Improved Health Behaviors Persist Over Two Years for Employees in a Worksite Wellness Program

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Abstract

This study evaluates whether improvements in health behaviors related to a worksite wellness program persist through 2 years. The program was designed to build behavioral capability and self-efficacy by yielding immediately applicable skills and tools and segmenting the behavior change process into weekly, manageable doses. Analyses are based on 267 individuals employed from 2009 through 2011. Significant improvements were observed in the frequency and volume of exercise, and the consumption of vegetables and fruits over 12 and 24 months. Requests for health coaching significantly increased over the study period. Thus, the type of wellness program evaluated in this study produced sustainable health behaviors through 24 months, which likely will translate into future positive health outcomes and improved employee productivity. (Population Health Management 2012;15:261–266)

Introduction

Modifiable risk factors explain a large portion of the mortality burden in the United States.\textsuperscript{3} Healthy behavior changes, such as increasing physical activity and consumption of fruits, vegetables, and whole grains, have been linked to beneficial health outcomes, including reduced risk of chronic disease and cancer.\textsuperscript{4,5} However, Merrill et al have shown that for many individuals adopting new healthy behaviors, there is an eventual reduction in adherence and a return to their original less healthy patterns.\textsuperscript{7} Thus, the need remains for interventions to help individuals adopt—and especially persist in—healthy behavioral change.

O’Donnell suggested that health promotion “…can be facilitated through a combination of learning experiences that enhance awareness, increase motivation, and build skills…through the creation of opportunities that open access to environments that make positive health practices the easiest choice.”\textsuperscript{8–11} The worksite may be an appropriate venue to facilitate health promotion as many worksite interventions have been shown to be effective at positively influencing health behaviors and outcomes.\textsuperscript{8–11}

According to Goetzal and Ozminowski, the worksite is a practical setting to deliver health promotion programs.\textsuperscript{12} Their rationale includes the following: Worksites have a concentrated group of people with a common culture; there is the potential for efficient communication; individual and company goals often are aligned; there is often social and organizational support; and program measurement is feasible.\textsuperscript{12} In addition, Healthy People 2010 and Healthy People 2020 have noted the potential of employee-sponsored health programs by the inclusion of specific objectives to increase their prevalence and to increase employee participation in these programs.

Though many worksites offer some type of health program, few businesses, particularly small businesses, provide comprehensive health promotion programs.\textsuperscript{13} In addition, it has been suggested previously that there is a need for long-term studies that identify the effectiveness of worksite interventions.\textsuperscript{14,15} Length of follow-up is particularly vital as maintenance of health-related behavior change has proven difficult for many individuals over time. Therefore, the purpose of this study was to determine the extent to which a multifaceted worksite health promotion program was associated with sustained health behavior change over 24 months.

Methods

Study population

The methods for this study have been published previously.\textsuperscript{7} This study received Institutional Review Board approval in September 2011. The study population consisted of a small integrated engineering, science, and operations company, located in the United States. There were 267 individuals continuously employed in the company during 2009 through 2011. These employees had the option of
completing a Personal Health Assessment (PHA) each year and also were encouraged to participate in a wellness program consisting of selected behavior change activities. All participants reported in this study had the opportunity to participate in the wellness program continuously over the 2-year study. The wellness program was provided by a separate company (WellSteps, LLC, Mapleton, Utah). Program involvement was defined as participation in the baseline PHA and any of the 6 behavior change campaigns each year. Employees were eligible to participate in any or all 6 behavior change campaigns over a 12-month period, with a total of 30 weekly tasks. To complete a task, the employee had to finish the behavior change requirements during the specified week.

