

## **Une intervention ponctuelle en vue d'accroître l'activité physique chez les travailleuses sédentaires**

**Janet Purath, Arlene Michaels Miller,  
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Les interventions ponctuelles et ciblées en matière de counseling, lorsqu'elles sont faites sur les lieux de travail, sont-elles un moyen efficace d'encourager l'activité physique chez les femmes sédentaires? C'est ce qu'on a tenté de déterminer dans cette étude aléatoire et prospective, en recourant à une intervention ponctuelle fondée sur le modèle transthéorique. Dans un premier temps, les sujets ont fait l'objet d'un examen de santé et d'une intervention, suivis, deux semaines plus tard, d'un rappel de l'infirmière praticienne par téléphone. Chaque intervention avait été conçue en fonction des habitudes rapportées par chacune des participantes. Dans un deuxième temps, on a comparé les 134 femmes de l'échantillon aléatoire aux 153 femmes du groupe témoin; ces dernières avaient reçu des conseils sans égard à leur comportement individuel en matière d'exercice et n'avaient pas été rappelées. Six semaines plus tard, on a constaté une augmentation significative de l'activité physique chez les participantes du premier groupe; le temps consacré aux exercices physiques pendant le week-end et le temps dédié à la marche (dans le but de faire de l'exercice ou des courses), de même que la distance parcourue, avaient augmenté. Les gains étaient significatifs par rapport au groupe témoin. Ces conclusions démontrant les mérites d'une stratégie ponctuelle et ciblée constituent un apport essentiel à la recherche de méthodes efficaces de promotion de la santé en milieu de travail.

Mots clés : activité physique, intervention ponctuelle, modèle transthéorique

# **A Brief Intervention to Increase Physical Activity in Sedentary Working Women**

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The purpose of this study was to determine whether a brief, tailored counselling intervention is effective for increasing physical activity in sedentary women when delivered in the workplace. This prospective randomized trial used a brief intervention based on the Transtheoretical Model. The intervention group received health screening, a brief intervention, and, 2 weeks later, a booster telephone call from a nurse practitioner. The intervention was tailored to each woman's reported exercise behaviour. The 134 women randomized to the intervention were compared with 153 women in a control group who received health counselling not tailored to their exercise behaviour and no telephone call. Six weeks later, the intervention group, when compared to baseline, had significantly improved their physical activity, increasing their amount of weekend physical activity as well as minutes walked for exercise, on errands, total walking, and total daily blocks walked. When compared to controls, they showed significantly greater gains. This test of a brief, tailored strategy provides a critical contribution to the search for efficient, effective ways for nurses to deliver workplace health promotion interventions.

Keywords: physical activity, brief intervention, nursing-managed centre, tailoring, transtheoretical model

## **Background**

The role of physical activity in the prevention and control of chronic disease is well documented. However, nearly 75% of American adults are physically inactive. Of these, 28% engage in no physical activity at all (US Department of Health and Human Services [USDHHS], 2001). Women who are older, less educated, or of lower socio-economic status are less likely than other women to engage in physical activity. The Surgeon General's Report (1996) notes that women in all age groups are more likely than men to report that they engage in no physical activity. Sternfeld, Ainsworth, and Quesenberry (1999) found that older women were less active than younger women in a large ethnically diverse sample. Recent research suggests that very brief, focused behavioural interventions that are tailored to the individual can facilitate change in a variety of health behaviours including cigarette smoking (Glasgow, Whitlock,

Eakin, & Lichtenstein, 2000; Rollnick, Butler, & Stott, 1997) and alcohol consumption (Fleming et al., 2002; Hermansson, Knutsson, Ronnberg, & Brandt, 1998). Brief interventions, which have been studied primarily in physicians' offices, have been effective in initiating physical activity (Bull & Jamrozik, 1998; Calfas et al., 1996).

Focusing interventions in physicians' offices is a useful strategy for increasing physical activity. However, clinics assess physical activity in only 19% of women (USDHHS, Office of Health Promotion and Disease Prevention, 1991). Because of these low levels of assessment and counselling, physical activity advice given at alternative health-care sites should be considered. Use of alternative sites to target inactive populations is important because a large portion of the population use their physician for illness care rather than primary prevention and health counselling. Since 60% of women participate in the labour force (US Department of Labor, 2002), offering brief behavioural interventions at worksites could reach more sedentary women.

