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Sedentary behaviour and obesity

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Abstract

Objectives

This article examines sedentary behaviours (television viewing, computer use and reading) in relation to obesity among Canadian adults aged 20 to 64 years.

Methods

The analysis is based on 42,612 respondents from the 2007 Canadian Community Health Survey. Cross-tabulations were used to compare the prevalence of obesity by time engaged in sedentary behaviours. Multiple logistic regression models were used to determine if associations between sedentary behaviours and obesity were independent of the effects of socio-demographic variables, leisure-time physical activity and diet.

Results

Approximately one-quarter of men (25%) and women (24%) who reported watching television 21 or more hours per week were classified as obese. The prevalence of obesity was substantially lower for those who averaged 5 or fewer hours of television per week (14% of men and 11% of women). When examined in multivariate models controlling for leisure-time physical activity and diet, the associations between time spent watching television and obesity persisted for both sexes. Frequent computer users (11 or more hours per week) of both sexes had increased odds of obesity, compared with those who used computers for 5 or fewer hours per week. Time spent reading was not related to obesity.

Keywords

body mass index, computer use, diet, health behaviour, leisure-time physical activity, reading, television

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Over the past 25 years, the prevalence of obesity in Canada has increased substantially among people of all ages.^{1,2} Understanding the causes of this trend is critical for the establishment of effective population-level interventions.

Increases in energy intake and decreases in energy expenditure are obvious candidates as contributors to the rise in obesity. However, empirical evidence establishing either factor as instrumental in causing the increase in obesity is equivocal. Findings from survey data indicate that average caloric consumption among Canadians has not risen since the early 1970s, and in some population groups, consumption has declined.³ Most survey data tracking physical activity have been limited to leisure-time physical activity, which has increased modestly since the mid-1980s.^{4,5} However, leisure-time physical activity is only one small component of total waking-time activity. The counterintuitive trends for energy intake and leisure-time physical activity and those observed for obesity indicate the importance of identifying and examining other behavioural correlates of obesity.

A relatively new area of obesity research is the study of sedentary behaviours. It has been suggested that sedentary behaviours should be examined as a construct distinct from physical activity.⁶ To date, the most widely studied sedentary behaviour in relation to excess weight has been television viewing. For children and adolescents, most research has found a link between the number of hours of television viewing and being overweight or obese,⁷⁻²² but some studies have yielded inconsistent results.²³⁻²⁵ A recent review of the literature concluded that although time spent watching television has been consistently linked to overweight among children and adolescents, the association is weak and unlikely to be clinically relevant.²⁶ This conclusion however, has been refuted by other researchers.^{17,27}

Far less attention has focused on associations between television viewing and obesity among adults, and relationships with other sedentary behaviours have rarely been examined.

This article examines associations between leisure-time sedentary behaviours and obesity among a large sample of Canadian adults aged 20 to 64 years. The sedentary behaviours considered are television viewing, computer use and reading. For those associations that emerged, a second goal was to determine if they were mediated by leisure-time physical activity and nutrition (as measured by fruit and vegetable consumption).

Methods

Data source

Data are from the 2007 Canadian Community Health Survey (CCHS), a general health survey that covers the household population aged 12 years or older. The CCHS excludes residents of Indian reserves, institutions and some remote areas; full-time members of the Canadian Forces; and all residents (military and civilian) of military bases. Interviews were conducted from January through December 2007; 62% of the interviews were by telephone, and the remaining 38%, in person. The overall response rate was 78%, yielding a sample of 65,946 respondents. More information about the

CCHS is available in a published report²⁸ and on Statistics Canada's Web site (www.statcan.ca).

This study was based on the population aged 20 to 64 years. Since body mass index is not calculated for pregnant women, they were excluded from the study. Approximately 2% of records were dropped because of non-response to the questions on sedentary behaviours. The final analysis file consisted of 42,612 respondents: 19,811 men and 22,801 women.

Analytical techniques

Frequency estimates were produced to describe the characteristics of the study population based on data weighted to represent the Canadian population aged 20 to 64 years in 2007. Cross-tabulations were used to show associations between sedentary behaviours and obesity.

