchange officer, assisted with writing this article.