Despite the increase in the number of working women and in the number of worksite health promotion programs, there have been few worksite interventions that use contemporary behavioural theories, such as the Transtheoretical Model, with hard-to-reach, sedentary persons.

The central construct of the Transtheoretical Model developed by Prochaska and colleagues (Prochaska & Velicer, 1997) is Stages of Change. The authors posit that people progress through stages when attempting to adopt or change a behaviour. The stages are: (1) *precontemplation* — not thinking about changing; (2) *contemplation* — thinking about changing; (3) *preparation* — deciding and preparing to change but not actually or consistently engaging in the new behaviour; (4) *action* — overt behaviour change; the first 6 months of engaging in a behaviour; and (5) *maintenance* — long-term continuation of a behaviour. When one is making a behaviour change, a move from *contemplation* to the other stages suggests that intention to adopt a behaviour, such as to become physically active, is an important precursor to actual behaviour change (Prochaska, Redding, & Evers, 1997).

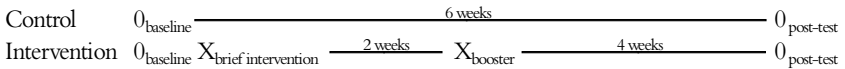
The purpose of this study was to determine whether a brief counselling intervention, tailored to Stage of Change and designed to increase physical activity, is effective for sedentary employed women when delivered in the workplace.

## Method

### Design

The study was a prospective randomized trial. The experimental and control groups were measured at baseline and after 6 weeks. The inter-

vention group received a brief intervention and a booster telephone call 2 weeks later. The design is described in the schematic below:



### **Sample and Setting**

**Sample.** Participants were recruited from among 603 female employees aged 18 to 65 who voluntarily attended a university-provided health screening as a part of a wellness program. The employee wellness program screens university employees for existing health problems as well as health, behavioural, and family risks. All regular employees of the university are invited to participate in the wellness program each year. The screenings are offered at regular intervals. Persons are screened at an academic nursing centre as well as at other conveniently located university sites. All women who attended the screening during the study period were invited to participate. They were recruited at the screening site.

**Site randomization procedure.** Prior to recruitment, all buildings at the university were randomly assigned to treatment and control groups. This strategy lacked the purity of simple randomization by participant but protected against contamination of the intervention and control groups through the sharing of information among co-workers. Sixty-one buildings were represented in the sample, with a range of one to 15 women in each building.

**Participant inclusion/exclusion.** Ninety-six (25%) of those screened did not meet the inclusion criteria. Eighty-seven of these women were excluded because they reported engaging in moderate physical activity for more than 30 minutes per day 5 days a week or vigorous activity for more than 20 minutes per day 3 days a week. Nine women were excluded based on the Physical Activity Readiness Questionnaire (PAR-Q). The PAR-Q identifies those with diagnosed heart conditions, coronary vascular disease, chest pain, unexplained changes in level of consciousness, myocardial infarction, bypass, percutaneous transluminal angioplasty, uncontrolled hypertension, and conditions that would worsen with activity (Shepherd, Cox, & Simper, 1981; Thomas, Reading, & Shepherd, 1992). A total of 287 women (75% of those who signed their consent) were enrolled in the study.

**Attrition.** Sixteen participants withdrew or were lost to follow-up and did not complete the final data-collection session. Fourteen of the noncompleters were in the intervention group and two in the control group, leaving 120 in the intervention group and 151 in the control group to complete the study protocol. The noncompleters were signifi-

cantly less educated than the completers ( $p < .01$ ). Their mean education was 12.6 (*s.d.* 3.7) years, compared to a mean of 14.3 (*s.d.* 3.0) years for the completers. There were no other differences between the two groups.