Logistic regression models were used to examine sedentary behaviours in relation to three outcomes: obesity, leisure-time physical activity, and fruit and vegetable consumption. These models controlled for the effects of potential confounding variables (age, marital status, education, household income, urban/rural residence, and immigrant status). For each of the three outcomes, separate models were fitted for men and women since some studies have found that associations between sedentary behaviours and these outcomes differ between the sexes.^{22,29}

In a final set of logistic regression models (one for each sex), obesity was examined in relation to sedentary behaviours using leisure-time physical activity and fruit and vegetable consumption as control variables. The purpose was to explore the possibility that these variables act as mediators in the association between sedentary behaviours and obesity. Evidence of mediation would be indicated by attenuated associations between sedentary behaviours and obesity.

All analyses were based on weighted data. To account for the survey design effect of the CCHS, standard errors, coefficients of variation and 95% confidence intervals were estimated using the bootstrap technique.^{30,31} Differences between estimates were tested for statistical significance, which was established at the level of $p < 0.05$.

Definitions

The 2007 CCHS asked Canadian adults about the time they spent engaging in three *sedentary behaviours*. They were asked to report the number of hours in a typical week over the past three months they spent watching television (including videos), using a computer (including playing computer games and using the Internet), and reading. Respondents were instructed to report **leisure-time hours only and to exclude time spent on these activities at work or school**. For each behaviour, respondents reported their weekly hours in eight categories: none, less than 1, 1 to 2, 3 to 5, 6 to 10, 11 to 14, 15 to 20, or more than 20. For this analysis, these response categories were collapsed to: 5 or fewer, 6 to 10, 11 to 14, 15 to 20, or 21 or more hours for television viewing. Because of smaller sample counts in the higher categories for computer use and reading, the top category was defined as 11 or more hours.

Body mass index (BMI) is a measure of weight adjusted for height, calculated by dividing weight in kilograms by height in metres squared. CCHS respondents whose BMI was 30.0 kg/m² or more were classified as obese, based on Canadian guidelines,³² which are in line with those of the World Health Organization.³³ BMI was based on CCHS respondents' self-reported height and weight.

Daily fruit and vegetable consumption in the CCHS was assessed with questions from the Behavioral Risk Factor Surveillance System in the United States.³⁴ Respondents were asked how frequently they consumed fruit, fruit juice, green salad, potatoes (excluding French fries and potato chips), carrots, and other vegetables. Based on responses to these questions, respondents were classified as consuming fruit and vegetables: less than 3 times, 3 to less than 5 times, or 5 or more times per day.

To measure *leisure-time physical activity*, respondents were asked about the frequency and duration of their participation in a variety of activities over the previous three months. Leisure-time physical activity level was based on total energy expenditure (EE) during leisure time. EE was calculated from the reported frequency and duration of all of a respondent's leisure-time physical activities and the

metabolic energy demand (MET value) of each activity, which was independently established.³⁵ Time spent walking or bicycling to work/school was included in the calculation. The number of times respondents participated in each activity over the past three months was multiplied by four to produce an annual estimate, and average EE per day was calculated as:

$$EE = \sum(N_i * D_i * MET_i / 365 \text{ days})$$
 where

N_i = number of occasions of activity i in a year,

D_i = average duration in hours of activity i , and

MET_i = a constant value for the metabolic energy cost of activity i .

The sum of the average daily energy expenditure of all activities was used to classify respondents as:

- *Active* – Using 3 or more kilocalories per kilogram of body weight per day; for example, walking an hour a day or jogging 20 minutes a day.
- *Moderately active* – Using 1.5 to less than 3 kilocalories per kilogram of body weight per day; for example, walking 30 to 60 minutes a day, or taking an hour-long exercise class three times a week.
- *Inactive* – Using less than 1.5 kilocalories per kilogram of body weight per day; for example, walking less than half an hour each day.

Based on their highest level of *education*, respondents aged 25 to 64 years were grouped into four categories: postsecondary graduation, some postsecondary, secondary graduation, and less than secondary graduation. The same categories were used for those aged 20 to 24 years, but education was based on the highest level of education in the household.

Household income groups were derived by calculating the ratio between total household income from all sources in the previous 12 months and Statistics Canada's low-income cutoff (LICO) specific to the number of people in the household, the size of the community, and the survey year. These adjusted income ratios were grouped into quintiles (five groups, each containing one-fifth of Canadians).

Immigrants were defined as those who were born outside of Canada and were not Canadian citizens by birth. Immigrant respondents were categorized

into three groups according to length of residence in Canada: 0 to 9 years, 10 to 19 years, and 20 or more years.

