Sedentary behavior among adults: The role of community belonging

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ABSTRACT

Sedentary behavior is a modifiable determinant of health. Little is known about the ways in which contextual factors may influence this behavior. The objectives of this study were to: (1) examine the association between community belonging and adult sedentary behavior during leisure; (2) determine if this association was explained by perceived health. Data were derived from the 2010 Canadian Community Health Survey ($N = 11,494$ adults). Multinomial regression models and 99% confidence intervals were used to examine associations between sense of community belonging and sedentary behavior, adjusting for sociodemographic variables and perceived health. On average, adults were sedentary for 20–24 h per week during leisure. More than a third of the sample reported low sedentary behavior (≤19 h a week). In a fully adjusted model participants who were female, in middle adulthood, married, and/or living in higher income households were less sedentary during leisure. Adults with a strong sense of community belonging were also significantly less sedentary during leisure; this association remained significant after adjustment for perceived mental and overall health. Most efforts to address sedentary behavior have focused on individual-level interventions. The present finding highlights the role that larger contextual factors may play in sedentary behavior. Sense of community belonging is a contextual determinant of health that may serve as a useful target for interventions designed to reduce adult sedentary behavior during leisure.

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1. Introduction

Sedentary behavior refers to waking periods of muscular unloading with low energy expenditure, such as sitting, and is distinct from physical inactivity (Sedentary Behavior Research Network, 2012). Prospective studies indicate sedentary time is associated with several leading causes of morbidity and mortality in developed countries including cardiovascular disease, cancer, and diabetes (Proper et al., 2011; Thorp et al., 2011; WHO, 2011). Sedentary lifestyles place a major burden on population health, life expectancy, and healthcare systems in developed nations. Adults in developed countries currently spend more than half of all waking hours in sedentary behaviors; with the frequency of these activities (particularly television viewing) increasing with age (Ding et al., 2012; Owen et al., 2009).

A recent systematic review of sedentary behavior highlighted an absence of research focused on social and environmental factors that could be of use in anti–sedentary behavior interventions (Rhodes et al., 2012). To begin to address this gap, this study examined how an individual's experience of community may shape the ways they spend their leisure time. Sense of community belonging has been associated with health, health behavior, and health behavior change across multiple studies (Hystad and Carpiano, 2012; Kitchen et al., 2012; Shields, 2008). The purpose of this study is to examine the role that this contextual factor may play in sedentary activity. Specifically, study objectives were to: (1) examine the association between community belonging and adult sedentary behavior during leisure; (2) determine if this association was explained by perceived health.

2. Methods

2.1. Study design

Data for this cross sectional study were derived from the 2010 CCHS; a national household health survey conducted annually in Canada. All respondents were residents of private dwellings. Excluded were persons living in institutions, Aboriginal communities, remote locations, military bases, and full-time members of the Canadian Forces. Dwellings were selected using a multistage stratified cluster design (Statistics Canada, 2011). Information was collected using computer-assisted interviewing in person or over the phone from January 1 to December 31, 2010. Data were weighted to represent the Canadian population.

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This study was exempt from IRB review, as data was obtained in de-identified form.

The national response rate was 71.5%, (N = 63,191 individuals aged 12 years or older) (Statistics Canada, 2011). Data on sedentary behavior were collected from 3 provinces located in western, eastern and central Canada (British Columbia, Newfoundland, and Manitoba; respectively). The number of participants selected from each province was based on population density. The present study limited the analysis to those 18 years and older. Overall, 95% of the adults who were asked questions about sedentary behavior provided valid responses (N = 11,494).

2.2. Measures

2.2.1. Sedentary behavior

Participants were asked to report the average weekly leisure-time (outside of school or work) that was spent: (1) on a computer, including playing computer games and using the Internet; (2) playing video games; (3) watching television or videos; and (4) reading. Total hours spent in these activities per week were calculated with participants classified in one of ten categories, beginning with <5 h of leisure sedentary time and increasing in five hour increments to a maximum of ≥45 h per week. To categorize low and high sedentary behavior, average time spent in sedentary activities was calculated. Those reporting sedentary leisure time that was >1 standard deviation above the mean (≥35 h per week for this sample) were classified as the *high sedentary group*. Those with sedentary time that fell within one standard deviation of the mean (20–34 h per week) were classified as the *average sedentary group*. Those reporting sedentary time that was less than one standard deviation below the mean (≤19 h per week) were categorized as the *low sedentary group*. The study sample was used to create this classification given there are no internationally recognized classification guidelines for adult sedentary leisure time.

