Health & Fitness Journal
of Canada

Volume 7 **May 30, 2014** **Number 2**

ARTICLE

Worksite health promotion programs: the effect of the social and physical environment.

Lisa J. Leininger[1], Breanna Z. Orozco[1], Debra Harris[2], and Susan Tracz[2]

Abstract

Background: Worksite health promotion programs (HPPs) are effective in providing health benefits to participating employees. However, participation rates are traditionally low. Therefore, health promotion professionals implement a variety of strategies to encourage participation, which may include attending to the physical and social environment. However, little is known about how the physical and social environment influences participation in HPPs and physical activity. The purpose of this study was to examine if the physical and social environment of the workplace is associated with participation in HPPs and physical activity. *Method:* The Environmental Assessment Tool (EAT) was administered at four university campuses. University employees were sent an electronic survey inquiring about program and physical activity participation. Participation in a HPP was analyzed using a chi-square test for independence. MANOVAs were performed to assess differences between groups for physical activity of higher, medium, and lower levels of support. *Results:* Findings indicate HPP participation was associated with the level of physical and social support. The campus designated as the higher support campus had the highest participation rates in programming. The medium support campuses followed, and the lower support campus had the lowest overall participation rates. However, there was no significant difference in off-campus moderate or vigorous physical activity participation between campuses. *Conclusion:* The physical and social environments are important factors in determining HPP participation. Therefore, improving the physical and social environment of the workplace should be considered as an effective practice for HPPs. **Health & Fitness Journal of Canada 2014;7(2):3-14.**

Keywords: Worksite Health Promotion; Physical Activity, Physical and Social Environment

From [1]California State University, Monterey Bay, and [2]California State University, Fresno. Email: lleininger@csumb.edu

Introduction

Worksite health promotion programs (HPPs) are any combination of educational, political, environmental, regulatory or organizational mechanisms that support actions to increase healthy behaviours (Report on the 2000 Joint Committee on Health Education and Promotion Terminology, 2001). HPPs are becoming increasingly prevalent as a result of the numerous benefits, and need to decrease health care costs. Many studies indicate that participation in HPPs can improve several lifestyle-related health indicators, including hypertension, stress levels and sedentary behaviour (Finkelstein et al., 2003; Fisher and Fisher, 1995; Haines et al., 2007; Gold et al., 2007; Leininger et al., 2013; Tunceli et al., 2005). In addition to individual benefits, there are numerous organizational benefits. Employees who improve their health through participation in HPPs have less absenteeism, are more productive while at work, and report higher morale (Finkelstein et al., 2003; Tunceli et al., 2005). Most markedly, the organization can benefit economically. Medical costs of the organization can decrease significantly with employee HPP participation (Aldana et al., 2005; Parks and Steelman, 2008).

Despite the documented benefits of worksite HPPs, participation rates are low, and likewise, attrition rates are high for most programs (Fidalgo et al., 2006; Taitel et al., 2008). Taitel et al. (2008) state, participation is the essential ingredient for maximizing the value of an HPP. Therefore, worksite health professionals are increasingly interested in strategies to increase participation to potentially improve health indicators of employees.

Strategies used at the worksite to improve participation in an effort to improve the health of employees vary. Commonly, organizations offer intervention programs that focus on individual behaviour change, such as increasing physical activity or weight loss. Many organizations also attend to environmental, social, and ecological factors that may influence unhealthy behaviours (DeJoy et al., 2008). Efforts to improve health by environmental intervention are supported by Social Ecological Theory (SET). SET emphasizes the multi-faceted interaction of individuals and their physical and social environment (Alihan, 1964; Binder, 1972; Michelson, 1972; Stokols, 1996). Additionally, the World Health Organization (WHO, 1984) suggests strong interrelations among environment, human behaviour, and wellness. Stokols (1996) found that environmental improvements are more powerful than individual intervention programs because environmental changes have the ability to influence all employees, not just those individuals who voluntarily participate in intervention programs.

The worksite environment includes physical and social support. Both aspects of the environment can contribute to the success or failure of an HPP. Crump and colleagues (1996) defined social environment as (a) the extent that employees perceive coworkers support in participation, (b) influence to support healthy behaviours, and (c) attitudes and beliefs about the HPP. The physical aspects include built environment, facilities, and program offerings (DeJoy et al., 2008).