To determine *health-related activity limitations*, respondents were asked: “Do you have any difficulty hearing, seeing, communicating, walking, climbing stairs, bending, learning or doing any similar activities?” As well, a series of questions about limitations in various settings was asked: “Does a long-term physical condition or mental condition or health problem reduce the amount or the kind of activity you can do: at home, at work, or at school or other activities (for example, transportation or leisure)?” The response categories were “often,” “sometimes” or “never.” Respondents were classified as having a *health-related activity limitation* if they replied “often” or “sometimes” to at least one item.

Results

Characteristics of study population

The total sample of 42,612 respondents (19,811 men and 22,801 women) was weighted to represent 19.6 million Canadians (9.8 million men and 9.8 million women) aged 20 to 64 years. Of the three sedentary behaviours studied, television viewing was the most popular. Approximately one-quarter of both sexes (27% of men and 24% of women) reported watching television for 15 or more hours per week (an average of more than 2 hours per day), and 16% of men and 15% of women reported 21 or more hours per week (an average of at least 3 hours per day) (Table 1). Frequent computer use (11 or more hours per week) was reported by 18% of men and 14% of women. Just 9% of men reported reading 11 or more hours per week. Reading was more common among women, with 15% reporting 11 or more hours per week.

Correlations among sedentary behaviours were low. Among men, correlations were 0.00 between television viewing and computer use, 0.07 between television viewing and reading, and 0.13 between computer use and reading. Among women, the corresponding correlations were 0.08, 0.12, and 0.12.

The prevalence of obesity, based on self-reported height and weight, was 18% among men and 16%

Table 1
Prevalence of sedentary behaviours, obesity, physical activity level, and fruit and vegetable consumption, by sex, household population aged 20 to 64 years, Canada, 2007

	Men		Women	
	%	95% confidence interval	%	95% confidence interval
Television viewing (hours per week)				
5 or fewer	29.4	28.4 to 30.3	33.0	32.0 to 34.0
6 to 10	28.2	27.1 to 29.2	25.6	24.8 to 26.5
11 to 14	15.9	15.2 to 16.7	17.1	16.3 to 17.8
15 to 20	10.3	9.7 to 10.9	8.9	8.3 to 9.4
21 or more	16.2	15.4 to 17.0	15.4	14.8 to 16.1
Computer use (hours per week)				
5 or fewer	64.0	62.9 to 65.1	71.8	70.8 to 72.7
6 to 10	17.7	16.9 to 18.5	14.7	13.9 to 15.4
11 or more	18.3	17.5 to 19.1	13.6	12.9 to 14.3
Reading (hours per week)				
5 or fewer	71.1	70.1 to 72.0	62.2	61.3 to 63.2
6 to 10	19.7	18.8 to 20.5	22.7	21.8 to 23.5
11 or more	9.3	8.7 to 9.9	15.1	14.4 to 15.8
Obese (body mass index ≥ 30 kg/m²)				
	18.4	17.6 to 19.2	15.9	15.2 to 16.6
Leisure-time physical activity level[†]				
Active (3 or more KKD)	27.7	26.7 to 28.6	23.2	22.4 to 24.1
Moderately active (1.5 to 2.9 KKD)	25.7	24.8 to 26.7	26.4	25.5 to 27.3
Inactive (less than 1.5 KKD)	46.6	45.5 to 47.7	50.4	49.3 to 51.4
Daily fruit and vegetable consumption				
Less than 3 times	28.7	27.7 to 29.7	17.8	17.1 to 18.6
3 to less than 5 times	36.5	35.5 to 37.5	32.4	31.5 to 33.4
5 or more times	34.8	33.8 to 35.9	49.8	48.8 to 50.7

[†] includes time spent walking or bicycling to work/school

Note: KKD is kilocalories per kilogram per day.

Source: 2007 Canadian Community Health Survey.

among women. Approximately half of men (47%) and women (50%) were categorized as being inactive in leisure-time. Infrequent consumption of fruit and vegetables (less than three times per day) was reported by 29% of men and 18% of women.

