Is Access to Workplace Amenities Associated With Leisure-time Physical Activity Among Canadian Adults?

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ABSTRACT

OBJECTIVE: The workplace represents an important setting for increasing physical activity levels. The purpose of the present study was to investigate the relationship between the workplace environment and leisure-time physical activity, using a nationally representative sample of the Canadian population.

METHODS: This study used cross-sectional, self-reported data from 48,916 participants who completed relevant questions on the 2008 Canadian Community Health Survey. Associations between supportive workplace environments for physical activity (e.g., perceived range of amenities available such as a pleasant place to walk, fitness facility, showers, and health program) and leisure-time physical activity level (active, moderately active, inactive) were examined using multinomial logistic regression.

RESULTS: Approximately three quarters ($n=36,216$) of participants had access to at least one amenity that supported physical activity while at work. Females in the lowest age category (18-35 years) who perceived a more supportive workplace environment for physical activity had higher odds of being moderately active (AOR 1.06, 95% CI 1.04-1.08) and active (AOR 1.15, 95% CI 1.13-1.17) as compared to inactive in their leisure time. The strength of this association was slightly higher with age and for males.

CONCLUSIONS: Since the majority of Canadian adults do not meet recommended levels of physical activity, the workplace offers a promising and modifiable target for increasing opportunities to be physically active. Employers who can provide a more supportive workplace environment for physical activity would benefit, as it can increase employees' physical activity levels and ultimately improve their productivity and overall health. These benefits may be increased for males and with employees' age.

KEY WORDS: Exercise; workplace; environment; public health

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

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Only 15% of Canadian adults meet the recommended level of 150 minutes of moderate-to-vigorous physical activity (PA) per week to achieve health benefits, as measured by accelerometry.^{1,2} PA declines with age,¹ and is lower among females¹ and those with lower socio-economic status (SES).³ Lack of PA has been associated with increased risk for type 2 diabetes, cardiovascular disease, some cancers, obesity, psychological disorders as well as all-cause mortality.⁴⁻⁷ Approaches for promoting PA levels increasingly focus on the influence of environmental settings.⁸ Specifically, the physical environment around an individual's home (e.g., design, access to facilities, sidewalks) has recently been recognized as a determinant of PA levels.⁹⁻¹¹ However, very few studies have examined whether the physical environment around the workplace also influences PA levels, in particular leisure-time PA (LTPA).¹²⁻¹⁵

In 2010, 62% of Canadian adults were employed and spent an average of 36 hours per week at work.¹⁶ As such, the workplace setting represents an important target for population-level interventions aimed at increasing LTPA levels.¹⁷ Interventions to promote LTPA in the workplace have had some success¹⁷ and suggest that interventions should target environmental aspects of the workplace to be more efficacious and to better support employees in being more physically active.^{18,19} Supportive workplace environments for LTPA may include providing access to amenities that could make it easier for employees to engage in LTPA, such as access to gyms, health programs, showers, or green space in the surrounding area of the workplace.²⁰ A survey of over 1,700 Canadian companies

found that 71% provided some form of support to promote PA, such as access to recreational opportunities, locker rooms, bicycle racks, and on-site fitness facilities.²¹ Evidence linking these amenities to employee LTPA levels could inform the development and implementation of health strategies and policies for businesses.

A small number of empirical studies have examined the relationship between workplace environment and PA. Among 987 workers in North Carolina, access to worksite facilities or policies that support PA was associated with greater work-break PA but not overall LTPA.¹² A more recent study of 1,300 adults living in three US states found that higher scores on a 9-point worksite promotion index (e.g., availability of exercise facilities, showers, stairs) was associated with greater moderate-to-vigorous PA and total recreational PA among employees.¹⁵ Two additional studies have found limited¹³ or no association¹⁴ between perceived features of the workplace environment and PA. Authors of a recent meta-analysis on

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Table 1. Descriptive Summary of Study Sample Using Frequencies and Weighted Percentages, Overall and by Physical Activity Level, 2007-2008, Canadian Community Health Survey (n=48,916)

