

Physical Activity and Ethnicity

Evidence from the Canadian Community Health Survey

Shirley N. Bryan, MKin¹

Mark S. Tremblay, PhD¹

Claudio E. Pérez, BSc¹

Chris I. Ardern, PhD²

Peter T. Katzmarzyk, PhD^{2,3}

ABSTRACT

Background: A large proportion of the Canadian population lives a sedentary lifestyle. Few data are available describing the physical activity behaviours among specific ethnic groups in Canada, so the purpose of this study is to examine the relationship between ethnicity and the level of self-reported physical activity.

Methods: Pooled data from cycles 1.1 (2000/01) and 2.1 (2003) of the cross-sectional Canadian Community Health Survey (ages 20-64 yrs; N=171,513) were used for this study. Weighted prevalences of self-reported leisure-time moderate (≥ 1.5 kcal·kg⁻¹·day⁻¹ (kkd)); moderate to high (≥ 3 kkd) and high physical activity (≥ 6 kkd) were calculated, and multiple logistic regression models were used to quantify the odds of being physically active across ethnic groups, after adjustment for several covariates (White referent group).

Results: The rank order of prevalence of being moderately physically active by ethnicity was: White (49%), Other (48%), NA Aboriginal (47%), Latin American (40%), East/Southeast Asian (39%), Black (38%), West Asian/Arab (36%), South Asian (34%). Aboriginal men and women had the highest prevalences of being physically active at ≥ 3 kkd (M=32%, F=22%) while East/Southeast Asian (19%) and East Asian/Arab men (19%), and South Asian women (12%) had the lowest prevalences. After accounting for covariates, Aboriginal men were at elevated odds of being physically active compared to Whites (≥ 3 kkd, OR=1.6, $p < 0.05$; ≥ 6 kkd, OR=2.7, $p < 0.05$). Only 7% and 3% of Canadian men and women, respectively, were active at ≥ 6 kkd.

Conclusion: These results suggest that the prevalence of physically active Canadian adults varies by ethnicity. Strategies to promote physical activity and prevent physical inactivity should consider these findings.

MeSH terms: Race; ethnicity; exercise; epidemiology; population

La traduction du résumé se trouve à la fin de l'article.

1. Health Statistics Division, Statistics Canada, Ottawa, ON

2. School of Physical and Health Education, Queen's University, Kingston, ON

3. Department of Community Health and Epidemiology, Queen's University

Correspondence and reprint requests: Dr. Mark Tremblay, Senior Scientific Advisor on Health Measurement, Statistics Canada, Main Building, Room 0005, Tunney's Pasture, Ottawa, ON K1A 0T6, Tel: 613-951-4385, Fax: 613-951-2497, E-mail: mark.tremblay@statcan.ca

Physical activity (PA) has important health benefits, including a reduced risk of chronic diseases and premature mortality.¹ Despite this evidence, a large proportion of the Canadian population lives a sedentary lifestyle.^{2,3} According to the 2000/01 Canadian Community Health Survey (CCHS), only 21% of Canadians aged ≥ 12 years were considered physically active enough in their leisure time to obtain health benefits (expending ≥ 3.0 kcal·kg⁻¹·day⁻¹ (kkd)).⁴ The same survey indicated that approximately 15% of Canadian adults between 20-64 years were classified as obese (body mass index (BMI) ≥ 30 kg/m²).⁴ The high prevalence of physical inactivity is placing a burden on the health care system, estimated at \$5.3 billion, or 2.6% of total health expenditures in 2001.⁵

In February 2003, the Federal and Provincial/Territorial Ministers responsible for PA set a national target to increase the proportion of Canadians meeting a minimal threshold of PA by 10 percentage points in each province and territory by the year 2010.⁶ The Ministers agreed to focus efforts on children and youth, women and girls, low-income individuals, Aboriginal Peoples, persons with disabilities and older Canadians.⁶ Thus, it is important to determine whether there are specific ethnic groups in Canada that would be classified as "less active" so that targeted initiatives can be developed as part of realizing this goal.

National surveys have consistently shown that PA levels decrease with advancing age, and that men are more physically active than women.^{2,7} Evidence also suggests that socio-economic factors, community design and body weight may have an influence on PA patterns.^{7,8} However, few data are available describing the PA behaviours among specific ethnic groups in Canada. This lack of knowledge is the result of a small number of questions on ethnicity being asked on national surveys, and from inadequate sample sizes which limits the ability to produce reliable estimates for specific ethnic groups. The purpose of this study is to provide further insight into the PA behaviours of Canadians by examining the relationship between ethnicity and level of self-reported PA among Canadians.

METHODS

This analysis is based on cycles 1.1 (2000/01) and 2.1 (2003) of Statistics Canada's CCHS.

The CCHS is a cross-sectional, self-reported survey that collects information about the health of Canadians every two years. The survey covers approximately 98% of the Canadian population aged ≥ 12 years in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, in institutions (prisons, hospitals, universities) and in some remote areas. Self-reported information about health conditions and risk factors is collected through either face-to-face (50% for cycle 1.1, 30% for cycle 2.1) or telephone interviews with selected respondents. A detailed description of the CCHS design, sample and interview procedures can be found elsewhere.⁹ After restricting the cycles to respondents aged 20 to 64 years with non-missing energy expenditure values, the sample sizes were 84,749 for 2000/01 and 86,764 for 2003. Data from the two survey cycles were combined to create a single unweighted sample of 171,513, thus the results represent two points in time, 2000/01 and 2003.