**Sample characteristics.** The baseline physical activity levels and demographic characteristics of the control and intervention groups are presented in Table 1. The mean years of education for the total sample was 14.3; however, the 118 participants (41%) with an education of high school or less formed the largest group. One hundred and seventy-nine participants (62.4%) identified themselves as administrative/professional, which includes clerical, administrative, and teaching personnel; 66% (23%) as food-service workers; and 33 (11.5%) as cleaning-service workers. The majority (81.2%) of the participants described themselves as White. Thirty (10.5%) identified themselves as Asian or Pacific Islander. The only racial difference between the two groups at baseline was that the control group contained significantly more minorities ( $p = .01$ ).

### Intervention

Participants in the intervention group were offered a brief intervention after completion of their screening and usual-care follow-up. The intervention was based on the Patient-Centered Assessment and Counseling for Exercise (PACE<sup>®</sup>) protocol (Caparosa & Thompson, 1999). The PACE<sup>®</sup> intervention is based on the Stages of Change from the Transtheoretical Model. The stage-based discussion was brief, lasting 3 to 5 minutes. Participants in *precontemplation* discussed their views of the benefits of physical activity and were encouraged to increase their physical activity.

**Table 1** *Characteristics of Control and Intervention Groups at Baseline (N = 287)*

Participant Characteristics at Baseline	Control N = 151	Intervention N = 120	<i>p</i>
Age (years)	43.3 (10.7)	44.6 (9.9)	0.30
Education (years)	14.4 (3.0)	14.1 (2.6)	0.49
% Married	71	65	0.25
% Administrative/professional positions	64	60	0.47
% White	75	88	0.01
% Tobacco users	5	11	0.17
Body mass index	30.5 (7.8)	30.5 (6.9)	0.95
Systolic blood pressure	120.3 (13.1)	119.7 (13.3)	0.93
Diastolic blood pressure	77.0 (8.9)	77.1 (8.1)	0.95
Total cholesterol	191.2 (33.8)	195.0 (30.1)	0.38
HDL cholesterol	55.3 (17.0)	53.4 (16.7)	0.37

Participants in *contemplation* and *preparation* set a physical activity goal for the following 2 weeks and were given a prescription-style note with the goal written on it. They also signed a contract to achieve the goal. Some participants set a goal of 30 minutes of moderate physical activity most days of the week or 20 minutes of vigorous activity 3 or more days a week. Others chose a goal that they thought would be more realistic for them. Two weeks later, a nurse practitioner telephoned the participant to inquire about her progress. Any identified problems or pitfalls were discussed. If questions arose during the phone call, appropriate information was given by telephone or pamphlets were mailed. If the participant was not reached on the first attempt, two additional attempts were made.

Those in the control group received usual care: health promotion counselling by nursing and health promotion students. Counselling included advice and teaching focused on the participant's identified goals, such as weight reduction, tobacco cessation, or improved nutrition. If the counselling included a discussion of physical activity, any advice offered was non-stage-based and did not include a booster call or any additional contact with the nurse or nurse practitioner. All participants who completed the second data collection received \$5 for their time.

### ***Dependent Measures***

The dependent physical activity measures were: Stage of Change in physical activity, questions from the Paffenbarger Physical Activity Questionnaire, and PACE<sup>®</sup> walking questions from the National Health Interview Survey. Change scores for these variables were calculated and are reported below.

***Stage of Change.*** The PACE<sup>®</sup> score used by Calfas et al. (1996) was used to classify participants according to their Stage of Change of Physical Activity. The Stage of Change score was determined by asking the women to circle the one item that best described their level of physical activity. This item classified participants into a stage. Higher scores indicate increased readiness to change. The measure is outlined in Table 2. Women in stage 5 or higher were considered physically active and excluded from the study. Change was defined as the difference in stage from baseline to follow-up. The PACE<sup>®</sup> score has a test-retest reliability of 0.80. Construct validity is evidenced by correlations with self-efficacy and previously validated measures of physical activity (Isrow-Cohen et al., as cited in Armstrong, 1990).