Universities are implementing these programs for employees as well. However, a majority of published research on HPPs at the university worksite focus on individual intervention outcomes, health benefits to individuals, and financial benefits for the organization. Fewer studies have researched the physical and social environment of the university in relation to HPPs and physical activity participation.

The purpose of this study was to examine if physical and social environment is associated with participation in university worksite HPPs and self-initiated physical activity. The researchers hypothesized that the higher support campuses would have the highest participation rates in programming, and highest levels of physical activity while both on and off campus.

Methods

The research design for this study was causal comparative. Four university campuses with employee HPPs participated in this study. The study was approved by the Human Subjects Review Board at each university.

The physical and social environment of the four campuses was assessed with the Environmental Assessment Tool (EAT), developed by DeJoy et al. (2008). The purpose of this tool is to evaluate a worksite's physical and social

characteristics. The three major components this tool assesses are organizational characteristics, physical activity, and nutrition and weight. The assessment criteria were initially developed using best practices found in literature and concepts found in the Heart Check instrument (DeJoy et al., 2008). An HPP professional can use this tool to identify, and thus, improve areas of weakness to increase the effectiveness of the campus environment and the offered HPPs. The EAT includes questions regarding employee characteristics, work rules, health promotion polices, fitness facilities, and current program offerings. Part One of the EAT is completed by an administrator of the organization's HPP. Part Two is completed by the researcher through an observational site visit. The research team evaluates the worksite by examining physical characteristics such as bike paths, staircases, bulletin boards, and dining options. The research team also examines the current program offerings, such as exercise classes and nutritional interventions, of the university worksite.

The final tool consists of 105 items broken down into two sections. Each section on the EAT is awarded with points. With the summation of each section's points, a worksite will receive a total score. EAT scores can range from 0-100; the higher the score, the higher physical and social support for health promotion activities is assumed. The campus score received on the EAT from each site was the independent variable in this study, indicating level of physical and social support.

Institutional Review Board (IRB) approval was obtained from all four universities. Emails were sent to all university employees inviting them to participate in an online survey. All employees responded on a volunteer basis, were informed of all procedures, and consent was obtained prior to participation in the study. The email included a link to the online survey, including The International Physical Activity Questionnaire ([IPAQ] Craig et al., 2003). The IPAQ asks individuals to report the number of days they participated in physical activity over the last week. Physical activity is divided into walking over 10 minutes at a time, moderate intensity and vigorous intensity exercise. The IPAQ provides examples of such activities to help individuals indicate the most appropriate exercise intensity. Employees were also asked to indicate how many HPP activities they had attended over the last six months; this portion was developed by the researchers.

Data analysis was completed with Statistical Package for the Social Sciences (SPSS) 17.0. The alpha level for statistical significance was set at 0.05 ($\alpha = 0.05$). Participation in a HPP was analyzed using a chi-square test for independence. MANOVAs were performed to assess differences between groups for physical activity of higher, medium and lower levels of support. The independent variable was level of support, as indicated by score on the EAT. The dependent variables were number of days of walking, moderate and vigorous physical activity per week.

Results

Following completion of the four campus visits, one campus was classified as lower support (an EAT score <40), two campuses were classified as medium support (EAT scores between 41-59) and one campus was classified as higher

Table 1: EAT score by section and campus.

EAT Section	High Support	Medium Support 1	Medium Support 2	Low Support
Site Characteristics	4	4	4	3
Work Rules	6	5	6	5
Physical Activity Program	6	6	4	1
Current Nutrition Program	4	4	3	1
Current Obesity Program	4	2	2	0
Parking/Bike Assessment	4	3	2	2
Staircase/Elevator Assessment	3	3	3	3
Shower/Changing Facilities	6	6	6	6
Signage/Bulletin boards	0	0	0	0
Written Policies	0	0	0	0
Fitness Facilities	12	8	8	7
Vending Machines	6	6	6	4
Food Services	12	9	11	7
Total Score	**67**	**56**	**55**	**39**

support (EAT score ≥60). These ranges were determined by the researchers based on scores reported in the development of the EAT (Dejoy et al., 2008). The scores for the EAT, including section scores, for each campus can be found in Table 1. Of the 494 total respondents (a response rate of 6% for all four campuses), the total number of male respondents was 143 (29%) and the total number of female respondents was 351 (71%). Table 2 shows number of employees and survey response rates for each campus.