Level of PA was derived from respondents' responses on leisure-time PA participation. From a list of activities, respondents indicated the number of times they engaged in the activity and the average duration of the session. These data were used together with the MET value associated with the activity to derive an energy expenditure value for each respondent, expressed in kkd.¹⁰ PA level was categorized as moderately active (≥ 1.5 kkd), moderately to highly active (≥ 3.0 kkd) or highly active (≥ 6 kkd).

BMI categories were assigned according to Health Canada guidelines, which are applicable to the non-pregnant, non-lactating population aged ≥ 18 years.¹¹ BMI was calculated as the ratio weight (kg)/height² (m). Respondents with a BMI ≥ 30 kg/m² were considered obese while those with a BMI ≥ 25 kg/m² were considered overweight (overweight includes obesity).

Household income groups depended on total income and household size and were categorized using standard Statistics Canada income categories.^{12,13} Educational attainment was grouped into four levels: less than secondary school graduation, secondary school graduation (no post-secondary education), some post-secondary education, and post-secondary degree/diploma.

Prevalence estimates of, and odds ratio estimates for, moderately active, moderate-

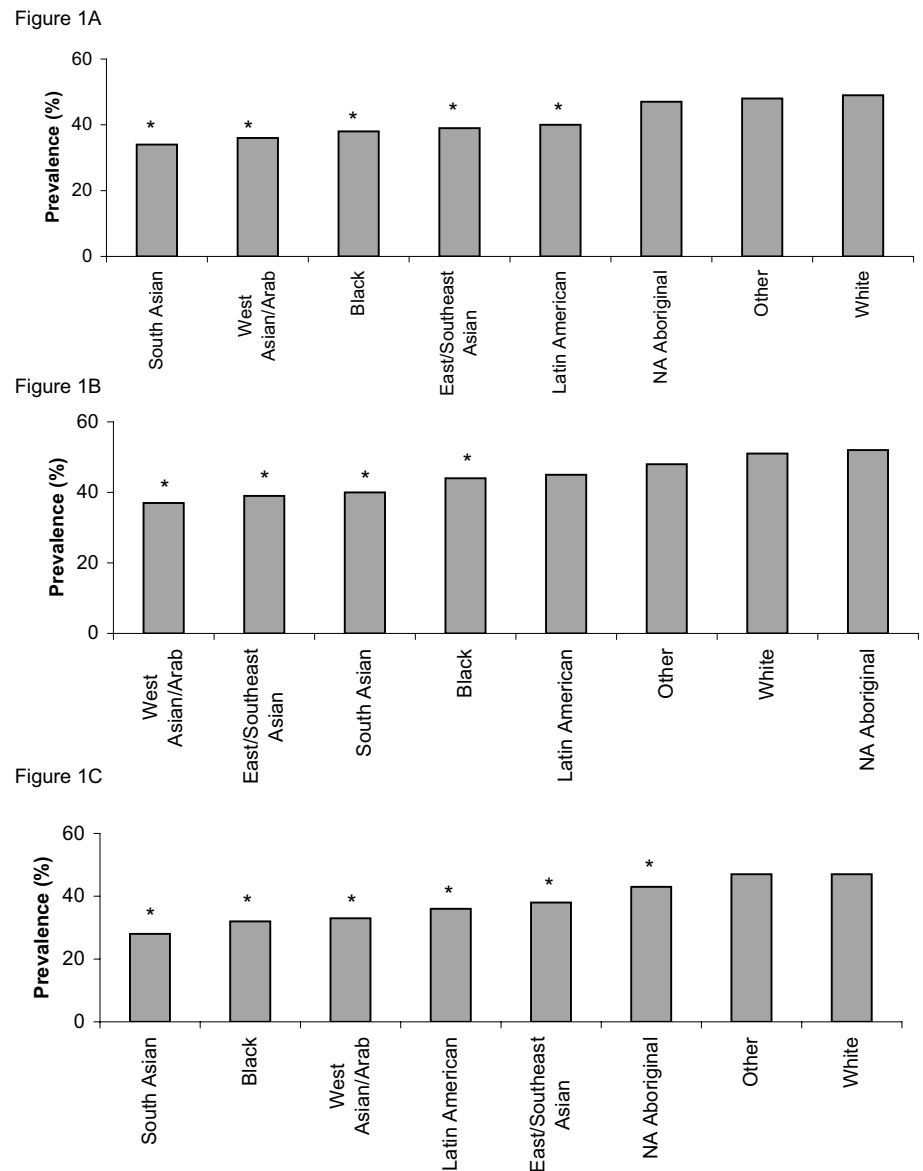


Figure 1. Prevalence of self-reported leisure-time moderate activity (MPA, ≥ 1.5 kkd) in 20-64 year-old men and women from CCHS cycles 1.1 and 2.1 by self-ascribed ethnicity.

Panel A presents women and men combined, Panel B presents men only and panel C presents women only.

