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# Step by Step: The Feasibility of a 16-Week Workplace Lunchtime Walking Intervention for Physically Inactive Employees

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***Background*:** A 16-week lunchtime walking intervention was designed to increase physical activity in physically inactive University employees. The program was delivered and monitored twice over 7 months to examine feasibility across different seasons. ***Methods*:** Seventy-five participants (n = 69 females, n = 6 males; mean age = 47.68) were randomly allocated into a Winter (February start) or Spring group (May start). Participants were asked to complete 3 weekday lunchtime walks and 2 weekend walks. Weeks 1 to 10 were led by walk leaders (group phase) while the participants self-organized their walks during weeks 11 to 16 (independent phase). Yamax pedometers recorded daily step counts and walk group leaders recorded participant attendance in the group phase. Acceptability was assessed via a satisfaction survey and 2 focus groups with participants. ***Results*:** A participant pool representative by ethnicity, but not gender was recruited using a range of strategies. The program demonstrated good retention across both groups (73%). The intervention was acceptable to participants. More steps were accumulated in the group-led versus the independent phase. ***Conclusion*:** The intervention is feasible in this workplace setting across different seasonal periods. In the future, researchers should examine if the findings can be replicated in a definitive trial and generalize to other workplace settings.

***Keywords*:** physical activity, health promotion, intervention strategy

As employees spend more than one-third of their time at work, the workplace has been identified as a key health setting to increase physical activity and reduce sedentary time.[1] Although several approaches have been attempted to enhance levels of physical activity among employees, they have been met with variable success. Meta-analyses have shown that workplace physical activity interventions in general have small, but significant, effects on self-reported physical activity ($d$ = .11 to .26).[2–4] with walking interventions being more effective than other types ($d$ = .54 versus $d$ = .16).[2] The use of pedometers as part of these interventions can increase physical activity, at least in the short-term.[5] Research in the work setting has also shown that walking interventions that use facilitated goal setting,[6,7] diaries and self-monitoring,[6–8] and walking routes[9] are effective. However, only a few programs have been subjected to rigorous evaluation.[10–12] Specifically, there is a lack of studies evaluating the feasibility of lunchtime physical activity interventions that address participant recruitment, program delivery, and patterns of participation in different seasons in the UK.

In the current study, we examined the feasibility of implementing a 16-week program using a phased approach whereby the first 10 weeks were group-led and the remaining 6 weeks were independently organized yet still with some, albeit more remote, support (eg, provision of motivational text messages). The length of 10 weeks for the group-led phase was based on results from previous studies showing that this period is sufficient to increase walking in a workplace context (eg, Gilson, McKenna, & Cooke, 2008[13]). The 6 weeks of independent walking was added as a strategy to increase likelihood that walking will be sustained and thus be more long term cost-effective after removal of formal group support (ie, under the guidance of a walk leader). This was also in line with the conceptual underpinning of the intervention, which was the development of empowerment in the participants using Self-Determination Theory principles (see Thøgersen-Ntoumani et al, 2010[14]). This is because empowerment promotes motivation that comes from within individuals and is sustainable over time. Hence, we withdrew formal group-led support and encouraged independent organization of walks at a point in the program when participants had a chance to build up a routine, had received information and become familiar with (preferred) walking routes, had built up a network with fellow participants, and had more experience using self-regulation skills. It is important in the design of future walking interventions to examine the feasibility of this approach.

One of the potential problems with outdoor walking interventions is that in many parts of the world (such as the UK), seasonal variability in the weather and walking conditions may impede attendance and adherence to physical activity. Indeed, research has shown that weather factors (such as temperature and precipitation) can act as important barriers to participation in physical activity.[15,16] Adverse temperatures, rain, wind and snow might be particularly relevant inhibiting factors affecting participation among adults who are not regularly physically active.[17] Rather surprisingly, however, to our knowledge no researchers have explored whether such interventions are equally feasible when implemented across different seasons.