**Personal Health Assessment**

To be eligible to participate in the wellness program, the employee first needed to complete the PHA. Employees were first offered the PHA and wellness program in 2009. The PHA consisted of 26 questions, modeled after the 2006 Behavioral Risk Factor Surveillance System Questionnaire. The PHA questions and feedback were written at the 6th–7th grade reading level. The average time to completion was 8 minutes. PHA data provided information on demographics, physical activity, dietary behaviors, health status, life and job satisfaction, number of days of sufficient sleep, and seat belt use. The PHA was completed online, and participants received electronic feedback explaining their health risks and recommendations for making small, manageable changes in behaviors to reduce elevated health risks. The feedback report consisted of visual risk stratification for each risk factor (green, yellow, or red).

**The WellSteps Wellness Program**

The WellSteps employee health improvement program follows a behavior change framework proposed by O’Donnell. This framework suggests that long-term behavior change is more likely when programs include each of these 4 elements: awareness and education; motivation; skills and strategies; and supportive policies, environments, and peers. The WellSteps program was customized to the characteristics of the worksite. Initial site assessment included evaluation of the results of the PHA and an in-depth evaluation of the worksite culture, including policies and environments that support healthy behaviors. Health policy and environment data were obtained with a health culture audit called “The Checklist to Change,” which is a healthy culture checklist based on recommendations in the Centers for Disease Control and Prevention Community Guide. There was no change in the health or benefits plan during the 24 months of the study. Information from the PHA and Checklist to Change was evaluated by a WellSteps program manager. Health risk prevalence and specific company health needs were identified and discussed with the on-site wellness coordinator, who was a representative from the company. A 3-year employee wellness plan was created from this information.

Program implementation took a 2-pronged approach. First, the WellSteps manager worked with the on-site coordinators to identify policy and environmental changes that could realistically be implemented and would help employees maintain healthy behaviors. These efforts to create worksite policies and environments included commitment and assistance from worksite leaders. Second, while efforts were being made to create a healthy worksite culture, employees and their significant others began participating in a series of behavior change campaigns. Campaigns were 3- to 8-week behavior change interventions. Six different campaigns were conducted per year. By completing a weekly task during a campaign and reporting on that task, employees were counted as participating for that week. By participating in all the interventions and completing each weekly task, the employee was credited as participating 30 times.

A more complete description of the 6 different campaigns has been published previously by Merrill et al.; nevertheless, a brief description of each intervention follows. (1) The Culprit and the Cure and the Fast Food Guide were used, along with various weekly related tasks, to encourage healthy lifestyle behaviors and to assist in making healthy food choices. (2) In a campaign entitled “Move It,” participants were encouraged to achieve 30 minutes of physical activity at least 3 days per week. (3) The “Good Night” campaign encouraged improving sleep habits. (4) “Maintain Don’t Gain” encouraged the application of strategies to manage body weight. (5) “Food Makeover” focused on changing the type of food that was available in the home from unhealthy to healthier options. (6) “Stress Free” assisted participants to manage their personal stress.

Several modes of communication were used to solicit employee participation (i.e., e-mail, posters at the worksite, postcards delivered to the homes of the employees). Following the Transtheoretical Model (precontemplation, contemplation, preparation, action, maintenance), messages were sent to individual employees who reported readiness to change. Each of the campaigns was based on Social Cognitive theory and on evidence from the Coronary Health Improvement Project.

Depending on the topic of the campaign, participants received pedometers, books, or other printed materials. In addition, to incentivize the completion of a campaign, the participant had a chance to win a modest reward and receive company recognition. The winner was chosen through a random selection process. Each campaign was designed to build behavioral capability by providing immediately applicable skills and tools. Self-efficacy was improved by segmenting the behavior change process into weekly, manageable doses. All program aspects were available in printed and Web-based formats. Participants were allowed to decide which method works best for them (printed or Web-based materials). All materials are written at the 6th to 10th grade reading level and some programs were available in Spanish. Additional details are available elsewhere.