Associations with obesity

Television viewing was associated with obesity for both sexes. Among men, the prevalence of obesity rose from 14% of those who averaged 5 or fewer hours per week to 25% of those averaging 21 or more hours a week (Table 2). Similar results emerged for women, with the prevalence of obesity rising from 11% of those reporting 5 or fewer hours to 24% of those reporting 21 or more hours per

Table 2
Prevalence of obesity by sex and sedentary behaviours, household population aged 20 to 64 years, Canada, 2007

Sedentary behaviours (hours per week)	Obese (body mass index ≥ 30 kg/m ²)			
	Men		Women	
	%	95% confidence interval	%	95% confidence interval
Television viewing				
5 or fewer [†]	13.7	12.3 to 15.0	11.3	10.3 to 12.4
6 to 10	17.3*	15.6 to 18.9	15.4*	14.0 to 16.8
11 to 14	18.7*	16.6 to 20.8	16.2*	14.5 to 18.0
15 to 20	23.5*	20.7 to 26.4	20.6*	18.0 to 23.2
21 or more	25.0*	23.1 to 27.0	23.6*	21.8 to 25.4
Computer use				
5 or fewer [†]	18.4	17.4 to 19.3	15.3	14.5 to 16.1
6 to 10	19.6	17.3 to 21.9	16.9	14.9 to 18.8
11 or more	17.2	15.3 to 19.0	18.2*	16.0 to 20.4
Reading				
5 or fewer [†]	18.3	17.3 to 19.2	15.2	14.2 to 16.1
6 to 10	18.5	16.6 to 20.4	16.3	14.7 to 17.8
11 or more	18.6	16.2 to 20.9	18.4*	16.7 to 20.1

[†] reference category

* significantly different from estimate for reference category ($p < 0.05$)

Source: 2007 Canadian Community Health Survey.

week. These associations persisted when examined in multivariate models that controlled for the potentially confounding effects of age, marital status, education, household income, urban/rural residence, and immigrant status (Table 3).

In the bivariate analysis, leisure-time computer use was not significantly associated with obesity among men. Among women, those using computers 11 or more hours per week were slightly more likely to be obese than were those who averaged 5 or fewer hours per week (18% versus 15%). However, computer use is most common among younger individuals,³⁶ who are also less likely to be obese. As a result, when examined in multivariate models controlling for age and other socio-demographic characteristics, stronger associations between computer use and obesity emerged. For both sexes, those who used computers for at least 6 hours per week had increased odds of being obese (20% higher odds for men and 30% higher odds for women), compared with those who averaged 5 or fewer hours.

Reading was not associated with obesity among men. Among women, those who reported reading 11 or more hours per week were slightly more likely to be obese than were those who averaged 5 or fewer

Table 3
Adjusted odds ratios relating sedentary behaviours to obesity, by sex, household population aged 20 to 64 years, Canada, 2007

Sedentary behaviours (hours per week)	Obese (body mass index ≥ 30 kg/m ²)			
	Men		Women	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Television viewing				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.2*	1.0 to 1.5	1.4*	1.2 to 1.6
11 to 14	1.3*	1.1 to 1.6	1.4*	1.1 to 1.6
15 to 20	1.8*	1.5 to 2.2	1.7*	1.4 to 2.1
21 or more	1.8*	1.6 to 2.2	1.8*	1.6 to 2.2
Computer use				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.2*	1.0 to 1.4	1.3*	1.1 to 1.5
11 or more	1.2*	1.0 to 1.4	1.3*	1.1 to 1.6
Reading				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.0	0.9 to 1.2	1.0	0.9 to 1.2
11 or more	1.0	0.9 to 1.2	1.1	0.9 to 1.3

[†] reference category

* significantly different from estimate for reference category ($p < 0.05$)

... not applicable

Notes: Adjusted for age group, marital status, education, household income, population size of place of residence, and immigrant status. See Appendix Table A for results of full model.

Source: 2007 Canadian Community Health Survey.

hours (18% versus 15%). But reading is more common among older women, who are also more likely to be obese. Consequently, in the multivariate model, the association between obesity and hours spent reading did not persist among women. Since reading was not associated with obesity in the multivariate analyses for either sex, it was not retained in subsequent analyses.

Poor diet and low levels of physical activity are commonly thought to act as mediators in the relationship between television viewing and obesity. In this study, positive associations were observed between hours devoted to television and to computer use, and infrequent leisure-time physical activity and low consumption of fruit and vegetables (Appendix Tables B and C). Nonetheless, associations between obesity and television viewing remained significant in models that controlled for these potentially mediating variables, and attenuation of the odds ratios was minimal (Table 4). The association between obesity and frequent computer use also persisted for both sexes.