	Overall Mean (SD) N (%) ^{††}	Inactive (n=24,462) Mean (SD) % ^{††}	Moderately Active (n=12,503) Mean (SD) % ^{††}	Active (n=11,951) Mean (SD) % ^{††}
Access to PA amenities (0-7)	2.76 (2.54)	2.37 (2.46)	2.97 (2.52)	3.36 (2.57)
Amenity type				
Pleasant place to walk	27,765 (55.3)	50.2	58.0	63.2
Playing field	19,393 (37.1)	31.9	40.3	44.9
Gym	20,600 (41.7)	36.0	44.8	50.5
Fitness classes	15,764 (32.6)	27.3	36.0	40.3
Organized sports teams	14,644 (28.2)	22.8	30.9	36.9
Shower/change rooms	22,387 (44.5)	38.3	47.5	54.5
Programs to improve health	18,487 (36.6)	31.2	39.4	45.2
Sex				
Female	23,944 (45.1)	47.4	45.3	39.9
Male	24,972 (55.0)	52.6	54.7	60.1
Age (yrs)				
18-34	10,839 (26.1)	22.5	25.5	34.4
35-49	23,687 (49.5)	50.7	49.4	46.9
50-69	14,390 (24.4)	26.7	25.1	18.7
Educational attainment				
≤High school	13,523 (25.6)	28.5	23.9	21.4
≥Post-secondary	35,393 (74.4)	71.5	76.1	78.6

* Due to rounding, totals may not add up to 100%.

† Probability-weighted percentages.

SD=standard deviation; PA=physical activity.

workplace PA interventions reported that few studies have targeted environmental characteristics of the workplace to promote PA but suggested that environmental factors are promising targets for changing employee's lifestyle behaviours.²²

Current evidence includes studies on particular worksites, geographical areas or within an intervention context; therefore, the present study was designed to investigate the relationship between perceived workplace support for LTPA and level of LTPA from a nationally representative sample of Canadian adults. Examining a large group of workers with a wide range of workplace environments will provide a more generalizable understanding of the relationship under study. Insights will also be more applicable for the Canadian context. The study hypothesized that individuals who report access to a greater number of supportive amenities (e.g., gym, showers, health programs) at work will also report higher levels of LTPA, and explored whether this association differed by age, sex and SES.

METHODS

Data from cycle 4.1 of the Canadian Community Health Survey (CCHS) were analyzed for this study. The CCHS is a cross-sectional survey with data collected on the health of Canadians. A complex multi-stage sampling frame was used to randomly select households from all Canadian provinces and territories. Between January and December 2007, computer-assisted interviews were conducted with individuals aged 12 and older living in a private dwelling (excluding those living in institutions, on First Nation reserves, on government-owned land, or in certain remote regions). Further details about the CCHS methodology can be found elsewhere.²³

The sample for the present study was drawn from adults, aged 18 to 64, who worked in the week prior to completing the survey, did not work from home, and responded to questions on PA level and workplace environment, yielding a sample of 59,612 eligible respondents. Although workplace questions were asked of those aged 15 to 74, the focus of this study was on adults, thus, youth (<18) and older adults (65+) were excluded. Youth and older adults are more likely to have unique employment situations (e.g., part-time employment, less benefits) and thus may have different expe-

riences with access to recreational facilities. Respondents working from home (n=5,872) were also excluded since the work and home environment are combined for these individuals and many of the workplace amenities would not apply (e.g., programs, sports teams).

The primary variables of interest were LTPA and perceived access to PA amenities at the workplace. An LTPA index was calculated by Statistics Canada to categorize individuals as inactive, moderately active or active. From a list of 21 activities (e.g., walking, running, golfing), respondents reported the frequency and duration of engaging in that activity over the previous three months. Questions were adapted from the Minnesota Leisure-Time Physical Activity Questionnaire, previously validated against cardiorespiratory fitness ($r=0.43$).²⁴ Statistics Canada computed energy expenditure for each activity by multiplying the minutes of activity with the corresponding Metabolic Equivalent value (MET, where 1 MET is equivalent to energy expended while sitting).²⁵ Energy expenditures for each activity were summed and expressed as kilocalories per kilogram of body weight per day (KKD).²⁵ Individuals were classified as inactive (≥ 1.5 KKD), moderately active (>1.5 and ≤ 2.9 KKD) and active (≥ 3 KKD) based on cut-points consistent with Canadian PA recommendations and literature.²⁶⁻²⁸ Expenditure of 3 KKD is equivalent to 60 minutes of brisk walking per day.

A more supportive workplace environment for PA was assessed by the number of amenities respondents reported having access to at or near their place of work. Response options included: 1) a pleasant place to walk; 2) playing fields; 3) a gym; 4) fitness classes; 5) organized sports teams; 6) shower/change rooms; and 7) programs to improve health. Affirmative responses were added to create a numerical variable from 0 to 7 producing a scale with high internal consistency (Cronbach's $\alpha=0.87$).