**Statistical techniques**

Frequencies, means, and standard deviations were used to describe the data. A repeated measures design using a mixed (random effects) model was used to assess change in health behaviors through 12 and 24 months of follow-up. Logistic regression was used to assess percentage changes for each dichotomous outcome. Significant change over time was tested using the F statistic. Two-sided tests of significance
### Table 1. Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Women (n=96)</th>
<th>Men (n=133)</th>
<th>Combined (n=229)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>39.8±10.4</td>
<td>43.7±10.9</td>
<td>42.1±10.8</td>
</tr>
<tr>
<td>Weight (lbs)</td>
<td>151.5±28.5</td>
<td>197.5±36.7</td>
<td>178.2±40.5</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25.1±4.4</td>
<td>27.6±4.2</td>
<td>26.5±4.4</td>
</tr>
<tr>
<td>Elevated blood pressure*</td>
<td>15%</td>
<td>27%</td>
<td>22%</td>
</tr>
<tr>
<td>Elevated total cholesterol**</td>
<td>17%</td>
<td>30%</td>
<td>24%</td>
</tr>
<tr>
<td>Elevated blood glucose**</td>
<td>3%</td>
<td>8%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Based upon 229 baseline PHA completers.

*Indicates borderline and high levels; **indicates prediabetes or diabetes.

Men were significantly higher than women with regard to age, weight, and BMI (P<0.05). There was no difference between men and women for borderline/high blood pressure (P=0.09), borderline/high cholesterol (P=0.09), or glucose at prediabetic or diabetic levels (P=0.19).

BMI, body mass index; PHA, personal health assessment.

were based on the 0.05 level against a null hypothesis of no association. Analyses were performed using SAS, version 9.2 (SAS Institute Inc., Cary, NC).

### Results

This analysis was based upon 267 eligible employees. A total of 229 employees completed a PHA at baseline, 170 employees completed a PHA at 12 months, and 174 employees completed a PHA at 24 months. Analysis of health behaviors between PHA completers (PHA completed at all 3 time points; n=116) and non-completers (n=113) at baseline revealed that only smoking was different; non-completers were more likely to be smokers (F=2.46; P=0.015). For health outcomes, only baseline glucose was higher in non-PHA completers compared to PHA completers (F=2.0; P=0.047). More men (53%) completed the PHA at all 3 time points. The age of the PHA completers was dispersed as follows: 24-30 years (21%), 31-40 years (28%), 41-50 years (24%), 51-60 years (22%), and 61-65 years (9%).

Characteristics for all employees completing the PHA at baseline are included in Table 1. Of those, 116 employees completed the PHA at all 3 time points. Approximately 80% of PHA completers also participated in at least 1 health campaign during year 1 and year 2. Employees tended to be overweight, middle-aged, and there were more men than women. For those employees who completed the PHA at each period, the largest improvements tended to occur during the first year. Number of days per week of exercise, number of minutes of exercise per week, fruit intake each day, and vegetable intake each day were maintained throughout the 24-month study. Whole grain intake increased significantly at 12 months but decreased slightly at 24 months, though it remained above baseline. The number of cigarettes/cigars smoked per day began low and remained low with no difference over the duration of the study. In addition, the number who requested health coaching significantly increased at the end of 24 months compared to 12 months and baseline (Table 2).

Twelve- and 24-month changes from baseline in selected health behaviors are shown in Table 3. For exercise, there was a 61% increase in those exercising at least 4 days/week at 12 months, which was maintained at 24 months (F=8.78). Likewise, there was a 45% increase in those achieving at least 90 min of exercise/week at 12 months, which also persisted at 24 months (F=14.69). More dramatically, the number of employees eating at least 5 fruits or vegetables each day nearly doubled at 12 months and more than doubled (122% increase) at 24 months (F=19.16).