***Paffenbarger physical activity questions.*** This is a self-administered measure designed to identify leisure-time and other physical activity among college alumni (Paffenbarger, Blair, Lee, & Hyde, 1993). This study used variables from the Paffenbarger Physical Activity Questionnaire: (1) number of flights of stairs climbed per day, (2) number of blocks

**Table 2** *Physical Activity Status and Stage of Change*

<b>PACE<sup>®</sup> Score</b>	<b>State of Change</b>
1 I don't do regular vigorous or moderate exercise now, and I don't intend to start in the next 6 months.	precontemplation
2 I don't do regular vigorous or moderate exercise now, but I have been thinking of starting in the next 6 months.	contemplation
3 I'm trying to start doing vigorous or moderate exercise, but I don't do it regularly.	preparation
4 I'm doing vigorous exercise less than 3 times per week (or) moderate exercise less than 5 times per week.	preparation
5 I've been doing 30 minutes a day of moderate exercise 5 or more days per week for the last 1–5 months.	action
6 I've been doing 30 minutes a day of moderate exercise 5 or more days per week for the last 6 months or more.	action
7 I've been doing vigorous exercise 3 or more days per week for the last 1–5 months.	maintenance
8 I've been doing vigorous exercise 3 or more days per week for the last 6 months or more.	maintenance

walked per day, (3) hours of vigorous and moderate physical activity per day during the week, and (4) hours of vigorous and moderate physical activity per day on weekends. Test-retest reliability correlations of the Paffenbarger are reported as 0.72 at 1 month with 59 adult men and women (Ainsworth, Leon, Richardson, Jacobs, & Paffenbarger, 1993).

***PACE<sup>®</sup> walking questions.*** Four questions from the original PACE<sup>®</sup> study were adapted from the National Health Interview Survey (Adams & Benson, 1991; K. J. Calfas, personal communication, December 12, 2000). The questions are reported as minutes walked per week: for exercise, on errands, during breaks or lunch, and to work or school. A fifth walking variable, total walking, summed the four walking variables. The NHIS measure is considered reliable and valid for the assessment of self-reported walking (Rauh, Hovell, Hofstetter, Sallis, & Gleghorn, 1992).

***Demographic and Lifestyle Measures***

The demographic and lifestyle variables of self-reported age, race, ethnicity, marital status, level of education, job task, and tobacco use were collected at baseline.

***Protection of Human Subjects***

Approval for the study was obtained from the Institutional Review boards at the University of Illinois at Chicago and Purdue University.

## **Analyses**

Baseline differences in demographic variables between the control and intervention groups were analyzed using chi square for categorical and *t*-tests for continuous variables. To protect against inflating the Type I error rate, preliminary multivariate analyses of variance, with group assignment and building worked in as factors, were performed to examine group effects on changes in the different domains of physical activity. The first analysis included the four dependent variables from the Paffenbarger scale; the second included the four walking measures from the original PACE<sup>®</sup> study. In both cases, the assignment to the intervention group was highly significant ( $p = 0.012$  and  $0.001$ , respectively). The primary analysis, using buildings rather than individuals, was then performed using an ANOVA with group assignment as a fixed effect and building as a random effect. Since there were 61 buildings with one to 15 participants per building, the degree of freedom for the distribution of the *F*-statistics varied. All analyses were performed using SPSS for Windows. Statistical significance was accepted at  $p < 0.05$ .

## **Results**

### ***Baseline Physical Activity Measures***

The participants' baseline physical activity measures are described in Table 3.

***Stage of Change.*** The mean Stage of Change score was 2.8 (*SD* 0.9), indicating that the average participant was between the point of *contemplation* (starting physical activity in the next 6 months) and *preparation* ("trying to start to do vigorous or moderate exercise, but not...regularly").

***Paffenbarger physical activity questions.*** Participants reported climbing a mean of less than five flights of stairs per day, with the majority reporting two flights per day. Participants walked 7.2 (*SD* 7.4) blocks per day — approximately two thirds of a mile (or just over 1 kilometre). They reported nearly 4 hours per day of vigorous and moderate physical activity during the week and slightly more than 5 hours per day on weekends.

