

Research UPDATE

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Summary

This article highlights a study that assesses physical activity, fitness, body mass index and insulin sensitivity in youth aged 9 to 15 years. The Healthy Hearts research project is a school-based study conducted in seven rural communities in central Alberta.

Key Terms

Body Mass Index (BMI) is defined as an individual's weight (kg) divided by his/her height, squared (m^2). The resulting value classifies him/her as normal weight, overweight or obese, based on internationally derived sex- and age-specific BMI cut-points (Cole, Bellizzi, Flegal, & Dietz, 2000).

Accelerometry is a tool used to measure physical activity objectively. The device is lightweight, durable, portable and has the ability to measure duration and intensity of movement for up to weeks at a time. As the majority of previous research of physical activity in youth was done using self-reported measures, this tool provides a more accurate assessment of physical activity steps a person takes.

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Healthy Hearts: Physical Activity, Fitness & Obesity in Alberta Youth

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Background

Over the past three decades, the percentage of Canadian children and adolescents who are overweight or obese has risen considerably. Recent results from the Canadian Health Measures Survey (CHMS) show that the percentage of overweight or obese adolescents aged 15 to 19 years rose significantly between 1981 and 2009 (Tremblay et al., 2010). The number of overweight or obese boys in this age group rose from 14 to 31%, while the rate for girls went from 14 to 25% between 1981 and 2009.



A major concern surrounding childhood obesity is that over 60% of obese children remain obese into adulthood (Serdula et al., 1993). Another concern is that the duration of a person's obesity is associated with an accelerated progression to chronic diseases, such as heart disease, type 2 diabetes and many forms of cancer (World Health Organization [WHO], 2010).

The Canadian Physical Activity Guidelines published by the Public Health Agency of Canada (PHAC) recommend that children do 90 minutes of moderate-to-vigorous activity above and beyond the incidental activities required by daily living. As of 2007, only 12% of children were meeting this standard (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2009).

What We Did

Using participants previously enrolled in the school-based research project called Healthy Hearts, a sub-sample of 457 youth (aged 9 to 15) were studied between January and October 2008.

Satellite laboratories were set up at each school, with research assistants from the University of Alberta completing various testing protocols with each participant, as follows:

- height and weight were measured;
- body mass index was calculated;
- fitness level was measured using a multi-stage run protocol (Leger Shuttle Run); and
- a fitness classification was determined, based on final stage completed.

In addition, an entire week of physical activity was measured using accelerometers. Duration and intensity of activity was formulated using specialized computer software (KineSoft, Denver, USA).

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What We Found

The following results are worth noting:

- 24.8% of female participants and 27.1% of male participants were considered either overweight or obese.
- 11.9% of females and 26.2% of males scored within the “needs improvement” category for fitness level, based on their age, sex and final stage completed in the multi-stage run test.
- 64.9% of female and 49.4% of male participants completed less than 30 minutes of moderate-vigorous physical activity per day (which is 60 or more minutes less than the recommended minimum of 90 minutes, as suggested in the Canadian Physical Activity Guidelines).
- While wearing the accelerometer, only 2% of this sample met the recommended minimum of 90 minutes of moderate-vigorous physical activity per day.
- There was no significant difference between boys and girls when focusing on body mass index, waist circumference, height and weight.
- There was significant difference between boys and girls for fitness final stage completion and average moderate-vigorous physical activity minutes/day.

The following table provides a portrait of an average 12-year-old from the Healthy Hearts study compared to the recently published data from the national CHMS (Tremblay et al., 2010).

| Variable | Boys | | Girls | |
|--------------------------------------|--------------------------------|-----------------------------------|--------------------------------|-----------------------------------|
| | 2008 Healthy Hearts* (Alberta) | 2007-2009 National (CHMS) Survey* | 2008 Healthy Hearts* (Alberta) | 2007-2009 National (CHMS) Survey* |
| Age (yrs) | 12 | 12 | 12 | 12 |
| Height (cm) | 153.0 | 155.8 | 153.0 | 155.9 |
| Weight (kg) | 45.2 | 48.0 | 44.3 | 47.6 |
| Body Mass Index (kg/m ²) | 19.0 | 19.2 | 18.8 | 19.5 |
| Waist Circumference (cm) | 69.0 | 66.2 | 68.0 | 68.0 |
| Physical Activity/Day** (min) | 32.66 | Not available | 27.85 | Not available |

*estimates are based on median values for boys and girls


** at a moderate-vigorous intensity which is equivalent to a walking speed or greater intensity

Since 1981, the national survey has shown noticeable increases in weight, waist circumference and body mass index (Tremblay et al., 2010). Our data suggests that the current situation in Alberta is similar to the national average.

This Healthy Hearts sub-sample is part of a three-year prospective cohort study, designed to pinpoint doses of physical activity and fitness associated with protection from obesity and risk for type 2 diabetes in youth. Additional results will be published at a later date.

Practical Implications

The data presented herein reinforces many trends that have been noted in previous studies: overweight and obesity levels are high in youth and physical activity levels are relatively low.

These realities are cause for concern considering the increased risk of chronic diseases associated with obesity and inactivity. Prevention steps or interventions are needed at multiple levels, across society, to help reverse these unhealthy trends in our youth population and to help reduce costs and demands on the health care system in the future. 

About the Authors

Randi Lynn Rinaldi, BPE, is presently a graduate student at the University of Alberta. She has been part of the Healthy Hearts research team since 2006 and enjoys educating others on incorporating physical activity and wellness into their daily lives.

Normand Boulé, PhD, is an Assistant Professor in the Faculty of Physical Education and Recreation at the University of Alberta. His research interests are centred on the role of physical activity in the prevention and management of obesity and type 2 diabetes.

Jonathan McGavock, PhD, and **Richard Lewanczuk**, PhD, MD are the Principal Investigators for the Healthy Hearts research project.