Other research has shown that time of the week is related to step count accumulation. Specifically, observational research by Clemes and colleagues[18–20] has shown that adults in the UK tend to accumulate less physical activity as measured via pedometers on Sundays compared with the rest of the week. It is therefore also important to examine whether participants taking part in a work-

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place walking intervention occurring mainly during the weekdays accumulate fewer steps during the weekend.

In view of the above, the aim of the present investigation was to explore the feasibility of implementing a 16-week phased lunchtime workplace walking intervention with physically inactive employees in 2 different seasonal periods (Winter-Spring and Spring-Summer). Specifically, feasibility was explored in terms of 1) recruitment (who can be recruited and what are the most effective strategies?), 2) rates of retention and drop-out, 3) acceptability (satisfaction and appropriateness of the intervention), and 4) aspects of the intervention needing improvement.

# Methods

## Participants and Recruitment

Following University ethical approval, participants were recruited by the research team through a University workplace well-being health fair, pay-slip messages, flyers and posters, a monthly University staff magazine, and a specially designed website (for further information, see Thøgersen-Ntoumani et al, 2010[14]). Two months was spent preparing for recruitment, with recruitment conducted over a 6-month time period targeted to full-time nonacademic University employees, who did *not* meet current physical activity recommendations for health (defined as 5 days or less of 30 minutes of moderate intensity physical activity per week) and who had no limiting cardiac health conditions or mobility constraints. Academic employees were excluded as their schedules often preclude standard lunch time hours which may impact their availability to regularly attend the offered walks. They are also less representative of the working population. Potential participants were asked to complete an initial online screening survey requesting self-report information on current physical activity levels (including frequency, duration, and intensity).

Of the total 3589 (n = 2223 females, n = 1366 males) administrative-related and support staff employees (these numbers include full and part time workers, and those who work irregular hours), 75 (n = 69 females, n = 6 males) full-time employees working regular hours were recruited for the program. Age range was 24 to 63 years (mean = 47.68, SD = 10.31) with 85.3% White British, 6.7% Asian, 4% Black, 2.7% Chinese, and 1.3% "Other" in ethnic representation.

## Step by Step Program

Participants were given a target goal of 3 30-minute lunchtime weekday walks and 2 30-minute weekend walks throughout the 16 weeks. Weeks 1 to 10 of the program were group-based and led by trained walk leaders (group-led phase) and in weeks 11 to 16, participants were encouraged via text messages to self initiate their walks (independent phase).

## Research Design and Protocol

Evaluation was conducted through a 16-week feasibility trial using 2 intervention groups who started the intervention in different seasons (Winter or Spring). A random number generator was used to select participants into either the Winter (February 2010 start) or Spring (May 2010 start; see Figure 1 for CONSORT diagram of randomization allocation) group. There was no overlap between the 2 groups. Participants were presented with an unsealed pedometer with instructions on how to use and wear it. No baseline step counts were taken to control for any reactivity effects before the start of the program. Two motivational step count walk log booklets, 1 for the participant to retain and 1 to be returned to the study coordinator, were also provided and used throughout the duration of the 16-week study to track daily step counts and number of walks completed each week.

In weeks 1 to 10, participants were asked to register on a Doodle registration site indicating the weekday and time they planned to walk, as well as complete 3 weekday campus based walk leader led lunchtime walks and 2 30 minute independent walks during the weekends. During this phase, participants received 2 autonomy-supportive text messages per week to encourage (continued) walking. In weeks 11 to 16, the led walks were discontinued and participants were requested to self-organize their own walks. The participants received autonomy supportive text messages 3 times per week during this phase. Participants were informed of the 2 walk phases at the beginning of the study. Walks for all weeks in the group-led portion of the program were completed at a moderate intensity as determined by the trained walk leader. Weather data retrieved from the Meteorological Office in the UK showed average monthly air temperatures of 2.4°C (February) and 10.7°C (May), average monthly rainfall of 56.2 mm (February) and 31.6 mm (May), and mean monthly hours of sunshine were 58 in February versus 198 hours in May. During weeks 12 to 14 the project Research Fellow telephoned all participants to check on participant progress regarding walking and overall program adherence. At the end of week 16, the participant walk log booklets were collected.