To assess differences in health promotion program participation among campuses with varying levels of physical and social support, a chi-square test of independence was performed. Table 3 presents frequencies and percentages by support level. On the low support campus, 20.70% of respondents did participate in HPP. For medium support campuses, 41% of respondents reported HPP

participation. On the high support campus, 76.5% of respondents participated in HPP. The results indicate that support is related to participation. The research hypothesis was supported by these findings.

Table 2: Response rate by campus.

Campus	N	Response Rate (%)
High Support Campus	87	2.2
Medium Support Campus 1	19	2.1
Medium Support Campus 2	193	8.7
Low Support Campus	195	15.3
Total	**494**	

To assess differences in physical activity participation between groups based on level of physical and social support, a MANOVA was performed. The independent variable was support level (Higher, Medium, Lower) based on the EAT score and the dependent variables were vigorous physical activity days per week, for both on and off campus, moderate physical activity days per week on and off campus and days of walking for longer than 10 minutes per week on and off campus. Table 4 reports means and standard deviations for the groups.

The Multivariate Analysis of Variance test for differences between employees with a lower, medium or higher support program on vigorous days of activity on and off campus, moderate days of activity on and off campus and walking days on and off campus was significant (Roy's Largest Root = 0.133, F = 9.32, df = 6, 419, $p < 0.001$, $Eta^2 = 0.118$).

Table 5 reports the univariate results for physical activity by support level. Table 6 presents the Least Significant Differences (LSD) post hoc results. The univariate results for vigorous activity days on campus were significant (F = 13.83, df = 2, 423, $p < 0.001$, $Eta^2 = 0.061$). Means for vigorous activity on campus were greater for the high support campus than medium support campuses (Mdif = 0.87, $p < 0.001$) and high support means are greater than the lower support campus (Mdif =79, $p < 0.001$), while there is no significant difference between medium and lower support campuses (Mdif = -0.08, p = 0.540).

The univariate results for vigorous activity days off campus were not significant (F = 4.84, df = 2, 423, p = 0.008, $Eta^2 = 0.022$) because the results were in the opposite direction of the hypothesized outcome. Means for higher support campus were less than medium support campuses (Mdif = -0.09. p = 0.015) and the means for the higher support campus were less than the low support campus (Mdif = -0.62, p = 0.015), while the medium support campus means were lower than the low support campus (Mdif = -0.53, p = 0.006).

The univariate results for moderate activity days on campus were significant (F = 9.94, df = 2, 423, $p < 0.001$, $Eta^2 = 0.045$). Means for the higher support campus were greater than the medium support campus (Mdif = 0.79, $p < 0.001$) and the means for the higher support campus were greater than the low support campus (Mdif = 0.76, $p < 0.001$) while the means for the medium support campus were less than the lower support campus (Mdif = -0.03, p = 0.833).

The univariate results for moderate amounts of physical activity off campus were not significant (F = 5.48, df = 2, 423, p = 0.004, $Eta^2 = 0.025$) because the results were in the opposite direction of the hypothesized outcome. Means for the higher support campus were less than the medium support campuses (Mdif = -0.35, p = 0.183) and the higher support campus

means were less than the lower support campus (Mdif = -0.82, p = 0.02) while the means for the medium support campus were less than the lower support campus (Mdif = -0.47, p = 0.183).

The univariate results for walking days per week on campus were not significant (F = 1.64, df = 2, 423, p = 0.195, Eta^2 = 0.008). The means for the higher support campus were less than the medium support campuses (Mdif = -0.33, p = 0.236) and the means for the higher support campus was less than the lower support campus (Mdif = -0.52, p = 0.072) while the means for the medium support campus were less than the lower support campus (Mdif = -0.19, p = 0.398).

The univariate results for walking days per week off campus were not significant (F = 9.88, df = 2, 423, p < 0.001, Eta^2 = 0.045) because the results were in the opposite direction of the hypothesized outcome. The means for the higher support campus were less than the medium support campuses (Mdif = -.053, p = 0.087) and the means for the higher support campus were less than the lower support campus (Mdif = -1.3, p < 0.001) while the medium support campuses means were less than the low support campus (Mdif = -0.77, p = 0.001).

Overall, while on campus, those with higher support for their health promotion program are more active than those with medium or low support. However, those with a lower support campus are more active off campus than those with higher and medium support. The research hypotheses were partially supported by these findings.