Covariates examined included age, sex (male/female), income and education. Respondents' age was collapsed into tertiles: 18-34 years, 35-49 years, and 50-64 years. Annual household income, collected as a categorical variable, was grouped into two levels: less than or equal to \$59,000, and greater than or equal to \$60,000. Educational attainment was grouped into two levels: high school or less, and some post-secondary or greater.

Table 2. Spearman Correlations Among Study Variables (n=48,916)

	Leisure-time PA Level	Access to PA Amenities	Age	Sex (Female)	Educational Attainment
Leisure-time PA level	–				
Access to PA amenities	0.162**	–			
Age	-0.109**	-0.010*	–		
Sex (Female)	-0.059**	0.052**	-0.015**	–	
Educational attainment	0.070**	0.136**	-0.015**	0.052**	–

* Significant at p<0.05.

** Significant at p<0.001.

PA=physical activity.

Table 3. Multinomial Logistic Regression Examining the Relationship Between Access to Workplace Physical Activity Amenities and Leisure-Time Physical Activity Level[‡], 2007-2008, Canadian Community Health Survey (n=48,916)

Study Variables	Unadjusted		Adjusted	
	Moderately Active OR (95% CI)	Active OR (95% CI)	Moderately Active OR (95% CI)	Active OR (95% CI)
Access to PA amenities [†]	1.10 (1.09-1.11)*	1.16 (1.15-1.17)*	1.06 (1.04-1.08)* [†]	1.15 (1.13-1.17)* [†]
Age (yrs)				
18-34	Reference	Reference	Reference	Reference
35-49	0.86 (0.82-0.91)*	0.61 (0.58-0.64)*	0.77 (0.71-0.83)*	0.56 (0.52-0.61)*
50-69	0.83 (0.78-0.88)*	0.46 (0.43-0.49)*	0.72 (0.66-0.79)*	0.43 (0.39-0.47)*
Sex				
Female	Reference	Reference	Reference	Reference
Male	1.09 (1.04-1.13)*	1.35 (1.29-1.41)*	1.07 (1.01-1.15)*	1.48 (1.37-1.58)*
Educational attainment				
≤High school	0.79 (0.75-0.83)*	0.68 (0.65-0.72)*	0.84 (0.79-0.88)*	0.73 (0.70-0.77)*
≥Post-secondary	Reference	Reference	Reference	Reference
Interactions:				
Access X Age (35-49)			1.03 (1.01-1.06)*	1.01 (0.99-1.03)
Access X Age (50-69)			1.05 (1.03-1.08)*	1.00 (1.00-1.05)*
Access X Sex (Male)			1.02 (1.00-1.04)*	1.00 (0.98-1.02)

* Significantly different than reference category, p≤0.05.

[†] Estimates represent the odds of being physically active during leisure time for females in the youngest age category (18-34 years).[‡] Reference physical activity level is inactive.

OR=odds ratio; CI=confidence interval; PA=physical activity.

Individuals with missing responses to any of the study variables were omitted, yielding an analytic sample of 48,916. A large number of respondents did not provide responses to questions on workplace amenities (n=10,545) or income (n=6,113). Since omitting income did not significantly change the results (data not shown), it was removed to reduce the amount of missing data. Further, 624 and 241 respondents did not answer questions on LTPA and education level, respectively. As compared to the analytic sample (n=48,916), respondents with missing information (n=10,696; 17.9%) were more likely to be female (53% vs. 45%; p<0.001) and in the oldest age category (28% vs. 24%; p<0.001). There were no differences in access to amenities (p=0.15), LTPA (p=0.52) or education (p=0.91).

Multinomial logistic regression, using a generalized logit link, was used to examine the association between perceived access to amenities that facilitate PA while at work and LTPA level. Spearman correlations and bivariable regression models were run to examine the effect of each study variable on LTPA level and potential multicollinearity issues (i.e., correlations less than .40). In multivariable modelling, interaction effects with age, sex and education were also examined. It was of interest to test if the relationship between the workplace environment and LTPA differed by age, sex or education as differences among groups would have potential policy implications. Only significant interactions were kept in the final model. Regardless of significance tests, it was decided that age, sex and education would be included in the final model because they are well-established variables known to influence both PA levels¹ and type of employment.^{29,30} Adjusted odds ratios (AOR) and 95% confidence intervals (CI) were reported. Frequency percentages and analyses were conducted using probability weights to account for

the survey design effect. Statistical analyses were conducted using SAS version 9.3 (SAS Institute, Cary, NC).