Table 4
Adjusted odds ratios relating television viewing, computer use, physical activity level, and fruit and vegetable consumption to obesity, by sex, household population aged 20 to 64 years, Canada, 2007

	Obese (body mass index ≥ 30 kg/m ²)			
	Men		Women	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Television viewing (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.2*	1.0 to 1.5	1.4*	1.2 to 1.6
11 to 14	1.3*	1.1 to 1.6	1.3*	1.1 to 1.6
15 to 20	1.8*	1.4 to 2.1	1.6*	1.3 to 2.0
21 or more	1.8*	1.5 to 2.1	1.7*	1.4 to 2.0
Computer use (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.2*	1.1 to 1.5	1.3*	1.1 to 1.5
11 or more	1.2*	1.0 to 1.4	1.4*	1.1 to 1.6
Leisure-time physical activity level[‡]				
Active (3 or more KKD) [†]	1.0	...	1.0	...
Moderately active (1.5 to 2.9 KKD)	1.2*	1.0 to 1.4	1.5*	1.2 to 1.7
Inactive (Less than 1.5 KKD)	1.4*	1.2 to 1.7	2.3*	2.0 to 2.7
Daily fruit and vegetable consumption				
Less than 3 times	1.0	0.9 to 1.3	1.0	0.9 to 1.2
3 to less than 5 times	1.0	0.9 to 1.2	0.9	0.8 to 1.1
5 or more times [†]	1.0	...	1.0	...

[†] reference category

[‡] includes time spent walking or bicycling to work/school

* significantly different from estimate for reference category ($p < 0.05$)

... not applicable

Notes: Adjusted for age group, marital status, education, household income, population size of place of residence, immigrant status, and variables in this table. KKD is kilocalories per kilogram per day.

Source: 2007 Canadian Community Health Survey.

Since television viewing and computer use may vary over the course of the year, the season in which the CCHS interview was conducted was added as a control variable, but the odds ratios relating television viewing and computer use to obesity remained virtually the same as those in Table 4 (data not shown).

In a final set of models, health-related activity limitation was added as a control variable. Again, the odds ratios relating television viewing and computer use to obesity were essentially the same as those in Table 4 (data not shown).

Discussion

To our knowledge, this is the first study based on a nationally representative data set to examine associations between sedentary behaviours and obesity among Canadian adults. The findings provide strong evidence of a positive association between time spent watching television and obesity among both men and women. When examined in multivariate models, modest associations emerged between computer use and obesity for both sexes, but reading was not associated with obesity for either sex.

Most studies examining sedentary behaviours in relation to obesity have measured associations between television viewing and overweight among children and adolescents. Reviews of the literature conclude that evidence from both cross-sectional and prospective studies of children and youth support a positive association between hours of television viewing and excess weight, but the effects are generally small.^{26,37,38} Studies examining associations between television viewing and obesity among adults are relatively scarce and have usually been based on small-scale surveys or specific population sub-groups or occupations. However, the findings of these studies^{9,39-50} are generally consistent with those reported here.

The mechanisms most commonly proposed to explain the link between television viewing and obesity are reduced leisure-time physical activity and increased energy intake.⁵¹ Television viewing is hypothesized to supplant physical activity and/or increase caloric intake through snacking in response to the numerous cues in advertisements for energy-dense foods of poor nutritional content.⁵²⁻⁵⁴ This study provides some support for both mechanisms. Men and women who were frequent television viewers were more likely to be inactive in their leisure time. Low consumption of fruit and vegetables, which is correlated with a diet high in fat,⁵⁵ was also associated with high levels of television viewing. However, when obesity was examined in models controlling for these potentially mediating factors, attenuations in associations between obesity and television viewing were minimal. Other studies of adults have also found television viewing to be

What is already known on this subject?

- Numerous studies have examined associations between sedentary behaviours and obesity among children and adolescents. Results provide evidence of a positive association between television viewing and excess weight, but the effects have generally been small.
- Studies of adults have been relatively rare and have usually been based on small-scale surveys or specific population sub-groups and occupations.

What does this study add?