Table 3: Frequencies and percentages by support level.

	Participation in Program					
	Yes		No		Total	
Support Level	**N**	**%**	**N**	**%**	**N**	**%**
Low	38	8.2	146	31.4	184	39.6
% within support	--	20.7	--	79.3	--	100.0
% within participation	--	20.9	--	51.6	--	39.6
Medium	82	17.6	118	25.4	200	43.0
% within support	--	41.0	--	59.0	--	100.0
% within participation	--	45.1	--	41.7	--	43.0
High	62	13.3	19	4.1	81	17.4
% within support	--	76.5	--	23.0	--	100.0
% within participation	--	34.1	--	6.7	--	17.4
Total	**182**	**39.1**	**283**	**60.9**	**465**	**100**

Table 4: Physical activity by support level.

	Support Level							
	High (n = 72)		Medium (n = 187)		Low (n = 167)		Total (n = 426)	
	M	*SD*	*M*	*SD*	*M*	*SD*	M	SD
Vigorous Activity Days On Campus	1.2	1.69	0.37	1.03	0.45	1.19	0.55	1.26
Vigorous Activity Days Off Campus	1.0	1.42	1.13	1.70	1.65	2.01	1.32	1.81
Moderate Activity Days On Campus	1.2	1.66	0.50	1.23	.532	1.30	0.65	1.37
Moderate Activity Days Off Campus	1.0	1.45	1.40	1.77	1.88	2.17	1.53	1.91
Walking Days On Campus	1.4	1.76	1.79	2.12	1.98	2.09	1.81	2.05
Walking Days Off Campus	1.5	1.89	2.03	2.19	2.80	2.46	2.24	2.30

Discussion

The purpose of this study was to examine if the social and physical environment is associated with participation in university worksite HPPs and self-initiated physical activity. Overall findings indicate that HPP participation by employees was highly associated with overall level of social and physical support. The campus designated as the higher support campus had the highest reported participation rates in programming. The medium support campuses followed, with a substantial percentage of employees participating. Finally, the lower support campus had the lowest overall participation rates.

In addition, physical activity levels for those with higher support were more active while on campus.

Past research indicates best practices for HPPs. Stokes, Henley, and Herget (2006) indicate that there are several factors that directly contribute to successful worksite HPPs. These include: 1) individual behaviour change information, behavioural counselling and educational material, 2) social supports in

the form of wellness challenges, classes and support groups, 3) senior level management support, and 4) environmental supports like workplace fitness centres, on site health services and smoke free worksites. The characteristics identified by Stokes et al. (2006) was associated with the rankings (higher, medium, lower) from the EAT.

Effective communication and marketing are also successful practices, and considered essential to increase participation in HPPs. O'Donnell, Bishop, and Kaplan (1997) identified characteristics of sustainable programs and reported effective communication was a key component to a sustainable, successful program. Other researchers have indicated communication and effective marketing increase awareness of health behaviours and increased participation in HPPs (Crump et al., 1996; Goetzel, Roemer, Liss-Levinson, and Samoly, 2008; Gottlieb, Lovato, Weinstein, Green and Eriksen, 1992; Taitel et al., 2008).

Table 5: Univariate results for physical activity participation by support level.

Source	SS	df	MS	F	p	Eta^2
Vigorous Activity Days On Campus	47.17	2	20.80	13.80	< 0.001	0.061
Error	637.84	423	1.50	--	--	--
Vigorous Activity Days Off Campus	31.21	2	15.60	4.84	0.008	0.022
Error	1362.0	423	3.22	--	--	--
Moderate Activity Days On Campus	35.99	2	17.90	9.94	< 0.001	0.045
Error	765.19	423	1.80	--	--	--
Moderate Activity Days Off Campus	39.54	2	19.07	5.48	0.004	0.025
Error	1524.4	423	3.60	--	--	--
Walking Days On Campus	13.87	2	6.93	1.64	0.195	0.008
Error	1789.0	423	4.23	--	--	--
Walking Days Off Campus	101.01	2	50.50	9.88	<.001	0.045
Error	2160.6	423	5.10	--	--	--

Table 6: Univariate 1-way ANOVA post hoc results.