# Measures and Instrumentation

Before beginning the program, a written informed consent and Physical Activity Readiness Questionnaires (PAR-Q)[21] were completed by all participants.

## Self-Monitoring Log Booklet

A 22-page color booklet listed separate weekly entries for each of the 16 weeks allowing participants to indicate the date, day, number of 30-minute walks, walk route or area, total number of daily steps, and accumulated weekly step count. Participants were able to list their reasons for walking, favorite walks, identify other areas they would like to walk in the future, and generate personalized physical activity goals. A weekly step count chart was supplied to help participants determine progress toward their goals. In addition, contact details for the research team were provided.

## Pedometers

Unsealed Yamax Digi-Walker 351 pedometers were used both as motivational and as monitoring tools. Previous RCT workplace walking intervention programs with university employees[9,13] have demonstrated that the use of pedometers is associated with increases in physical activity, enhanced motivation and goal attainment[22] and can be used with sedentary populations.[23]

## Step Counts and Group-Walk Attendance

Participants were asked to report their step counts in the self-monitoring log booklet every evening just before going to bed. At the end of the intervention, self-reported weekly and weekend step counts were extracted from the participants' log book and recorded in a database. Objective group walk attendance was calculated using the walk registers completed by the walk leaders in weeks 1 to 10.

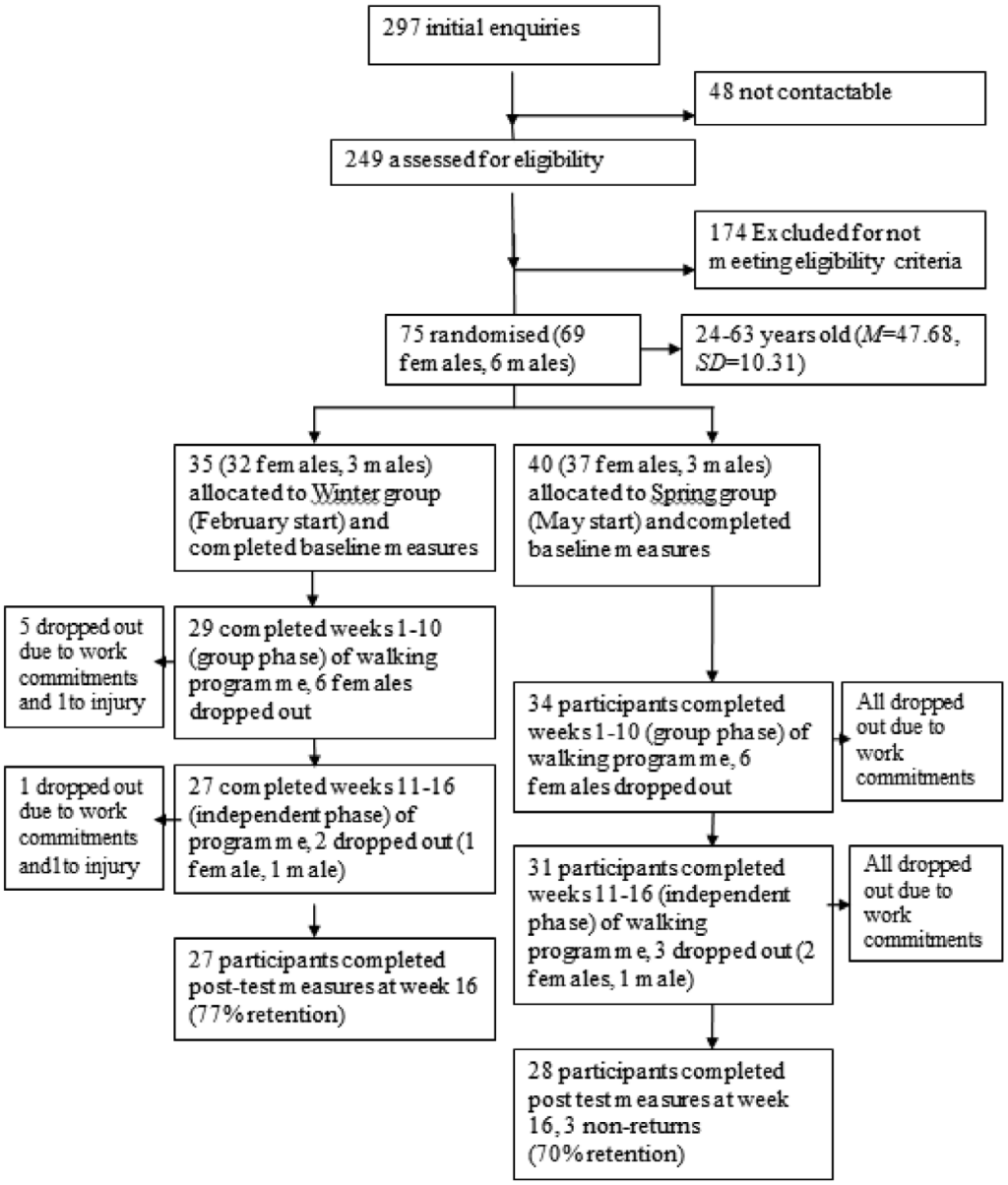


**Figure 1** — CONSORT diagram of participant flow through the program.

## Acceptability

Acceptability of the intervention was measured via a questionnaire distributed to all the participants at the end of the intervention. Questions addressed the program format including qualities of the walk leaders, the walk routes, the registration process, and the pedometers. In addition, 2 focus groups were conducted with a total of 6 participants (5 adherers and 1 nonadherer) at the end of the intervention to gauge more in-depth information about acceptability, including barriers to and facilitators of success of the intervention.