RESULTS

Within the analytic sample (n=48,916), half of respondents were classified as inactive (51%) and three quarters (72%) reported access to at least one amenity that supported PA at or near their workplace. The most commonly reported amenity was a pleasant place to walk (55%), followed by showers/change rooms (45%), and then a gym (42%). All amenity types were reported more frequently by individuals who were more active. Among those who were inactive (n=24,462), 67% reported access to at least one workplace amenity as compared to 76% who were moderately active, and 80% who were active. As presented in Table 1, activity level increased with the mean number of reported workplace amenities. The study sample was composed of more males (55%) than females and a high proportion of adults with post-secondary education (74%). Spearman correlations among the study variables are presented in Table 2.

Access to amenities that facilitate PA while at work was significantly associated with more LTPA in both bivariable and multivariable models (Table 3). For females in the youngest age category (18-35), the odds of being moderately active were higher by 6% for every additional workplace amenity an individual reported having access to (AOR 1.06, CI 1.04-1.08). Similarly, the odds of being active as compared to inactive were higher by 15% for every additional workplace amenity an individual reported having access to (AOR 1.15, CI 1.13-1.17). These results can also be expressed as higher odds of being moderately active and active by 46% and 168%, respectively, for females in the youngest age category with access to all seven amenities as compared to those with access to

none. The association between workplace amenities and LTPA was greater for males and for those in the older age groups, although differences were modest. For males and adults aged 35 to 49 years, the interaction between workplace amenities and being active as compared to inactive did not reach statistical significance. No differences were found by educational attainment.

Findings also suggested that males and younger adults had higher odds of being more active. Additionally, having a higher level of education was associated with higher odds of being active.

DISCUSSION

This study found that the workplace environment can play a crucial role in promoting an active lifestyle. Specifically, a more supportive workplace environment for PA was positively associated with LTPA among employees from a population-based sample of Canadians. This is the first study to report that the benefits of workplace amenities may be greater for males and may increase with age. This finding supports our hypothesis and suggests that greater access to workplace amenities may increase opportunities for LTPA by reducing barriers to being active at work. Given the need to increase PA levels among the population, employers should consider providing facilities and programs to support LTPA as part of a broader strategy to increase employees' overall health and productivity.

Employees who reported more supportive workplace environments for PA, i.e., access to more amenities, were more likely to be moderately active and active as compared to inactive. A previous study examining similar workplace environment characteristics found a significant association with work-break PA but, unlike this study, found no association with any LTPA.¹² The study being restricted to one geographical region (North Carolina) and having a smaller sample size ($n=987$) may have limited the ability to detect an association. The findings presented here are supported by an increasing number of studies that suggest that the physical environment significantly impacts health behaviours, including PA.³¹⁻³³ While these studies have typically examined neighbourhood characteristics around the home (e.g., land-use mix, street connectivity, access to recreational facilities), few have investigated the area surrounding the workplace, where adults spend a large proportion of their day.³² The current study provides further evidence that the workplace may act as an influential environment for supporting LTPA. However, these findings do not shed light on what other factors, such as policies or social norms, might be needed to facilitate utilization of amenities.

The relationship between the workplace environment and LTPA was stronger for older respondents as compared to younger respondents and for males as compared to females. It is unclear why a stronger association was observed for older workers, who are also less likely to be physically active. It may suggest that older workers have fewer opportunities to be active outside of work, thus, older employees may benefit from workplace amenities to a greater extent than younger employees. Findings also suggest that male employees may benefit from workplace amenities to a greater extent than female employees, perhaps because females may be less likely to utilize facilities at work. Although this difference is not well understood, it may reflect grooming and time requirements or comfort level with exercising in the workplace. Despite the observed interaction with age and sex, effect sizes were small and

may not represent meaningful differences among age groups or males versus females.³⁰ Further, since older age was also associated with less access to workplace amenities, there may be added incentives for workplaces to provide PA amenities given the aging Canadian workforce, and the associated surge in health care costs.³⁴

Consistent with national trends, females and older individuals were less likely to be physically active in their leisure time.¹ Education, a surrogate measure of SES within our sample, also independently predicted levels of LTPA. In accordance with previous research, individuals with higher levels of education are more likely to engage in LTPA.³⁵ Previous research suggests that decreased activity related to SES is likely mediated by fewer resources, and reduced self-efficacy and social support for LTPA.³⁶