* $p < 0.05$ compared to "White" referent

ly to highly active and highly active, by ethnicity, were weighted to represent the Canadian household population aged 20 to 64 years for both survey years. The logistic regression models were constructed in increasing order of complexity to adjust for age, education, household income, and BMI classification level. For each model, age was categorized into 3 groups (20-34 years; 35-49 years; 50-64 years). Records with missing values for the independent variables were dropped. Coefficients of variation and p-values were estimated and significance tests were performed using the

bootstrap technique, to account for the survey design effect.¹⁴⁻¹⁶ The significance level was set at $p < 0.05$.

The CCHS collects information from respondents on race and ethnicity which was used to classify respondents into the following eight ethnic categories: White; East or Southeast Asian; West Asian or Arab; South Asian; Latin American; Black; North American (NA) Aboriginal; and Other. For the purpose of this paper, the term "ethnicity" is used to represent race or ethnicity using the previously listed categories, however, when citing supporting

TABLE I

Odds Ratios (95% Confidence Intervals) for Being Moderately Physically Active (MPA, ≥ 1.5 kkd), by Ethnicity. Canadian Household Population (20 to 64 years), 2000-2003

	Men			Women		
	Unadjusted Odds Ratio	1 st Adjusted Odds Ratio [§]	2 nd Adjusted Odds Ratio	Unadjusted Odds Ratio	1 st Adjusted Odds Ratio [§]	2 nd Adjusted Odds Ratio
Ethnicity						
White†	1.0	1.0	1.0	1.0	1.0	1.0
Aboriginal	1.0 (0.9-1.2)	1.0 (0.8-1.2)	1.3* (1.0-1.5)	0.9* (0.8-1.0)	0.8* (0.7-1.0)	1.1 (0.9-1.3)
Latin American	0.8 (0.6-1.0)	0.7* (0.5-1.0)	0.8 (0.6-1.1)	0.6* (0.5-0.8)	0.6* (0.5-0.8)	0.7* (0.5-0.9)
Other‡	0.9 (0.8-1.0)	0.9* (0.8-1.0)	0.8* (0.7-1.0)	1.0 (0.9-1.1)	1.0 (0.9-1.1)	1.0 (0.8-1.2)
West Asian or Arab	0.6* (0.4-0.7)	0.5* (0.4-0.7)	0.6* (0.4-0.8)	0.6* (0.4-0.8)	0.5* (0.4-0.8)	0.5* (0.4-0.7)
Black	0.8* (0.6-0.9)	0.7* (0.6-0.9)	0.7* (0.6-0.9)	0.5* (0.4-0.6)	0.5* (0.4-0.6)	0.5* (0.4-0.7)
South Asian	0.6* (0.5-0.7)	0.6* (0.5-0.7)	0.6* (0.5-0.7)	0.4* (0.4-0.5)	0.4* (0.4-0.5)	0.5* (0.4-0.5)
East or Southeast Asian	0.6* (0.5-0.7)	0.6* (0.5-0.7)	0.6* (0.5-0.7)	0.7* (0.6-0.8)	0.7* (0.6-0.8)	0.6* (0.6-0.8)
Age (years)						
20-34†	n/a	1.0	1.0	n/a	1.0	1.0
35-49	n/a	0.7* (0.7-0.7)	0.7* (0.7-0.7)	n/a	0.9* (0.8-0.9)	0.9* (0.8-0.9)
50-64	n/a	0.7* (0.6-0.7)	0.7* (0.7-0.7)	n/a	0.8* (0.8-0.9)	0.9* (0.8-1.0)
Household Income						
Level 1 (lowest)	n/a	n/a	0.7* (0.7-0.9)	n/a	n/a	0.7* (0.6-0.7)
Level 2	n/a	n/a	0.6* (0.5-0.7)	n/a	n/a	0.6* (0.6-0.7)
Level 3	n/a	n/a	0.6* (0.5-0.6)	n/a	n/a	0.6* (0.6-0.7)
Level 4	n/a	n/a	0.7* (0.6-0.7)	n/a	n/a	0.7* (0.7-0.8)
Level 5 (highest)†	n/a	n/a	1.0	n/a	n/a	1.0
Education						
Less than high school graduation	n/a	n/a	0.6* (0.6-0.7)	n/a	n/a	0.6* (0.6-0.7)
High school graduation	n/a	n/a	0.8* (0.8-0.9)	n/a	n/a	0.8* (0.8-0.9)
Some post secondary	n/a	n/a	1.0 (0.9-1.1)	n/a	n/a	1.0 (0.9-1.1)
Post-secondary degree or higher†	n/a	n/a	1.0	n/a	n/a	1.0
Overweight/Obese	n/a	n/a	1.0 (0.9-1.0)	n/a	n/a	0.7* (0.7-0.8)

Data source: The Canadian Community Health Survey, cycles 1.1 (2000/01) and 2.1 (2003) pooled

* Significantly different from reference category, $p < 0.05$

† Reference category

‡ includes multiple groups or unknown

§ Adjusted for age

|| Adjusted for age, educational attainment, household income and body mass index category

literature, loyalty to the terminology used in the cited source is preserved.