## Analyses

The quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS v. 17.0). Descriptive statistics, independent samples *t* tests, chi-square analyses and mixed design ANOVAs were computed. The focus group data were transcribed verbatim, anonymized, and subsequently analyzed using content analysis as the topic area was decided a priori.[24]

# Results

## Recruitment

The most effective recruitment strategy was the workplace well-being and health fair (19.25% of all participants indicated that they had been recruited this way), followed by informal word-of-mouth through friends and colleagues (16.04%). A feature article in the University magazine for staff (14.81%), flyers/posters (8.64%), and pay-slip messages (6.17%) were somewhat less effective. Web-sites and other means of advertising the study were less effective in recruiting the target population. However, these results suggest that a recruitment package of several strategies is beneficial.

The composition of the participant group was compared with the overall pool of University administrative and support staff (from which the sample was taken) on ethnicity and gender. There was no significant difference in ethnicity [Pearson $\chi^2$ (1) = 0.007; $P$ > .05]; however there was an overrepresentation of females in this sample [Pearson $\chi^2$ (1) = 28.650; $P$ < .01]. In addition, 32 of the 43 University departments or corporate services were represented in the program. At baseline there were no significant differences between the Winter and Spring groups in terms of age [$t$(73) = –.16; $P$ > .05] or ethnicity [Pearson $\chi^2$ (4) = 1.77; $P$ > .05].

## Rates of Retention and Drop-Out

Seventy-five participants started the 16-week intervention, with 55 completing the program (73% retention; see Figure 1 CONSORT diagram). Eight participants from the Winter group and 9 participants from the Spring group dropped out from the intervention. Of those who dropped out from the intervention those in the Spring group cited work pressures as the reason, while 2 people in the Winter group reported injury as the reason for discontinuation (this was not attributable to the intervention). All participants dropped out in the group-based part of the program.