- Among Canadian men and women, the odds of being obese increased as weekly hours of television viewing rose. Furthermore, associations between time spent watching television and obesity were independent of leisure-time physical activity and diet.
- When the effects of age and other potential confounding variables were controlled, a modest association was observed between frequent computer use and obesity among men and women.
- Reading was not associated with obesity for either sex.

associated with obesity, independent of physical activity and dietary intake.^{9,40,44,48}

A third possible explanation of the link between television time and obesity is the low metabolic rate associated with television viewing.⁵¹ The metabolic energy demand (MET value) required for watching television is 1.0, only slightly above the MET value for sleeping (0.9).³⁵ Household chores such as vacuuming (3.5 METS), wall painting and papering (3.0 METS) and putting away groceries (2.5 METS) and sedentary behaviours such as playing the piano (2.5 METS), sitting writing (1.8 METS), typing (1.8 METS), playing cards or board games (1.5 METS) and sitting reading (1.3 METS) all have higher MET values than television viewing. This underscores the importance of accurately measuring physical activity⁵⁶ in all domains of life (including both structured and unstructured activities during leisure and non-leisure time) to understand the potential mediating role of other activities in the association between television viewing and obesity.

Limitations

The self-reported nature of these data is an important limitation of this analysis. Measures of sedentary behaviours, obesity, leisure-time physical activity, and fruit and vegetables consumption are all based on self-reports, which are likely subject to social desirability and recall biases. In particular, it is well established that the use of self-reported height and weight data results in lower estimates of the prevalence of obesity, compared with measured data.^{57,58} The extent to which self-reported data affected the associations between sedentary behaviours and obesity in this study is unknown. However, other studies of associations between television viewing and measured indicators of obesity in adults have found similar results to those reported here.^{29,39,44-46,49}

Single-item measures for sedentary behaviours lack content validity and likely yield only crude estimates of these behaviours.⁵⁹ In fact, a comparison with another data source suggests that the estimates of frequent television viewing in this study are low.³⁶

The results of this analysis might have been different had it been possible to use better measures of dietary habits, such as total calories consumed or percentage of calories from fat.

The cross-sectional nature of the CCHS precludes inferences about the temporal ordering of events or causality. It is possible that health-related activity limitations that are often associated with obesity result in obese individuals increasing their television viewing. Nonetheless, the inclusion of activity limitation as a control variable in the regression analysis did not alter associations between television viewing and obesity. Furthermore, evidence from prospective studies of adults shows that television viewing is associated with new cases of obesity and weight gain,^{40,48,49} and a decrease in television viewing is associated with weight loss.⁴¹ The test for the mediating role of physical activity and diet in this analysis should be considered exploratory; a proper assessment of mediation would require longitudinal data.

Conclusion

Projections suggest that the steady gains in life expectancy that were realized during the 20th century will begin to diminish unless effective population-level interventions to combat obesity are implemented.⁶⁰ Intervention studies specifically targeted at reducing television viewing have yielded encouraging results in reducing obesity levels among children and adolescents.^{51,61} Furthermore, some evidence indicates that recommendations aimed at reducing sedentary behaviours may be more effective than those targeted at promoting physical

activity.⁶² Studies have found that sedentary behaviours, particularly television viewing, adopted in childhood track into adulthood, and some even suggest that sedentary behaviours track more strongly than physical activity.^{18,23,63,64} In light of the evidence of a positive association between adult obesity and time spent watching television, intervention programs aimed at reducing television viewing among both children and adults may assist in reducing the prevalence of obesity among adults in the future. ●

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Table A
Adjusted odds ratios relating sedentary behaviours and selected socio-demographic characteristics to obesity, by sex, household population aged 20 to 64 years, Canada, 2007