RESULTS

In men and women combined, the prevalence of moderate physical activity (MPA, ≥ 1.5 kkd) was lowest in South Asian (34%) and West Asian or Arab (36%), and highest in NA Aboriginal (47%), Other (48%), and White (49%) ethnic groups (Figure 1A). Among all ethnic groups, the prevalence of MPA was higher in men than in women, however, the pattern differs across ethnicities. In men, MPA was lowest in West Asians or Arabs (37%), while in women it was lowest in South Asians (28%). MPA was highest among NA Aboriginal (52%) men and White and Other (both 47%) women (Figure 1B and 1C, respectively).

Table I presents the odds ratios for MPA in men and women. Compared to White men, the unadjusted odds ratios for MPA were lowest in East or Southeast Asians, South Asians, and West Asians or Arabs (all OR=0.6). Once corrected for age, household income, education and BMI category, the results in most ethnic groups were not substantially altered, with the exception of

NA Aboriginal men, who were at elevated odds of being moderately active (OR=1.30) compared to White men. In women, the patterns of results across ethnic groups were similar to men, except that after adjustment, both Black and South Asian women were at 50% lower odds of being moderately active by comparison to White women.

In contrast to the MPA results, there were several important sex and ethnic differences in the prevalence of moderate-to-high activity (MHPA, ≥ 3 kkd). The prevalence of MHPA was relatively consistent across ethnic groups but was lowest in East or Southeast Asians and South Asians (both 17%) and highest in NA Aboriginals (26%). In general, the prevalence of MHPA and high activity (HPA, ≥ 6 kkd) was higher in men than in women for all ethnic groups (Figure 2A and 2B, respectively). In men, MHPA ranged from 19% to 32% (Figure 2A), while the prevalence of HPA levels ranged from 4% to 14% across ethnicities (Figure 2C). In women, the prevalence of MHPA ranged from 12% to 22% (Figure 2B), while the prevalence of HPA was only 2% to 5% (Figure 2D). Compared to White men, West Asian or Arab, and East or Southeast Asian men had the lowest odds of

being moderately-to-highly active (OR=0.6), after adjustment for covariates (Table II). In the fully adjusted model, NA Aboriginal men were at elevated odds (OR=1.6) of MHPA and HPA (OR=2.7) by comparison to White men. In this model, both Latin American and South Asian men were also at increased odds of being highly active (OR 1.3 and 1.2, respectively).

East and Southeast Asian, South Asian, West Asian or Arab, Black and Latin American women were at lower odds (OR=0.5-0.7) of being moderately-to-highly active in the unadjusted and adjusted models compared to White women (Table III). Very low prevalence of HPA levels (≥ 6 kkd) across ethnic groups in women makes meaningful interpretation of ethnic gradients difficult.

DISCUSSION

To our knowledge, this is the first study that provides population-based estimates of the prevalence of PA for specific ethnic groups in Canada. Given the importance of PA in maintaining a healthy body weight and preventing chronic diseases, the identification of high-risk groups provides valu-