## Step Counts

A significant effect of time on steps per day was seen over the intervention period [$F$(15, 1095) = 8.48; $P$ < .01; partial $\eta^2$ = .10], but there was no time × group interaction [$F$(15, 1095) = .95; $P$ > .05; partial $\eta^2$ = .01]. Follow-up pairwise comparison analyses revealed that step counts were greater in week 1 (compared with week 16), week 2 (compared with week 8 and weeks 11 to 16), week 3 (compared with weeks 8, 12, 13, 15, and 16), week 4 (compared with week 8 and weeks 11 to 16), and week 5 (compared with week 8 and weeks 11 to 16; all $P$ < .05).

***Weeks 1 to 10 Group-Led Phase.*** The average number of participants on each walk was 5 in both the Winter and Spring groups. A 2 (group) × 10 (weeks) × 2 (time in week; weekdays versus weekends) mixed design ANOVA revealed significant main effect for weeks [$F$(4.94, 291.32) = 4.29, $P$ = .001, *partial* $\eta^2$ = .07] and time in the week [$F$(1, 59) = 46.47, $P$ < .001, partial $\eta^2$ = .44]. Post hoc analyses revealed that participants in both groups completed significantly fewer daily steps during week 8 compared with weeks 2, 3, 4, and 5. Moreover, participants in both groups completed significantly more daily steps during the weekday compared with the weekend (see Figure 2 for a graphic presentation of the mean step count values).

***Weeks 11 to 16 Independent Phase.*** A 2 (group) × 6 (weeks) × 2 (time in week) mixed design ANOVA was conducted separately for the independent phase (weeks 11 to 16) of the walking intervention. The analysis revealed a significant effect for time in week [$F$(1, 73) = 17.85, $P$ < .001, partial $\eta^2$ = .20]. Post hoc analysis showed that on average the participants accumulated more daily steps during the weekday than during the weekend. The main analysis also revealed a group x time in week interaction [$F$(1, 73) = 12.47, $P$ < .01, partial $\eta^2$ = .15]. Follow-up tests of simple effects using pairwise comparisons revealed that there was a significant difference in step counts between weekdays and weekends, with more steps taken on a daily basis on weekdays, for participants in the Winter group, but not in the Spring group (also see Figure 2).

## Group Walk Attendance

Another mixed design ANOVA was conducted to test for time and group differences in weekday walks, assessed via walk attendance registers completed by the walk leaders, during the group-led phase of the program. The analysis revealed a significant effect for time [$F$(9, 65) = 14.45, $P$ < .01, partial $\eta^2$ = .17] but not for group [$F$(1, 73) = 1.79, $P$ > .05, partial $\eta^2$ = .02]. However, a significant time x group interaction also emerged [$F$(9, 65) = 3.09, $P$ < .01, partial $\eta^2$ = .04]. An inspection of the pairwise comparisons revealed that the latter interaction was a result of differences between the groups mainly in week 6 which was due to a Bank Holiday taking place in the Spring group's intervention period. This meant that participants in the Spring group had fewer opportunities to engage in group walks that week. As a result, week 6 was removed from the analysis. This analysis revealed a significant effect for time [$F$(8, 584) = 15.85, $P$ < .01, partial $\eta^2$ = .18] but a nonsignificant time × group interaction [$F$(8, 584) = 1.04, $P$ > .05, partial $\eta^2$ = .01]. Follow-up pairwise comparisons showed that participation in the first 4 weeks of the group-led phase of the intervention was greater than in the last 5 weeks. The mean values across weeks 1 to 10 (excluding week 6) are presented in Figure 3.

## Acceptability

The results of the satisfaction survey are presented in Table 1. Participants generally reported high levels of acceptability with regard to the walk organization and registration, the routes, the walk leaders,