2.2.2. Sense of community belonging

To examine this variable, participants were asked: "How would you describe your sense of belonging to your local community?" Participants were asked to respond on the following scale: 1 = very strong, 2 = somewhat strong, 3 = somewhat weak, and 4 = very weak (Statistics Canada, 2011).

2.2.3. Sociodemographic covariates

Data were collected on gender, age (18–24, 25–34, 35–49, 50–64, ≥65), education (less than high school, high school diploma, some college/university, and college/university degree), household income (0–$19,999, $20,000–$39,999, $40,000–$59,999, $60,000–$79,999, ≥80,000), marital status (married/common-law, not currently married, never married), and employment status (currently employed: yes or no).

2.2.4. Perceived health

Perceived mental health and overall health were examined as covariates in this study given these variables are associated with sense of community belonging and sedentary activity and may confound the association (Proper et al., 2011; Shields, 2008; Thorp et al., 2011). Participants were asked to rate their perceived mental health on the following scale: 1 = excellent to very good, 2 = good, 3 = fair to poor. Participants were asked to rate their perceived overall health on the following scale: 1 = excellent to very good, 2 = good, 3 = fair to poor.

2.3. Analysis strategy

Descriptive statistics were used to derive average sedentary time during leisure. Multinomial regression and 99% confidence intervals were used to examine sociodemographic correlates of low and average sedentary behavior, as compared to high sedentary behavior, after adjustment for sociodemographic variables. When we examined associations between community belonging and sedentary behavior, we also adjusted for mental health and overall health given these variables have been associated with both community belonging and sedentary time (Rhodes et al., 2012; Shields, 2008). Potential confounders were tested for effect modification before entry into main effects models; none were indicated. Multicollinearity between variables was examined using variance inflation factors. Missing data (5%) was excluded using listwise deletion. Associations between variables were examined using weighted data, and completed using SPSS 19.0.

3. Results

The sample was 55.6% female and the mean age was 35–49 years. Most participants were married, employed, and had completed a post-secondary education (Table 1). Adults were sedentary an average of 20–24 h per week during leisure (range = 0 to ≥45 h). The prevalence of high sedentary behavior (≥35 h each week) during leisure was 25.4%. Watching television was the most frequent sedentary activity (6–10 h per week), followed by computer use and reading (3–5 h per week each), and playing video games (1–2 h per week). More than a third of the sample (39%) reported low levels of sedentary behavior (≤19 h) during leisure each week. In a fully adjusted model, participants who were female, in middle adulthood, married, and/or living in higher income households were less sedentary during leisure (Table 2). This pattern was repeated among adults who in engaged in average levels of sedentary time as compared high levels of sedentary time during leisure, although the overall size of the odds ratios were smaller.

Table 1
Characteristics of sample.

Characteristics	Sample n (%)
Total sample	11,494
Sex	
Male	5107 (44.4)
Female	6387 (55.6)
Missing	0
Sedentary time	
Low (0–19 h)	4482 (39)
Average (20–34 h)	4138 (36)
High (≥35 h)	2874 (25)
Age	
≥65	3097 (26.9)
50–64	3316 (28.8)
35–49	2523 (22.0)
25–34	1601 (13.9)
18–24	957 (8.3)
Missing	0
Marital status	
Married/common-law	6445 (56.3)
Widowed/divorced/separated	2464 (21.5)
Single/never married	2543 (22.2)
Missing	42
Education	
Less than secondary graduation	1910 (17.1)
Secondary graduate	2012 (18.0)
Some postsecondary	1065 (9.5)
Postsecondary graduation	6187 (55.4)
Missing	320
Household income	
0–$19,999	1206 (12.7)
$20,000–$39,999	2176 (22.8)
$40,000–$59,999	1856 (19.5)
$60,000–$79,999	1393 (14.6)
≥80,000	2892 (30.4)
Missing	1971
Currently employed	
Yes	7204 (71.4)
No	2882 (28.6)
Missing	1408