***PACE<sup>®</sup> walking questions.*** Participants walked for exercise a mean of 17.8 (*SD* 37.2) minutes per week at baseline. More than 200 (72%) reported no walking for exercise. The women reported an average of 86.6 (*SD* 90.8) minutes per week of total baseline walking. The distributions of walking for exercise and total walking were skewed to the right and had a wider standard deviation than expected because of the high number of women who reported no baseline walking. There were no significant differences between the experimental and control groups on any of the baseline physical activity variables.



**Table 3** *Description of Participants' Baseline Physical Activity Measures*

<b>Variables (Total N = 257)</b>	<b>Control</b>	<b>Intervention</b>	<b>p value</b>
	Mean (SD)	Mean (SD)	
<b>Cognitive variables</b>			
Self-efficacy	27.1 (8.3)	29.1 (8.9)	.097
Decisional balance—pro	40.6 (6.5)	41.2 (6.0)	.557
Decisional balance—con	15.7 (3.1)	15.1 (3.7)	.391
Decisional balance index	24.8 (7.8)	26.2 (8.0)	.314
<b>Physical activity measures</b>			
<i>Stage of Change</i>	2.9 (0.9)	2.7 (0.8)	.077
<i>Paffenbarger physical activity questions</i>			
Flights of stairs/day	4.4 (3.8)	5.3 (6.4)	.246
Blocks walked/day	7.0 (7.4)	7.7 (7.9)	.540
Hours of vigorous and moderate weekday physical activity	3.6 (3.2)	3.8 (3.4)	.252
Hours of vigorous and moderate weekend physical activity	5.2 (2.9)	4.9 (2.4)	.478
<i>Walking questions</i>			
Minutes walked to work/week	23.3 (31.7)	20.1 (25.1)	.531
Minutes walked on errands/week	26.9 (39.1)	31.7 (46.5)	.192
Minutes walked during lunch or breaks/week	16.7 (27.9)	19.7 (33.9)	.747
Minutes walked for exercise/week	17.8 (36.9)	18.6 (38.6)	.699
Total minutes walked/week	86.1 (89.0)	87.7 (93.8)	.861

**Intervention Results**

When compared to controls at 6 weeks follow-up, the intervention group showed significantly greater improvement in five of the 10 physical activity outcome measures: Stage of Change, blocks walked per day, vigorous and moderate weekend activity, minutes walked for exercise, and total minutes walked per week (Table 4).

The control group increased their Stage of Change by 0.72, whereas the intervention group increased it by 1.34 stages ( $p < .001$ ). When the Stage of Change scores are broken down into individual stages, a clearer evaluation of differences between control and intervention changes can be made. In the intervention group, one participant decreased one stage or more (.08%), while the intervention group showed a 6.9% decrease.

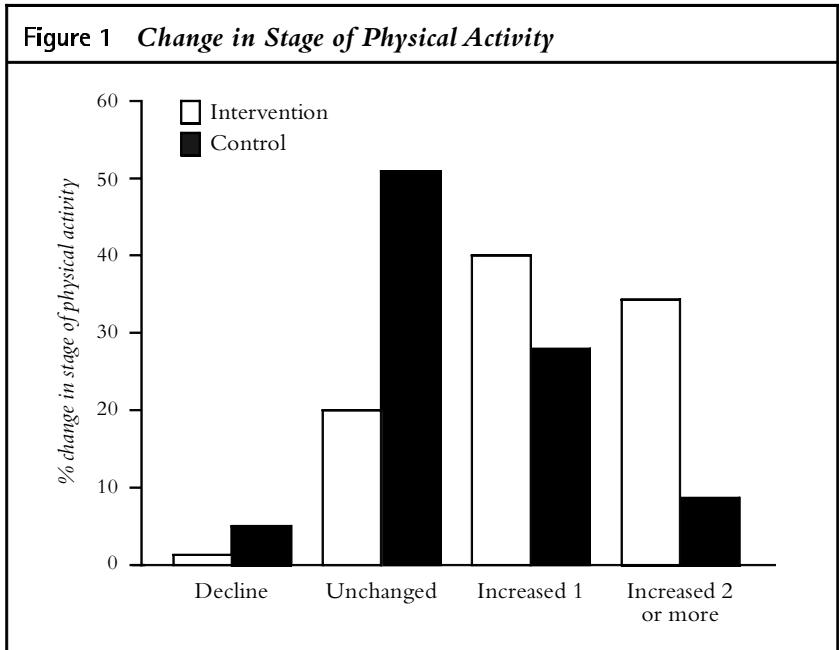
**Table 4** *Change in Physical Activity: Comparison of Control and Intervention Groups*