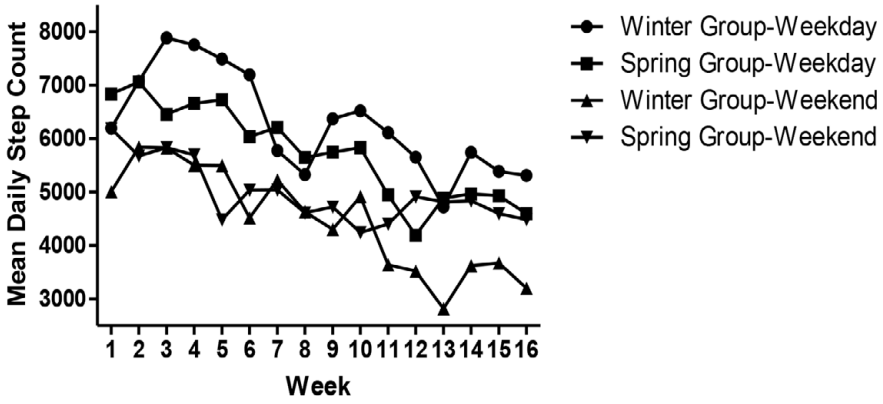


**Figure 2** — Mean weekday and weekend step count by group (Weeks 1 to 16).

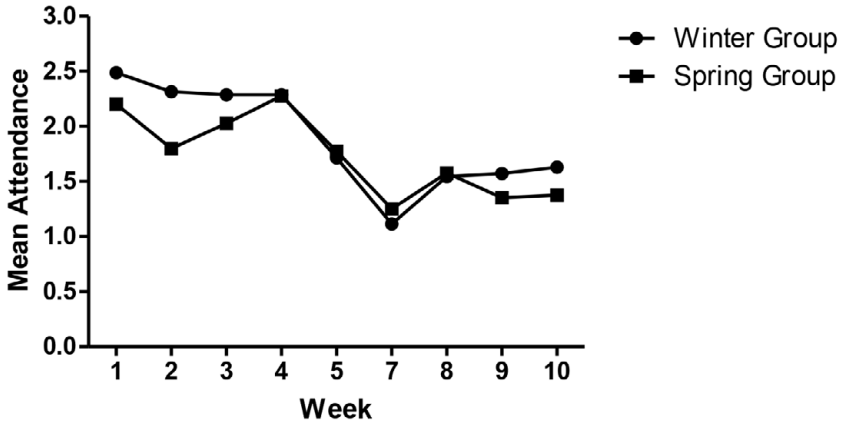


**Figure 3** — Participant mean lunchtime walk attendance (Weeks 1 to 10).

and the pedometers. The focus group data also revealed further support for aspects of the intervention. In particular, 4 participants (all adherers) agreed that the pedometers served a particularly important motivational function. This is highlighted in quotes by 2 different adhering female participants:

> "I wouldn't be without [the pedometer], I put it on every morning. It's my big incentive. It made you walk further... it made you do it (walk) because I want to get to my 10 [10,000 step target] today."

> "Brilliant, I really liked them. It is the one thing I will take away, it has been a really, really useful thing."

These accounts could indicate that they learnt how to use the pedometers more systematically as they progressed through the intervention. In contrast, 2 other participants (1 adherer and 1 nonadherer) noted how they forgot to wear the pedometer.

Two of the participants (1 adherer and 1 nonadherer) noted how seasonal changes might relate to attendance in the walk intervention. The nonadhering participant noted

> "I just want to keep walking. I know I need that push especially in the Winter. I think that's where we're all going to find it hard in the Winter months. Like, I don't want to go today it's snowy, it's freezing, it's cold."

The fact that the walks were offered over lunchtimes, however, appeared to help some participants adhere to the intervention. One adhering female highlighted the importance of walking in daylight, which was possible in the Winter months during lunchtime.

> "In the Winter you come into work in the dark, you go home in the dark. It is lovely to actually go out in daylight over lunchtime for a half hour or 20 minutes, cause that's what we don't do in the Winter; see dark no light."

The walk leaders and group-format appeared to be instrumental in facilitating physical activity change in the participants. As such, 2 participants (1 adherer and 1 nonadherer) expressed concern that it was difficult to adhere to the program once the group-led phase ended. The nonadherer noted that she needed to feel 'accountable' to continue on her own. In addition, 3 participants (all adherers) expressed concern that the walk leaders were 'too fit,' and that it was intimidating for participants who were new to exercise. This was exemplified by the reports of 2 adhering participants who described one of the male walk leaders as walking too fast and 'making' everyone complete the full walk route. All who expressed concern agreed that it would be useful with a feeder system whereby previous participants who had completed the walk program would act as walk leaders. Five participants thought in general that the walk leaders were friendly and approachable and took an interest in them which facilitated a sense of relatedness.