Table 2
Prevalence and odds of low and average sedentary behavior by sociodemographic characteristics (N = 11,494) (results from the 2010 Canadian Community Health Survey).[a]

	Prevalence of low SB (%)	Low SB OR (99% CI)	Average SB OR (99% CI)
Gender			
Male	37.7	1 (Reference)	1 (Reference)
Female	40.3	1.22 (1.21–1.23)	1.16 (1.16–1.17)
Age			
≥65	25.2	1 (Reference)	1 (Reference)
50–64	39.1	2.34 (2.32–2.36)	1.45 (1.44–1.47)
35–49	49.0	3.98 (3.94–4.02)	1.79 (1.77–1.81)
25–34	41.9	2.99 (2.95–3.02)	1.79 (1.77–1.81)
18–24	30.3	1.20 (1.19–1.22)	0.87 (0.86–0.88)
Marital status			
Never married	35.4	1 (Reference)	1 (Reference)
Not currently married	30.1	0.79 (0.78–0.80)	1.01 (1.0–1.02)
Married/common-law	42.2	1.69 (1.67–1.70)	1.51 (1.49–1.52)
Education			
Less than high school	38.9	1 (Reference)	1 (Reference)
High school diploma	41.7	1.21 (1.20–1.22)	1.15 (1.13–1.16)
Some university/college	33.2	0.78 (0.77–0.79)	1.00 (0.98–1.01)
College/university degree	38.9	1.18 (1.17–1.19)	1.33 (1.32–1.34)
Household income			
0–$19,999	30.9	1 (Reference)	1 (Reference)
$20,000–$39,999	30.2	1.03 (1.02–1.05)	1.13 (1.12–1.15)
$40,000–$59,999	41.2	1.88 (1.86–1.91)	1.40 (1.38–1.42)
$60,000–$79,999	39.1	1.93 (1.90–1.96)	1.69 (1.67–1.71)
≥80,000	42.5	2.28 (2.26–2.31)	1.76 (1.74–1.79)
Currently employed			
No	27.4	1 (Reference)	1 (Reference)
Yes	43.6	2.73 (2.71–2.75)	1.67 (1.66–1.68)

[a] Outcome variable (sedentary behavior) using the high SB group (≥35 h/week) as the reference point for analysis.

3.1. Sense of community belonging and sedentary behavior

Most adults (84.1%) who reported low sedentary behavior also reported a strong or very strong sense of community belonging. In a fully adjusted model, adults with a strong sense of community belonging were significantly less sedentary during leisure (Table 3). We observed a dose response association between community belonging and the lowest level of sedentary time (≤19 h week). The odds of low sedentary behavior increased with each increase in community belonging. Adjustment for perceived mental health and overall health did not account for these associations.

4. Discussion

The mean amount of sedentary leisure time reported by adults was 20–24 h per week. Consistent with previous studies, television viewing was the most common sedentary activity among adults; and those living in higher income households were less sedentary during leisure than adults living in lower income homes (Rhodes et al., 2012; Shields and Tremblay, 2008). The average sedentary leisure time in our low sedentary group was 19 or fewer hours per week, or an average of <3 h per day. This is below the amount of leisure sedentary time that has been

associated with increased risk of morbidity and mortality in some studies. For example, a recent meta-analysis of cohort studies found that television viewing time was associated with all-cause mortality in a J-shaped fashion, with a significantly increased risk at approximately 4 h per day (Sun et al., 2015). This suggests individuals in the present study who reported low leisure sedentary time (<3 h per day) may have lower health risk compared to those with average or high sedentary time.