Variables	Change Score		Df	F	p
	Control	Intervention			
<i>Stage of Change</i>	+ .72	+1.34	1,37	38.27	.001
<i>Paffenbarger physical activity questions</i>					
Blocks walked/day	+1.54	+7.31	1,33	4.98	.033
Flights of stairs up/day	+ .81	+1.21	1,32	0.38	ns
Hours of weekday vigorous and moderate physical activity	+ .06	+ .35	1,38	1.46	ns
Hours of weekend vigorous and moderate physical activity	+ .36	+ .77	1,33	7.94	.008
<i>Walking variables</i>					
Minutes walked to work/week	+3.54	+3.1	1,38	1.19	ns
Minutes walked on errands/week	+15.7	+23.6	1,19	3.43	ns
Minutes walked during lunch or breaks/week	+22.4	+25.8	1,31	0.51	ns
Minutes walked for exercise/week	+32.9	+77.9	1,24	28.35	.001
Total minutes walked/week	+76.2	+103.1	1,27	13.31	.001

Twenty-one percent of the intervention group and 53.1% of the controls remained the same. More than 41% of the intervention group increased one stage, compared to 29.6% of the controls. The percentage of intervention participants who increased two or more stages was 35.5, compared to 10.3 for the controls. Figure 1 graphs percentage change in Stage of Physical Activity.

Because the two preliminary MANOVAs were significant, the differences on the individual Paffenbarger and walking variables were examined. Increase in blocks walked per day was higher ( $p < .05$ ) for the intervention group (7.31) than for the controls (1.54). Hours of weekend vigorous and moderate physical activity increased by .77 for the intervention group compared to .36 for the controls ( $p = .008$ ). Change in minutes walked for exercise was also greater ( $p < .001$ ) for the intervention group than for the controls, the former increasing their walking for exercise by 77.9 minutes per week and the latter by 33.9 minutes per week. The increase in total minutes walked per week was significantly higher ( $p < .0001$ ) for the intervention group (103.1) than for the controls (76.2).

The findings for the intervention group were examined to determine change over time as a result of the brief intervention. This group signifi-



cantly improved on seven of the 10 physical activity outcome measures at 6 weeks. Their mean Stage of Change was significantly increased, from 2.7 to 4.0 ( $p < .001$ ). Significant increases were also seen in their mean weekend vigorous and moderate physical activity, from 4.9 to 5.3 hours per day ( $p < .01$ ); self-reported number of blocks walked per day, from 7.7 to 12.9 ( $p < .05$ ); minutes walked per week for exercise, from 18.6 to 91.6 ( $p < .0001$ ); and total minutes walked per week, from 87.7 to 209.5 ( $p < .0001$ ).

It is noteworthy that, when compared to baseline, both the control group and the intervention group increased nine out of 10 physical activity variables. Improvement for both groups was seen in all variables except number of hours of vigorous and moderate weekend physical activity, on which only the intervention group improved. Even though both groups showed improvement, the intervention group improved significantly more than the controls on seven of the 10 variables.

### Discussion

This study examined the effect of a brief, tailored intervention on the physical activity levels of sedentary working women. The controlled trial demonstrated that a brief intervention matched to the participant's stage of physical activity can result in sedentary women becoming physically

active. The use of nurse practitioners to provide the intervention at a workplace health promotion site extends the body of published research, since previous interventions have been administered to clinic patients in physicians' offices. The fact that participants who received the brief, tailored intervention in a busy workplace setting were more likely to adopt physical activity than control participants lends support to the use of the PACE<sup>®</sup> intervention with sedentary women. The consistency of the results across various measures strengthens confidence in the efficacy of the intervention. Women who received the intervention showed greater improvement than controls on types of physical activity associated with leisure time rather than work time (i.e., weekend physical activity and walking for exercise).