An important limitation of this study is that utilization of workplace amenities was not measured, therefore, it is unclear how the findings would differ if access and actual utilization of workplace amenities were measured. Second, associations were examined in a cross-sectional sample; therefore, it is possible that awareness of amenities may be more common in individuals who regularly engage in LTPA. Third, this study relied on self-reported measures of LTPA, which are known to overestimate the number of Canadians meeting PA guidelines (49% when measured with self-report versus 15% when measured with accelerometry).¹ Fourth, no previous studies have reported on the reliability and validity of the LTPA cut-points used by the CCHS, although they are routinely used. Fifth, individuals who did not work the week prior to the survey, who worked from home, or who did not identify with traditional workplaces (e.g., might include those who travel frequently, work out of multiple locations, or have occupations such as a taxi driver or flight attendant) were excluded; therefore, we do not know how their work situation influenced LTPA. Sixth, those excluded from the analyses were more likely to be female and older, which may reflect the profile of the Canadian workforce and may differ from other countries, thus limiting the generalizability of the findings to the Canadian workforce. Finally, transportation-related activity may be influenced by worksite features such as having shower/change rooms; however, this type of activity was not examined.

In conclusion, employees are more active when employers provide more amenities to encourage engagement in PA within the workplace itself, in the surrounding area, as well as outside of work hours. Interestingly, these benefits may be even greater for males and as employee age increases. Where adequate resources are available, employers are encouraged to provide amenities such as fitness facilities and showers to support employees in being active as it can influence the latter's levels of PA. Since the number of amenities offered by employers resulted in greater potential benefits, employers should provide as many opportunities as possible for engagement in LTPA. Where resources are scarce or it is not possible to provide the workplace amenities examined in this study, employers may benefit from finding alternative strategies to help their employees be more active (e.g., partnering with community organizations). Future studies should examine what other elements are needed to encourage the utilization of workplace PA amenities, as amenities alone may not be enough to produce substantial increases in LTPA. In the context of an aging workforce, there is a high priority for workplaces to create environments that support healthier behaviours, such as LTPA, as employee health is linked to

better job performance and lower health benefit costs.²² As inactivity continues to have significant health impacts on Canadians, the workplace offers a promising and modifiable target to increase opportunities for LTPA.

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RÉSUMÉ

OBJECTIF : Le lieu de travail est l'un des principaux endroits où accroître les niveaux d'activité physique. Nous avons voulu étudier le lien entre l'environnement de travail et l'activité physique pendant les loisirs à l'aide d'un échantillon national représentatif de la population canadienne.

MÉTHODE : Notre étude fait appel aux données transversales autodéclarées de 48 916 personnes ayant répondu aux questions pertinentes de l'Enquête sur la santé dans les collectivités canadiennes de 2008. Nous avons examiné par régression logistique multinomiale les associations entre les environnements de travail propices à l'activité physique (le choix perçu de commodités disponibles, comme un endroit agréable où marcher, des installations de conditionnement physique, des douches et un programme de santé) et les niveaux d'activité physique pendant les loisirs (activité, activité modérée, inactivité).

RÉSULTATS : Environ les trois quarts (n=36 216) des répondants avaient accès à au moins une commodité favorisant l'activité physique au travail. Les femmes de la catégorie d'âge inférieure (18-35 ans) qui jugeaient avoir un environnement de travail plus propice à l'activité physique présentaient une plus forte probabilité d'être modérément actives (RCa 1,06, IC de 95 % 1,04-1,08) ou actives (RCa 1,15, IC de 95 % 1,13-1,17) plutôt qu'inactives dans leurs temps libres. La force de cette association augmentait légèrement avec l'âge, et elle était légèrement plus élevée chez les hommes.

CONCLUSION : Étant donné que la majorité des adultes canadiens sont en-deçà des niveaux d'activité physique recommandés, le lieu de travail offre une cible prometteuse et modifiable pour accroître les occasions d'être actif. Les employeurs qui peuvent fournir un environnement de travail plus propice à l'activité physique en profiteraient, car cela ferait augmenter les niveaux d'activité physique des employés et, en bout de ligne, améliorerait leur productivité et leur santé globale. Ces avantages pourraient être accrus pour les hommes et augmenter avec l'âge des employés.

MOTS CLÉS : exercice physique; lieu de travail; environnement; santé publique