	Obese (body mass index ≥ 30 kg/m ²)			
	Men		Women	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Television viewing (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.2*	1.0 to 1.5	1.4*	1.2 to 1.6
11 to 14	1.3*	1.1 to 1.6	1.4*	1.1 to 1.6
15 to 20	1.8*	1.5 to 2.2	1.7*	1.4 to 2.1
21 or more	1.8*	1.6 to 2.2	1.8*	1.6 to 2.2
Computer use (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.2*	1.0 to 1.4	1.3*	1.1 to 1.5
11 or more	1.2*	1.0 to 1.4	1.3*	1.1 to 1.6
Reading (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.0	0.9 to 1.2	1.0	0.9 to 1.2
11 or more	1.0	0.9 to 1.2	1.1	0.9 to 1.3
Age group (years)				
20 to 24	0.8	0.6 to 1.1	0.5*	0.4 to 0.6
25 to 34	0.9	0.8 to 1.1	0.7*	0.6 to 0.8
35 to 44	1.1	1.0 to 1.3	0.9	0.7 to 1.0
45 to 54 [†]	1.0	...	1.0	...
55 to 64	1.1	0.9 to 1.3	1.0	0.9 to 1.2
Marital status				
Married/Common-law [†]	1.0	...	1.0	...
Divorced/Separated/Widowed	0.8*	0.6 to 0.9	1.0	0.9 to 1.2
Never married	0.6*	0.5 to 0.7	1.0	0.8 to 1.1
Education				
Less than secondary graduation	1.2	1.0 to 1.4	1.5*	1.2 to 1.7
Secondary graduation	1.1	0.9 to 1.3	1.1	1.0 to 1.3
Some postsecondary	1.1	0.9 to 1.4	1.2	1.0 to 1.5
Postsecondary graduation [†]	1.0	...	1.0	...
Household income quintile				
1 (lowest)	1.0	0.8 to 1.3	1.2	1.0 to 1.5
2	1.0	0.8 to 1.2	1.0	0.8 to 1.2
3 [†]	1.0	...	1.0	...
4	1.0	0.8 to 1.2	0.7*	0.6 to 0.9
5 (highest)	1.0	0.8 to 1.2	0.6*	0.5 to 0.8
Urban/Rural residence				
Rural [†]	1.0	...	1.0	...
Urban: population less than 30,000	1.0	0.8 to 1.1	1.1	0.9 to 1.2
Urban: population 30,000 to 99,999	0.8*	0.7 to 1.0	0.9	0.7 to 1.0
Urban: population 100,000 to 499,999	1.0	0.9 to 1.2	0.8*	0.7 to 1.0
Urban: population 500,000 or more	0.7*	0.6 to 0.8	0.7*	0.6 to 0.8
Immigrant status				
Immigrant: 0 to 9 years in Canada	0.5*	0.3 to 0.7	0.5*	0.3 to 0.7
Immigrant: 10 to 19 years in Canada	0.5*	0.3 to 0.7	0.4*	0.3 to 0.6
Immigrant: 20 or more years in Canada	0.6*	0.5 to 0.8	0.7*	0.6 to 0.9
Canadian-born [†]	1.0	...	1.0	...

[†] reference category

* significantly different from estimate for reference category ($p < 0.05$)

... not applicable

Source: 2007 Canadian Community Health Survey.

Table B

Adjusted odds ratios relating television viewing and computer use to physical inactivity, by sex, household population aged 20 to 64 years, Canada, 2007

	Physically inactive (less than 1.5 kilocalories per kilogram per day)			
	Men		Women	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Television viewing (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.1	1.0 to 1.2	1.2*	1.1 to 1.4
11 to 14	1.0	0.8 to 1.1	1.3*	1.1 to 1.5
15 to 20	1.4*	1.1 to 1.6	1.6*	1.4 to 1.9
21 or more	1.3*	1.1 to 1.5	1.9*	1.7 to 2.2
Computer use (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.0	0.8 to 1.1	0.9	0.8 to 1.1
11 or more	1.1*	1.0 to 1.3	1.1	0.9 to 1.2

[†] reference category

* significantly different from estimate for reference category ($p < 0.05$)

... not applicable

Note: Adjusted for age group, marital status, education, household income, population size of place of residence, and immigrant status.

Source: 2007 Canadian Community Health Survey.

Table C

Adjusted odds ratios relating television viewing and computer use to infrequent consumption of fruit and vegetables, by sex, household population aged 20 to 64 years, Canada, 2007

	Consume fruit and vegetables less than 3 times per day			
	Men		Women	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Television viewing (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.0	0.9 to 1.2	1.2*	1.0 to 1.4
11 to 14	1.2	1.0 to 1.3	1.3*	1.1 to 1.6
15 to 20	1.6*	1.3 to 1.9	1.3*	1.1 to 1.6
21 or more	1.7*	1.5 to 2.0	1.9*	1.7 to 2.3
Computer use (hours per week)				
5 or fewer [†]	1.0	...	1.0	...
6 to 10	1.0	0.9 to 1.2	1.0	0.8 to 1.1
11 or more	1.3*	1.1 to 1.5	1.5*	1.3 to 1.7

[†] reference category

* significantly different from estimate for reference category ($p < 0.05$)

... not applicable

Note: Adjusted for age group, marital status, education, household income, population size of place of residence, and immigrant status.

Source: 2007 Canadian Community Health Survey.