In addition to the pedometers and the group format, other facilitators included the use of an online doodle system to sign up for walks (all participants), use of e-mail reminders from the researchers and support from the wider group (5 adherers). Three adherers noted that 'not wanting to let others down' helped them stay committed especially at the beginning. Finally, feeling more productive at work following walks served as reinforcement which was reported by 3 adhering participants.

### Required Improvements

Numerous suggestions were made for improvement to the walking intervention which the participants believed would facilitate adherence in the longer-term. Four participants noted that more options in terms of routes, length and pace could be introduced a few weeks into the program.

## Discussion

In this study, we sought to examine the feasibility of recruitment of participants, patterns of physical activity participation during the course of a workplace walking intervention, and acceptability of the intervention format to participants. Although we did not have access to all demographic characteristics of the workforce, it was possible to recruit an ethnically representative sample of the workforce. The overrepresentation of females in the trial may suggest that the recruitment strategy was more effective for female employees. A recent systematic review has shown that males are generally underrepresented in walking interventions.[26] However, it is unclear whether this underrepresentation is due to walking being less attractive to males or whether recruitment strategies are ineffective. In addition, the meanings attached to work may differ by gender. It is imperative that more qualitative work is conducted to establish reasons and what can be done to overcome this problem.

The results pertaining to recruitment strategies revealed some similarities to the findings of other previous work which examined recruitment approaches to community walking programs.[27] Spe-

**Table 1 Evaluation of Intervention Components via Postintervention Questionnaire (1 = Strongly Disagree; 7 = Strongly Agree)**

| | Mean | SD |
|---|---|---|
| Evaluation of walks | | |
| Walk routes were enjoyable | 6.10 | .71 |
| Walk route length was appropriate | 6.16 | .80 |
| Physical difficulty was appropriate | 5.92 | .89 |
| Pace of walks was appropriate | 5.71 | 1.29 |
| Work commitments dictated when I could walk | 6.02 | 1.16 |
| Evaluation of walk leaders | | |
| Had useful knowledge | 4.79 | .97 |
| Willing to lead walks based on my input/needs | 5.27 | 1.13 |
| Facilitated the group walks well | 5.88 | 1.07 |
| Provided clear, practical, practical, concrete directions | 5.51 | 1.17 |
| Easy to relate to | 5.67 | 1.07 |
| Evaluation of pedometers | | |
| Comfortable wearing pedometers | 5.75 | 1.65 |
| Comfortable operating the pedometer | 6.21 | 1.14 |
| Pedometer motivating to increase daily step count | 5.67 | 1.43 |
| Pedometer accurately counted daily steps | 5.08 | 1.56 |
| Easy to read/understand pedometer to record daily steps | 6.21 | .72 |
| Signing up to/registering for walks (on Doodle) | | |
| Easy to register for the walks online | 5.58 | 1.35 |
| Understood route coding system | 5.13 | 1.51 |
| Online registration helped me organize walk days/times | 5.71 | 1.20 |
| Reminder e-mails following registration for walks were helpful | 6.21 | .98 |

cifically, word-of-mouth was particularly effective in attracting the target population. However, our results also demonstrated that researcher presence at a workplace event which focused on staff well-being could be used as a more time-efficient and less labor-intensive strategy in a workplace setting.

The results revealed that 73% of participants remained in the trial. This level of retention is comparable to findings reported in a recent review of retention rates to physical activity interventions across various settings, including the workplace.[25] It is important to note that the overriding reason for drop-out was work commitments. While it is encouraging that the participants who dropped out did not cite motivational reasons, it is clear that organizational buy-in is important to the success of the program and it appeared in cases that work pressures were prioritized over employee health as some were expected to work during their lunch breaks. Clearly, it is imperative that intervention planners work closely not only with higher level management but also middle-and lower-level management.