Examination of selected biometric outcomes showed that there were more men than women with borderline high/ high blood pressure, cholesterol, or glucose. Further, the combined percentage of those reporting borderline high/high blood pressure decreased significantly after 12 months (F=7.14). This percentage decrease, compared to baseline, remained at 24 months. There was little change in those reporting borderline high or high cholesterol throughout the entire 24 months (F=0.04). Further, the number of participants reporting borderline high or high glucose was low (4%) and this was unchanged at 24 months (F=0.51) (Table 4).

### Discussion

This study reports important health behavior changes associated with an ongoing multifaceted worksite health promotion program over a 24-month period. Significant

### Table 2. Health Behavior Change through 12 and 24 Months

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>12 Months</th>
<th>24 Months</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise (days/wk)</td>
<td>2.5±1.5</td>
<td>3.2±1.3</td>
<td>3.2±1.3</td>
<td>20.99</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Exercise (min/wk)</td>
<td>120.5±128.5</td>
<td>198.4±195.4</td>
<td>192.8±154.4</td>
<td>12.73</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cigarettes/cigars (per/d)</td>
<td>0.04±0.46</td>
<td>0.04±0.46</td>
<td>0.1±0.7</td>
<td>1.70</td>
<td>0.185</td>
</tr>
<tr>
<td>Whole grain (ser/d)</td>
<td>4.0±1.4</td>
<td>4.3±1.2</td>
<td>4.1±1.3</td>
<td>3.28</td>
<td>0.039</td>
</tr>
<tr>
<td>Fruit intake (ser/d)</td>
<td>1.6±1.1</td>
<td>2.0±1.1</td>
<td>2.1±1.2</td>
<td>14.39</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Vegetable (ser/d)</td>
<td>2.0±1.0</td>
<td>2.4±1.2</td>
<td>2.5±1.2</td>
<td>15.78</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Seatbelt use (%)</td>
<td>97±12</td>
<td>98±8</td>
<td>96±16</td>
<td>1.82</td>
<td>0.165</td>
</tr>
<tr>
<td>Sleep (d/wk)</td>
<td>3.8±1.8</td>
<td>4.1±1.9</td>
<td>4.0±2.0</td>
<td>1.45</td>
<td>0.238</td>
</tr>
<tr>
<td>Requested health coaching</td>
<td>1.4±0.5</td>
<td>1.5±0.5</td>
<td>1.6±0.5</td>
<td>4.96</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Based upon 116 participants who completed the personal health assessment at baseline, 12, and 24 months.

Age and sex were covariates. Different letter superscripts indicate statistical differences between periods.

*Different than baseline but not 12 months.
improvements in exercise and dietary behaviors resulted from the worksite health promotion program. These behaviors continued through 24 months without noticeable health behavior decay. Improvements in physical activity and fruit/vegetable consumption were most striking throughout the entire study and will be discussed in the following paragraphs.

Physical activity is an important component of overall health and is associated with reduced risk of chronic disease. The intervention reported in the present study produced an increase in the number of days and minutes exercised at 12 months, which persisted through 24 months. Further, many study participants reported that they exceeded current recommendations for physical activity (150 min per week; moderate intensity) at 12 and 24 months. Physical activity also is thought to contribute to body weight maintenance. Several organizations have recommended that the first goal of weight management is to prevent further weight gain. The body mass index (BMI) among the study participants did not change statistically at 12 or 24 months (-0.16 kg/m²). Absence of an increase in BMI may be viewed as a successful outcome given that Americans gain an average of 1-2 lbs per year through middle age. It is likely that physical activity contributed to the very slight decrease in BMI.

Fruit and vegetable servings per day increased significantly through 12 months (more than doubled to nearly 50% [consuming 5 or more per day]), which continued through 24 months. This represents a much higher level than previously reported for Americans generally. For example, according to 2009 data from the Behavioral Risk Factor Surveillance System, an estimated 32.5% of Americans consumed 2 or more fruits/day and 26.3% consumed 3 or more vegetables/day. Fruit and vegetable consumption has been shown to decrease risk of myocardial infarction and coronary heart disease by as much as 4% per serving increase and is associated with reduced risk for several types of cancer. In addition, fruit and vegetable consumption is an important part of a prudent dietary pattern previously shown to reduce incidence of chronic disease. Therefore, the fruit and vegetable improvement shown in the present study is meaningful.