Figure 2A

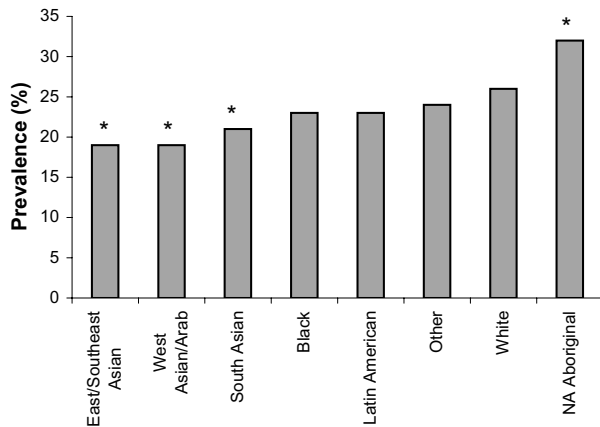


Figure 2B

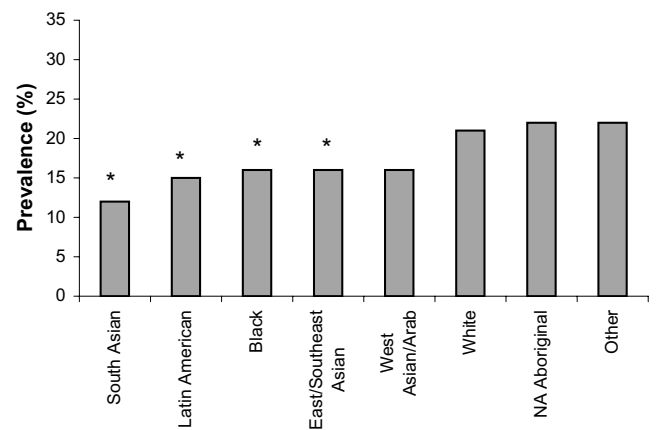


Figure 2C

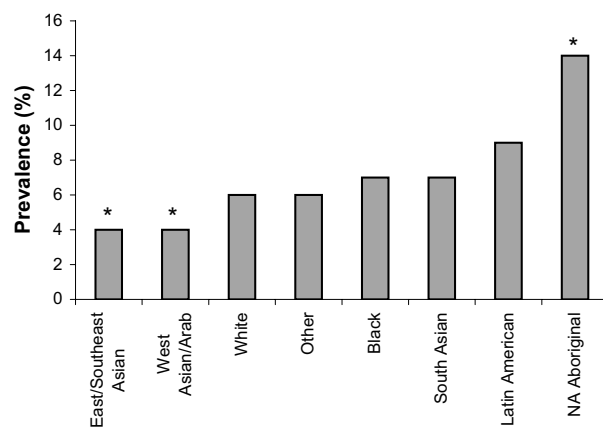


Figure 2D

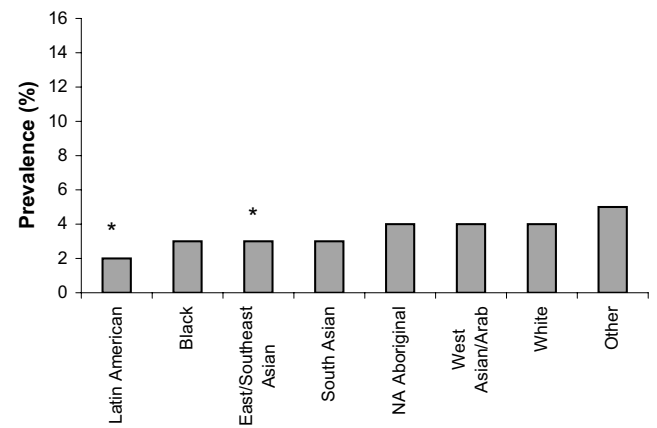


Figure 2. Prevalence of self-reported, leisure-time moderate-to-high (MHPA, ≥ 3 kkd) and high physical activity (HPA, ≥ 6 kkd), by self-ascribed ethnicity (20-64 years). Panels A and B present MHPA for men and women, respectively. Panels C and D present HPA for men and women, respectively. * $p < 0.05$ compared to “White” referent

able information for policy and program development. This study clearly demonstrates that the prevalence of leisure-time PA is lower in the majority of ethnic minority groups living in Canada and that women in all ethnic groups are less likely to be active.

Ethnic and racial differences in self-reported prevalence of leisure-time PA have been reported in other studies. Consistent with our findings, data from the Third National Health and Nutrition Examination Survey (NHANES III) demonstrated that Caucasians were the most active followed by other ethnic groups (African Americans and Mexican Americans) and that these results remained even after controlling for indicators of social class.¹⁷ Findings from the Behavioural Risk Factor Surveillance System (BRFSS) show that non-Hispanic Whites had the lowest prevalence of “no leisure-time physical activity”.¹⁸

Two earlier Canadian studies indicated that off-reserve NA Aboriginals had the highest prevalence of overweight and obesity.^{7,19} These results seem contradictory to those in the present analysis that show a high prevalence of leisure-time PA in this same group. However, the measure of PA in this study represents only leisure-time rather than total daily energy expenditure. Further, research using better measures of total PA or energy expenditure levels, in addition to other factors (socio-economic status, diet, genetics, etc.), is required to reconcile these results.

The finding that South Asian men and women are among the least active ethnic groups in Canada is consistent with reports from the United Kingdom which have shown that PA is lower in all South Asian groups compared to the general population, especially among South Asian women and older people.²⁰ However, the finding

that South Asian men were at increased odds of being highly active (≥ 6 kkd) compared to White men is interesting given the low levels of MPA and MHPA among this group. Previous research has shown that minority groups more often choose extreme response categories when reporting judgements on rating scales, and this may partially explain this finding.²¹ Further, it has been suggested that using a subjective assessment of intensity may be problematic because the perception of intensity varies among cultural or racial groups and may be confused with stress levels and level of enjoyment of the activity and thereby bias reporting.²²

Despite the large, nationally representative samples used in this study, there are some important limitations. First, the CCHS relies on self-reported frequency and duration of physical activities in the calculation of energy expenditure. Evidence suggests

TABLE II

Odds Ratios (95% Confidence Intervals) for Being Moderately-to-Highly (MHPA, ≥ 3 kkd) or Highly (HPA, ≥ 6 kkd) Physically Active, by Ethnicity. Male Household Population (20 to 64 years), Canada, 2000-2003