Results pertaining to differences in step counts between the 2 phases of the program (group-led and independent) suggest that the intervention needs rethinking to avoid a drop off in activity levels once leadership is no longer available. This is critical for sustainability of the intervention over time. It is unknown for how long led walks are needed to cement physical activity change and future research should be conducted to examine the optimal length of the supervised stage and how to ease transitions between the different phases of the intervention. Future research could also examine the mediators of the effects of the group-led format. Recent research using Self-Determination Theory as a conceptual framework has shown that while autonomy need satisfaction is critical to sustained behavioral engagement, relatedness need satisfaction is a stronger predictor of behavior during adoption than adherence.[28] Feelings of relatedness were most likely to be supported during the group-led phase, compared with the independent phase, and it is possible that relatedness need satisfaction was an important determinant of behavior at 10 weeks.

Explaining our results with regard to differences between the group-led and independent phases is compounded by the fact that our data does not show how many of the walks carried out in the independent phase were done in groups or individually. However, the finding that attendance to group walks was greater in the first, compared with the second, part of the group-based phase of the intervention could suggest that a different group-based format needs introducing around week 5 to enhance walk attendance. The qualitative data also indicated that the group-based format was instrumental to its success and it is possible that the duration of this phase should be reconsidered.

The findings showed that participants accumulated more steps during weekdays compared with the weekends (except for the Spring group in the independent phase). Although the physical activity status of the participants was unclear, recent research has shown that adults in the UK tend to accumulate fewer steps on Sundays compared with weekdays during the winter, but not during the

summer, months.[20] Our findings are consistent with this result. The Spring group participants (who did their independent phase during the summer months), had similar step counts between weekdays and weekends. It is important in future research to examine which intervention strategies might work best to increase walking specifically during the weekends across the Winter and Spring months.

An important contribution of this study is the finding that this workplace intervention can be feasibly implemented across different seasonal periods. This is shown by the lack of differences between the Winter and Spring group in levels of attendance and step counts over time. Indeed, a recent within-subject design study conducted in the UK with both overweight and nonoverweight adults has shown that nonoverweight individuals accumulate fewer steps during the winter, compared with the summer, months.[20] To our knowledge, our study represents a first attempt to demonstrate the feasibility of a workplace walking intervention implemented in different seasons. The qualitative results indicate that although Winter weather could pose a barrier for some participants, the fact that the walks took place during the lunchtime period allowed participants in the Winter group to benefit from the daylight, thus possibly facilitating adherence and preventing further drop-out in this group.

Participant focus groups highlighted the importance of pedometers as a motivational tool throughout the program and useful for feedback as they strived to reach their daily step count goals. Participants also noted feeling more productive at work on the days they had taken lunchtime walks. This could have potential carry-over effects in terms of workplace productivity and work engagement. In addition participants revealed they would like to see in future programming a feeder system of participants who have previously completed the organized walks act as walk leaders. This could facilitate sustainability of the intervention in the longer-term.

Limitations of the program include a small number of male participants and a relatively small sample size from 1 workplace location. Future qualitative work could examine how best to recruit males for walking interventions, and look to examine feasibility of the program in other work sectors such as manufacturing or hospital based settings. Finally, a definitive randomized controlled trial should be conducted to test the true effect of this intervention.

## Conclusion

Findings from the 16-week lunchtime walking intervention demonstrate the feasibility of recruiting and retaining physically inactive University employees to a work based program. It appeared to work equally well and was well-accepted by members of groups operating in 2 contrasting seasons. More steps were accumulated in the group-led versus the independent phase suggesting that more attention might be paid to strategies to enhance sustained habits once leadership is not available. The program requires more rigorous assessment through a randomized controlled trial design. This initial feasibility phase suggests that it has potential to be an effective workplace-based public health intervention.

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