Several notable components of the worksite wellness program likely contributed to the sustained health behavior change. First, the combination of the PHA and behavior campaigns was administered repeatedly over the course of the study. Most of those completing the PHA at baseline also participated in at least 1 wellness campaign (~80%). Though we cannot separate the individual effect of the PHA alone (small n), the combination of a PHA combined with specific behavioral campaigns was effective. Second, there was an emphasis on changing company culture based upon results from the PHA and the Checklist to Change. Third, the intervention included small rewards or company recognition to reinforce participation and behavioral changes. Fourth, the intervention activities were multifaceted and comprehensive (ie, physical activity, dietary behaviors, health status, life and job satisfaction, sleep quality, seat belt use).

There are several additional strengths of this study, including the length of the intervention and its comprehensive nature. However, there also are several limitations, as previously noted. Among these is the lack of a comparison group. In addition, there may have been some bias as a result of employees self-selecting participation and because the PHA was a self-reported assessment.

Conclusions

Long-term behavior change can be elusive for many adults. Health promotion interventions that target employees in a worksite setting have shown promise to effect behavior change. The results of the present study support the notion that a multifaceted worksite intervention is associated with (1) improvements in important health behaviors, and (2) maintenance of important health behaviors over 24 months. As healthy behaviors often translate into positive

Table 3. Baseline Levels and Shifts in Health Behaviors at Defined Levels over 24 Months

<table>
<thead>
<tr>
<th></th>
<th>Baseline 12 months</th>
<th>24 months</th>
<th>(p^*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≥4 d/wk)</td>
<td>26%</td>
<td>42%</td>
<td>42%</td>
</tr>
<tr>
<td>Exercise minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≥90 min/wk)</td>
<td>51%</td>
<td>74%</td>
<td>68%</td>
</tr>
<tr>
<td>Fruits and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vegetables</td>
<td>22%</td>
<td>41%</td>
<td>49%</td>
</tr>
<tr>
<td>Sleep (≥4 d/wk)</td>
<td>36%</td>
<td>42%</td>
<td>43%</td>
</tr>
<tr>
<td>Whole grain</td>
<td>55%</td>
<td>68%</td>
<td>63%</td>
</tr>
<tr>
<td>Seatbelt use</td>
<td>97%</td>
<td>97%</td>
<td>95%</td>
</tr>
</tbody>
</table>

Based upon 116 participants who completed the personal health assessment at each period.
Age and sex were covariates.

*Based upon Wald chi-square test.

Table 4. Baseline Levels and Changes in Selected Health Outcomes over 12 and 24 Months

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>12 Months</th>
<th>24 Months</th>
<th>(p^*)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td>Combined</td>
<td>Men</td>
</tr>
<tr>
<td>Elevated blood pressure*</td>
<td>32%</td>
<td>15%</td>
<td>24%</td>
<td>21%</td>
</tr>
<tr>
<td>Elevated cholesterol*</td>
<td>32%</td>
<td>9%</td>
<td>22%</td>
<td>31%</td>
</tr>
<tr>
<td>Elevated glucose**</td>
<td>8%</td>
<td>0%</td>
<td>4%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Based on 116 participants who completed the personal health assessment at each period.
*Indicates borderline and high levels; **indicates prediabetes or diabetes.
Age and sex were covariates.

*Based on Wald chi-square test over time (men and women analyzed together).
health outcomes and improved employee productivity, the results of this study are encouraging for other companies that wish to implement a similar program.

Author Disclosure Statement

Dr. LeCheminant and Dr. Merrill received honoraria from WellSteps, LLC. WellSteps owns the wellness program used in this study.

References