	Moderate-to-high PA (≥ 3 kkd)			High PA (≥ 6 kkd)		
	Unadjusted Odds Ratio	1 st Adjusted Odds Ratio§	2 nd Adjusted Odds Ratio	Unadjusted Odds Ratio	1 st Adjusted Odds Ratio§	2 nd Adjusted Odds Ratio
Ethnicity						
White†	1.0	1.0	1.0	1.0	1.0	1.0
Aboriginal	1.4* (1.1-1.6)	1.3* (1.1-1.5)	1.6* (1.3-1.9)	2.4* (1.8-3.4)	2.2* (1.6-3.0)	2.7* (1.9-3.9)
Latin American	0.8 (0.6-1.2)	0.8 (0.6-1.1)	0.9 (0.6-1.2)	1.4 (0.8-2.5)	1.2 (0.7-2.1)	1.3 (0.7-2.4)
Other§	0.9 (0.8-1.0)	0.9 (0.8-1.0)	0.8 (0.7-1.0)	1.0 (0.8-1.3)	1.0 (0.8-1.2)	1.0 (0.8-1.4)
West Asian or Arab	0.7* (0.5-1.0)	0.6* (0.4-0.9)	0.6* (0.4-0.9)	0.6 (0.4-1.1)	0.6* (0.3-1.0)	0.6 (0.3-1.1)
Black	0.8 (0.7-1.1)	0.8 (0.6-1.0)	0.8 (0.6-1.0)	1.1 (0.7-1.7)	1.0 (0.7-1.6)	1.0 (0.6-1.5)
South Asian	0.8* (0.6-0.9)	0.7* (0.6-0.9)	0.8* (0.6-0.9)	1.1 (0.8-1.6)	1.0 (0.7-1.5)	1.2 (0.8-1.6)
East or Southeast Asian	0.7* (0.6-0.8)	0.6* (0.6-0.8)	0.6* (0.5-0.7)	0.6* (0.5-0.8)	0.6* (0.4-0.7)	0.6* (0.4-0.7)
Age (years)						
20-34†	n/a	1.0	1.0	n/a	1.0	1.0
35-49	n/a	0.6* (0.6-0.7)	0.6* (0.6-0.7)	n/a	0.5* (0.5-0.6)	0.5* (0.5-0.6)
50-64	n/a	0.6* (0.6-0.7)	0.6* (0.6-0.7)	n/a	0.4* (0.3-0.4)	0.4* (0.3-0.4)
Household Income						
Level 1 (lowest)	n/a	n/a	0.8* (0.7-0.9)	n/a	n/a	0.7* (0.6-1.0)
Level 2	n/a	n/a	0.7* (0.6-0.8)	n/a	n/a	0.6* (0.5-0.8)
Level 3	n/a	n/a	0.6* (0.6-0.7)	n/a	n/a	0.6* (0.5-0.6)
Level 4	n/a	n/a	0.7* (0.6-0.7)	n/a	n/a	0.6* (0.6-0.7)
Level 5 (highest)†	n/a	n/a	1.0	n/a	n/a	1.0
Education						
Less than high school graduation	n/a	n/a	0.7* (0.6-0.7)	n/a	n/a	0.7* (0.6-0.8)
High school graduation	n/a	n/a	0.9* (0.8-1.0)	n/a	n/a	1.0 (0.9-1.1)
Some post secondary	n/a	n/a	1.0 (0.9-1.2)	n/a	n/a	1.1 (0.9-1.3)
Post-secondary degree or higher†	n/a	n/a	1.0	n/a	n/a	1.0
Overweight/Obese	n/a	n/a	0.9* (0.8-0.9)	n/a	n/a	0.9 (0.8-1.0)

Data source: The Canadian Community Health Survey, cycles 1.1 (2000/01) and 2.1 (2003) pooled

PA=physical activity

* Significantly different from reference category, $p < 0.05$

† Reference category

‡ includes multiple groups or unknown

§ Adjusted for age

|| Adjusted for age, educational attainment, household income and body mass index category

that gender, race/ethnicity and the use of an interpreter may influence the interpretation of broad-based words like "leisure" or "physical activity" that are used in questions measuring PA participation.²¹ Additionally, PA questionnaires do not take into account culturally diverse activities (e.g., dancing, religious celebrations, community involvement), work-related activities and household chores, which may vary significantly across ethnic groups and result in an under-reporting of activities among these groups.^{22,23} For example, Hispanic and Black Americans reported higher levels of "hard" occupational activity than White Americans.²⁴

In addition, 70% of interviews in cycle 2.1 were by telephone versus 50% in cycle 1.1. Since PA is a socially desirable trait, the type of interaction between the respondent and interviewer (face-to-face versus telephone), the respondent's sex, or the race/ethnicity of the respondent may bias reports of PA participation.²¹ There is also evidence that the use of the terms "race" and "ethnicity" may not only be problematic from a research standpoint but that these questions may elicit some confusion among survey respondents themselves, resulting in inaccurate classification or misrepresentation of a person's race or ethnicity.^{25,26}

Finally, the CCHS excludes people living on reserve and thus the NA Aboriginal data are limited to the off-reserve population and may not accurately reflect PA participation among this ethnic group as a whole.

This study highlights the importance of population monitoring of PA levels. Our results suggest that more targeted programs and interventions to increase PA among ethnic subgroups in Canada may be needed if the 2010 national target is to be realized. Further research is also needed to develop more reliable and valid measures of PA that can be used to monitor the activity levels of ethnically diverse populations.

REFERENCES

1. US Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Washington, DC: US Department of Health and Human Services, 1996.
2. Bruce MJ, Katzmarzyk PT. Canadian population trends in leisure-time physical activity levels, 1981-1998. *Can J Appl Physiol* 2002;27:681-90.
3. Craig CL, Russell SJ, Cameron C, Bauman A. Twenty-year trends in physical activity among Canadian adults. *Can J Public Health* 2004;95(1):59-63.
4. Statistics Canada. Health Indicators. 2002. Ottawa, ON, Catalogue No. 82-221-XIE.
5. Katzmarzyk PT, Janssen I. The economic costs associated with physical inactivity and obesity in