Adults with a stronger sense of community belonging were more likely to report low sedentary time during leisure. This association remained significant after adjustment for perceived health, suggesting there may be unique pathways beyond health linking this contextual factor to sedentary behavior for adults. A hypothesis that may be derived from these findings is that adults who experience a strong sense of community belonging are more likely to participate in community programs and events during leisure hours, rather than spend that time in sedentary activity, which is more often solitary in nature. Longitudinal studies are needed to test the temporal sequence implied by this hypothesis.

More generally, these findings speak to the theory of social capital, which posits that social networks have value and communities that are designed to support a sense of connectedness, safety, and trust among members can increase health and positive social behavior

Table 3
Prevalence and adjusted odds ratios (AOR) of low and average sedentary behavior during leisure by sense of community belonging (results from the 2010 Canadian Community Health Survey).

	Prevalence of low SB (%)	Odds of low SB AOR1 (99% CI)[a]	Odds of Average SB AOR1 (99% CI)[a]	Odds of low SB AOR2 (99% CI)[b]	Odds of average SB AOR1(99% CI)[b]
Sense of community belonging					
Very weak	25.8	1 (Reference)	1 (Reference)	1 (Reference)	1 (Reference)
Somewhat weak	36.2	1.49 (1.47–1.51)	1.10 (1.08–1.11)	1.38 (1.36–1.40)	1.04 (1.03–1.06)
Somewhat strong	40.5	2.16 (2.13–2.19)	1.44 (1.42–1.46)	1.95 (1.92–1.98)	1.35 (1.33–1.37)
Very strong	43.6	2.55 (2.51–2.59)	1.44 (1.42–1.47)	2.20 (2.16–2.23)	1.32 (1.30–1.34)

[a] Low sedentary behavior (SB) = ≤19 h per week; average SB = 20–34 h/week; reference group is high SB (≥35 h/week); AOR1 adjusted for sociodemographic factors (age, gender, marital status, education, employment, income).
[b] AOR2 adjusted for sociodemographic factors, perceived mental health, and perceived overall health.

(Lindström, 2011; Nieminen et al., 2013; Putnam, 2001; Sanchez-Villegas et al., 2008). To date, there has been little focus on the role that larger contextual factors may play in reducing sedentary behavior in populations (Rhodes et al., 2012). Research suggests it is possible to reduce sedentary activities through individual-level interventions that address lifestyle choices (Martin et al., 2015). The results of this study support the contention of Owen et al. (2014) who argued that social contexts may mediate the relationship between environmental factors and sitting time. This suggests there is value in addressing sedentary behavior through population-level interventions that address *the context* in which this behavior takes place. The goal of such interventions would be to move a whole population toward more favorable sedentary levels by addressing contextual factors influencing the population average (Rose, 1985). Such interventions can take place in tandem with interventions designed to move individuals who are highly sedentary to more favorable levels on the continuum.

Study limitations include use of a cross-sectional design, which limits inferences about causation and temporal sequence. The use of self-report measures may have introduced recall and social desirability bias. As well, sedentary activities examined were not exhaustive; for example sitting while visiting with friends or during motorized transport were not included. In addition, this study does not account for potential confounding environmental factors such a green space, urban/rural living environment, or housing facilities which have been found to influence sedentary time (Koohsari et al., 2015; McCormack and Mardinger, 2015). Reporting of community belonging was obtained using one question. Participants interpretation of community likely varied, making it potentially less reliable when averaged across the sample population. Study strengths include use of a representative community-based sample, population weighting, and control for potential confounders.

5. Conclusion

This study examined how the experience of community is correlated with sedentary time among adults. Findings suggest a strong sense of community belonging is associated with less sedentary behavior during leisure, independent of an adult's perceived mental and physical health. Most efforts to address sedentary behavior have focused on individual-level interventions. These findings highlight the role that larger contextual factors may also play in sedentary activity. Sense of community belonging is a well-researched contextual determinant of health that may serve as a useful target for intervention strategies designed to reduce sedentary behavior at a population-level.

Conflict of interest

We confirm that there are no known conflicts of interest associated with this publication.

Transparency document

The Transparency document associated with this article can be found, in online version.

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