The findings from this study are novel. It represents the first documentation of a nurse practitioner-led program that improved women's physical activity levels using the PACE<sup>®</sup> intervention. The beneficial effects of the brief intervention, as reported above, are similar to or greater than those reported for the PACE<sup>®</sup> intervention administered by primary-care physicians. Calfas et al. (1996) found that participants receiving a brief intervention and follow-up telephone call significantly increased their walking when compared to controls. They report an increase of 34 minutes per week (total walking) for the intervention group, compared to 21 minutes for controls. In the present study, the intervention group increased their total walking by 128 minutes per week and the controls by 72 minutes per week. The greater improvement in walking found in this study may be due to the inclusion of a larger proportion of women in the intervention, as women generally prefer walking to other types of physical activity (Ainsworth, Irwin, Addy, Whitt, & Stolarczyk, 1999; Brownson et al., 2000; Laffrey, 2000).

As discussed, both the intervention group and the control group showed an increase in many of the physical activity variables at 6 weeks. This improvement may be related to several factors: the fact that participants were enrolled in a study around physical activity, questionnaire completed at baseline, non-staged-based counselling, and seasonal effects. Two factors in particular were likely contributors: student counselling, and the seasonal effects of exercise. All women at the screening received follow-up counselling by students, which may well have affected their behaviour and caused some of them to increase their level of physical activity. With regard to seasonal effects, enrolment began in late January and ended in May; the second data collection took place 6 weeks after enrolment — at a time when Midwestern weather had most likely grown mild, and this could explain some of the improvement in physical activity seen in both groups. Future research spaced throughout the year could control for this artifact.

### ***Strengths and Limitations***

The results demonstrate the effectiveness of a brief intervention in raising levels of physical activity. The use of a randomized prospective design adds to confidence in the findings. Utilization of a usual-care control group provides convincing evidence of the efficacy of the intervention.

One limitation of this study was its use of self-report measures for physical activity. Self-report, especially of moderate forms of physical activity, is a less reliable technique than objective measurement (Ainsworth, Montoye, & Leon, 1994; Sallis & Saelens, 2000). Social desirability bias can inflate self-reported levels of physical activity (Warnecke et al., 1997). Objective measurement of physical activity would strengthen the self-reported outcomes and augment the applicability of a brief intervention strategy for the adoption of physical activity. However, self-report allows for data collection from large numbers of people at low cost and does not alter the behaviour under study (Sallis & Saelens).

A second limitation is the potential for a biased sample. Persons who are concerned about and conscious of their health are more likely than others to register for health screening. Hence, persons attending the screening likely were not typical of the university population. Further, the sample comprised working women. Because the sample was self-selected, generalizability is limited to women attending worksite health screenings.

### ***Implications and Recommendations***

This study broadens the boundaries of what is known about the effect of brief, tailored, theory-based behaviour change strategies. It extends previous research done in primary care and offers practitioners a successful program for encouraging women to initiate physical activity. The findings support the efficacy of a brief, tailored intervention delivered by nurse practitioners to increase the physical activity levels of sedentary women. The application and testing of this intervention at a worksite is a practical and efficient approach to exercise counselling for women. Behavioural science would benefit from further research into which parts of a tailored intervention — contracting, goal setting, or telephone prompting — are most beneficial. Benefits could be derived from testing the effects of different types of prompting, such as e-mail and computerized telephone calls. Further longitudinal work is needed to compare the effectiveness of brief interventions with that of other behaviour change strategies in order to determine which approaches lead to optimal long-term adherence. In addition, there is a need for further study to evaluate the effectiveness of interventions with women who are unemployed and women of low income and educational status.

In summary, nurses and nurse practitioners are in a key position to help women become physically active or to raise their physical activity to desirable levels. This test of a brief, tailored strategy contributes significantly to the search for efficient, effective ways for nurses to deliver community-based health promotion interventions. By routinely providing brief interventions to increase levels of physical activity, nurses and nurse practitioners can make a substantial contribution to the promotion of health and prevention of disease.

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