- Canada: An update. *Can J Appl Physiol* 2004;29:90-115.
6. Federal/Provincial/Territorial Ministers. Annual Meeting of the Federal and Provincial/Territorial Ministers of Sport, Recreation and Fitness - Feb. 21-22, 2003. Bathurst, New Brunswick. Available online at: http://www.scics.gc.ca/cinfo03/830778004_e.html (Accessed January 20, 2005).
7. Bryan S, Walsh P. Physical activity and obesity in Canadian women. *BMC Women's Health* 2004;4:S1-S6.
8. Craig CL, Brownson RC, Cragg SE, Dunn AL. Exploring the effect of the environment on physical activity. A study examining walking to work. *Am J Prev Med* 2002;23:36-43.
9. Béland Y. Canadian Community Health Survey-Methodological overview. *Health Rep* 2002;13:9-14.
10. Ainsworth BE, Haskell WL, Whitt MC, Irwin ML, Swartz AM, Strath SJ, et al. Compendium of physical activities: An update of activity codes and MET intensities. *Med Sci Sports Exerc* 2000;32:S498-S516.
11. Health Canada. Canadian guidelines for body weight classification. 2003. Ottawa, ON. Available online at: <http://www.healthcanada.ca/nutrition> (Accessed January 20, 2005).
12. Pérez CE. Health status and health behaviour among immigrants. *Health Rep* 2002;13:89-95.
13. Statistics Canada. Canadian Community Health Survey, (CCHS) Cycle 1.1. Derived Variable (DV) Specifications. 2002. Available online at: <http://www.statcan.ca/english/D1/Data/ftp/cchs/cchs.htm> (Accessed January 20, 2005).
14. Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodol* 1992;18:209-17.
15. Rust K, Rao JNK. Variance estimation for complex surveys using replication techniques. *Stat Methods Med Res* 1996;5:281-310.

TABLE III

Odds Ratios (95% Confidence Intervals) for Being Moderately-to-Highly (MHPA, ≥ 3 kkd) or Highly (HPA, ≥ 6 kkd) Physically Active, by Ethnicity. Female Household Population (20 to 64 years), Canada, 2000-2003

	Moderate-to-high PA (≥ 3 kkd)			High PA (≥ 6 kkd)		
	Unadjusted Odds Ratio	1 st Adjusted Odds Ratio \S	2 nd Adjusted Odds Ratio $\ \$	Unadjusted Odds Ratio	1 st Adjusted Odds Ratio \S	2 nd Adjusted Odds Ratio $\ \$
Ethnicity						
White \dagger	1.0	1.0	1.0	1.0	1.0	1.0
Aboriginal	1.1 (0.9-1.2)	1.0 (0.9-1.2)	1.3 (1.0-1.5)	1.0 (0.7-1.5)	0.9 (0.7-1.3)	1.2 (0.8-1.8)
Latin American	0.7* (0.5-1.0)	0.7* (0.5-0.9)	0.6* (0.4-0.9)	0.5 (0.3-1.1)	0.5* (0.2-1.0)	0.4 (0.2-1.0)
Other \ddagger	1.1 (0.9-1.2)	1.1 (0.9-1.2)	1.1 (0.9-1.3)	1.2 (0.9-1.6)	1.1 (0.9-1.5)	1.3 (0.9-1.8)
West Asian or Arab	0.7 (0.4-1.2)	0.7 (0.4-1.2)	0.6* (0.4-0.9)	0.9 (0.4-2.0)	0.8 (0.4-1.8)	1.1 (0.5-2.4)
Black	0.7* (0.6-0.9)	0.7* (0.5-0.9)	0.8* (0.6-1.0)	0.7 (0.4-1.3)	0.7 (0.4-1.2)	0.7 (0.4-1.2)
South Asian	0.5* (0.4-0.6)	0.5* (0.4-0.6)	0.5* (0.4-0.7)	0.7 (0.4-1.1)	0.6 (0.4-1.0)	0.7 (0.5-1.2)
East or Southeast Asian	0.7* (0.6-0.8)	0.7* (0.6-0.8)	0.6* (0.5-0.7)	0.7* (0.5-0.9)	0.6* (0.5-0.9)	0.5* (0.4-0.7)
Age (years)						
20-34 \dagger	n/a	1.0	1.0	n/a	1.0	1.0
35-49	n/a	0.8* (0.8-0.9)	0.9* (0.8-0.9)	n/a	0.7* (0.6-0.8)	0.7* (0.6-0.8)
50-64	n/a	0.8* (0.7-0.8)	0.9* (0.8-1.0)	n/a	0.5* (0.4-0.5)	0.6* (0.5-0.7)
Household Income						
Level 1 (lowest)	n/a	n/a	0.8* (0.7-0.9)	n/a	n/a	1.0 (0.7-1.3)
Level 2	n/a	n/a	0.8* (0.7-0.9)	n/a	n/a	0.7* (0.6-1.0)
Level 3	n/a	n/a	0.7* (0.7-0.8)	n/a	n/a	0.7* (0.6-0.8)
Level 4	n/a	n/a	0.8* (0.7-0.8)	n/a	n/a	0.7* (0.6-0.7)
Level 5 (highest) \dagger	n/a	n/a	1.0	n/a	n/a	1.0
Education						
Less than high school graduation	n/a	n/a	0.7* (0.6-0.7)	n/a	n/a	0.6* (0.5-0.7)
High school graduation	n/a	n/a	0.9* (0.8-0.9)	n/a	n/a	0.8* (0.7-0.9)
Some post secondary	n/a	n/a	1.1 (1.0-1.2)	n/a	n/a	1.2 (1.0-1.5)
Post-secondary degree or higher \dagger	n/a	n/a	1.0	n/a	n/a	1.0
Overweight/Obese	n/a	n/a	0.7* (0.6-0.7)	n/a	n/a	0.5* (0.5-0.6)