Dependent Variable	Pairwise Comparison	Mean Difference	p
Vigorous Activity Days On Campus	High > Medium	0.8671	< 0.001
	High > Low	0.7870	< 0.001
	Medium < Low	-0.0801	0.54
Vigorous Activity Days Off Campus	High < Medium	-0.0920	0.71
	High < Low	-0.6170	0.02
	Medium < Low	-0.5250	0.01
Moderate Activity Days On Campus	High > Medium	0.7890	< 0.001
	High > Low	0.7587	< 0.001
	Medium < Low	-0.0303	0.83
Moderate Activity Days off Campus	High < Medium	-0.3509	0.18
	High < Low	-0.8247	002
	Medium < Low	-0.4738	0.18
Walking Days On Campus	High < Medium	-0.3385	0.24
	High < Low	-0.5237	0.07
	Medium < Low	-0.1852	0.40
Walking Days Off Campus	High < Medium	-0.5374	0.09
	High < Low	-1.3000	< 0.001
	Medium < Low	-0.7710	0.001

The high support campus in this study demonstrated many of the positive characteristics, including fitness facilities with a variety of equipment such as cardiorespiratory equipment, free weights, and weight machines. In addition to adequate facilities, the higher support campus fitness centre was available at several times throughout the day, including before and after work, and had certified student instructors on staff at all times. In addition to offering a fitness centre, the higher support campus also included structured resistance training and yoga classes. Finally, the higher support campus held competitions in an effort to increase participation at the fitness centre. For instance, each semester the person who attended the most days during that time period

received a grand prize, while other regular participants were eligible for other prizes. These fitness facilities had lockers and a conveniently located bathroom and showers. Results from the EAT indicate that facilities contribute several points to the overall score. Communication and marketing took place via emails, newsletters, and bulletin boards. The program also maintained a website with health information, and a calendar of events.

The medium support campuses implemented several of these best practices. For instance, a fitness facility was available at one of the campuses; however, it was not staffed and only available during 2 hours of the day (7-8am, and 12-1pm). This facility had a restroom, but no lockers or showers. The other medium support campus had a fitness facility on campus that was equipped and open for longer periods of time, but at a cost to employees, similar to local gyms. The HPP at the medium campuses implemented physical activity interventions, both in the form of walking competitions. Communication and marketing for these programs were accomplished through email bulletin announcements and a program website.

The lower support campus implemented fewer of these best practices. The fitness facility available was the student recreation centre and at a cost for employees. However, the facility was well equipped with locker rooms and certified staff. There were no intervention programs for nutrition or physical activity in the form of competitions or challenges. Most markedly, communication and marketing was lacking for this HPP. Many employees stated on the employee survey that they did not even know that a HPP existed. Therefore, to increase the physical and social support score for the low support campus, effective marketing and communication methods are essential.

There are some limitations worth noting. The major limitation of this study was the low response rates. Also, the survey was a self-report measurement tool for program participation and physical activity amounts. Perceived measurement for program participation and physical activity participation historically yield moderately accurate ratings. However, electronic survey distribution was the most feasible method to include many employees from several campuses across the state in the study.

Conclusions

The results of this study determined that a campus with a higher physical and social environment score, as determined by the EAT, is conducive to higher HPP participation for university employees. Although off campus physical activity participation was not significantly affected by program presence or support level for all variables, these results have several implications for practice and further research. An area of future study is program participation and physical activity levels as a function of the different EAT sections. If this is evaluated, a researcher could determine what areas of the EAT are most influential for increasing program participation and physical activity levels. With this knowledge, health promotion professionals can prioritize improvements to be made to the campuses and the program offerings.

Ample research indicates the effectiveness of HPPs as a tool in improving health for employees, while decreasing absenteeism and medical

costs for the institution (Aldana et al., 2005; Heinen and Darling, 2009; Haines et al., 2007; Leininger, et al., 2013; Thompson and Wolf, 2001). If HPPs are to carry out their mission of improving health behaviours and increasing physical activity among employees, best practices must be implemented, including improvements to the social and physical environment. With increased participation in HPPs, employees have a greater chance of sustaining long-term positive health behaviour change, resulting in improvements in leading health indicators among employees.

Authors' Qualifications

The authors' qualifications are as follows: Lisa J. Leininger, Ed.D, PAPHS, Breanna Orozco (undergraduate trainee), Debra Harris PhD, and Susan Tracz, PhD.

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