Data source: The Canadian Community Health Survey, cycles 1.1 (2000/01) and 2.1 (2003) pooled

PA=physical activity

* Significantly different from reference category, $p < 0.05$

\dagger Reference category

\ddagger includes multiple groups or unknown

\S Adjusted for age

$\|\$ Adjusted for age, educational attainment, household income and body mass index category

16. Yeo D, Mantel H, Liu TP. Bootstrap variance estimation for the National Population Health Survey. American Statistical Association: Proceedings of the Survey Research Methods Section Conference, 1999.
17. Crespo CJ, Smit E, Andersen RE, Carter-Pokras O. Race/ethnicity, social class and their relation to physical inactivity during leisure time: Results from the third National Health and Nutrition Examination Survey, 1988-1994. *Am J Prev Med* 2000;18:46-53.
18. Ham SA, Yore MM, Fulton JE, Kohl III HW. Prevalence of no leisure-time physical activity-35 states and the District of Columbia, 1988-2002. *Morb Mortal Wkly Rep* 2004;53:82-86.
19. Tremblay MS, Pérez CE, Ardern CI, Bryan SN, Katzmarzyk PT. Obesity, overweight and ethnicity. *Health Reps* 2005;16(4):23-34.
20. Fischbacher CM, Hunt S, Alexander L. How physically active are South Asians in the United Kingdom? A literature review. *J Public Health (Oxf)* 2004;26:250-58.
21. Warnecke RB, Johnson TP, Chávez N, Sudman S, O'Rourke DP, Lacey L, Horm J. Improving question wording in surveys of culturally diverse populations. *Ann Epidemiol* 1997;7:334-42.
22. Tortolero SR, Mâsse LC, Fulton JE, Torres I. Assessing physical activity among minority women: Focus group results. *Women's Health Issues* 1999;9:135-42.
23. Sallis JF, Saelens BE. Assessment of physical activity by self-report: Status, limitations and future directions. *Res Quart Exerc Sport* 2000;59:314-27.
24. Centers for Disease Control and Prevention. Prevalence of leisure-time and occupational physical activity among employed adults - United States, 1990. *MMWR* 2004;49:420-24.
25. Comstock RD, Castillo EM, Lindsay SP. Four-year review of the use of race and ethnicity in epi-

RÉSUMÉ

Contexte : Une proportion importante de la population canadienne a un mode de vie sédentaire. Il existe peu de données décrivant les comportements en matière d'activité physique de certains groupes ethniques au Canada. Cette étude vise donc à examiner le rapport entre l'origine ethnique et le niveau d'activité physique autodéclaré.

Méthode : Pour cette étude, nous avons utilisé des données regroupées des cycles 1.1 (2000-2001) et 2.1 (2003) de l'Enquête transversale sur la santé dans les collectivités canadiennes (personnes âgées de 20 à 64 ans; N=171 513). Des prévalences pondérées de l'activité physique autodéclarée durant les loisirs (modérée $\geq 1,5$ kcal·kg⁻¹·jour⁻¹ (KKJ)), modérée à élevée ≥ 3 KKJ] et élevée ≥ 6 KKJ]) ont été calculées, et des modèles de régression logistique multiple ont servi à quantifier la cote exprimant la probabilité d'être physiquement actif selon le groupe ethnique, après rajustement selon plusieurs covariables (le groupe de référence était de race blanche).

Résultats : L'ordre de classement de la prévalence de l'activité physique modérée selon l'origine ethnique était le suivant : Blancs (49 %), Autres (48 %), Autochtones de l'Amérique du Nord (47 %), Latino-Américains (40 %), Asiatiques de l'Est/du Sud Est (39 %), Noirs (38 %), Asiatiques de l'Ouest/Arabes (36 %), Asiatiques du Sud (34 %). Les hommes et les femmes autochtones avaient la prévalence la plus forte d'être physiquement actifs, à ≥ 3 KKJ (H=32 %, F=22 %), tandis que les hommes originaires de l'Asie de l'Est/du Sud Est (19 %), de l'Asie de l'Est et des pays arabes (19 %), de même que les femmes de l'Asie du Sud (12 %), avaient la prévalence la plus faible. Une fois prises en compte les covariables, les hommes autochtones obtenaient une cote exprimant la probabilité d'être physiquement actifs élevée comparativement aux Blancs (≥ 3 KKJ, RC=1,6, $p < 0,05$; ≥ 6 KKJ, RC=2,7, $p < 0,05$). Seulement 7 % et 3 % des Canadiens et Canadiennes, respectivement, avaient un niveau d'activité supérieur ou égal à 6 KKJ.

Conclusion : Ces résultats montrent que la prévalence de l'activité physique chez les adultes canadiens varie selon l'origine ethnique. Les stratégies visant à promouvoir l'activité physique et à prévenir la sédentarité devraient donc en tenir compte.

demographic and public health research. *Am J Epidemiol* 2004;159:611-19.

26. Hahn RA, Truman BI, Barker ND. Identifying ancestry: The reliability of ancestral identification in the United States by self, proxy, inter-

viewer, and funeral director. *Epidemiol* 1996;7:75-80.

Received: March 29, 2005

Accepted: January 27, 2006